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The Impact of Information Technology Outsourcing on Firm Profitability Measures

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ABSTRACT

Some researchers have concluded that outsourcing of information technology (IT) provides benefits to firms including cost advantages, economies of scale and allowing more of a focus on core competencies. This paper attempts to determine if these benefits actually exist by comparing three financial measures, return on equity (ROE), return on assets (ROA) and profit margin, of firms that have varying levels of outsourcing.

To empirically test for the existence of a difference between firms that outsource differing amounts of IT spending, data from 104 companies was gathered. Analysis of variance was selected as the primary statistical tool to test the relationship between the level of outsourcing and the profitability measures.

The results of this study lead to the conclusion that there is not a significant difference between the amounts of IT outsourcing companies perform and any of the profitability measures used during the sample period. Further discussion continues related to the implications of the results.

INTRODUCTION

Outsourcing can be defined as “the significant contribution by external vendors in the physical and/or human resources associated with the entire or specific components of the IT infrastructure in the user organization (Loh & Venkatraman, 1992b). Information technology (IT) outsourcing began with application packages, contract programming and specific processing services in the 1970s and 1980s. It then expanded into the outsourcing of entire, enterprise-

wide systems integration, application development, and systems operation in the 1990s (Lee & Kim, 1999; Li, Yen, & Chou, 1997). It has been estimated that worldwide IT outsourcing would reach \$54.1 billion by 2000 (Caldwell & Kolbasuk, 1997).

Outsourcing has become more popular in recent years due to organizations desiring to maintain more diverse and high-quality information systems (Lee et al., 1999). It is this desire that leads companies to utilize outside sources to fulfill this important organizational function. Companies that have outsourced significant portions of their IT functions in recent years include Chase Manhattan Bank, Continental Airlines, General Dynamics, and Xerox (Lacity & Willcocks, 1998).

Although outsourcing is popular, the impact on financial variables such as profit margin, return on equity (ROE) and return on assets (ROA) is unclear. This paper will first focus on the advantages and disadvantages of outsourcing and then on an analysis of the financial impacts to firms of these decisions. The question will then be raised as to whether the decision to outsource is beneficial.

LITERATURE REVIEW

Outsourcing of IT functions offers benefits for the service receiver (Grover, Cheon, & Teng, 1996). One of the most common benefits described in the literature is the cost advantage that can be achieved by outsourcing some services (Alpar & Saharia, 1995; Harrar, 1993; Kettler & Willems, 1999; Loh & Venkatraman, 1992a; Loh et al., 1992b; Smith, Mitra, & Narasimhan, 1998). Some banks have been able to achieve 15-20 percent savings in operational costs from outsourcing (Ang & Straub, 1998). Another example of savings attributed to outsourcing took place when South Australia's government saved over \$100 million when it outsourced all information processing for seventy departments to EDS (Quinn, 1999). According to a 1994 study by the Outsourcing Institute (<http://www.outsourcing.com>), the average cost savings attributed to the outsourcing decision is 9 percent. Other sources (Huff, 1991; Saunders, Gebelt, & Hu, 1997) estimate savings closer to 15 percent. In contrast, some research indicates that outsourcing does not lead to any change in profitability (Smith et al., 1998).

Some savings can be attributed to economies of scale that are achieved by vendors when they are able to pool their knowledge, skills, and expertise across multiple customers (Li et al., 1997; Smith et al., 1998). These economies of scale, of course, cannot be achieved when these IT functions are performed by a single organization. In addition, economies of scope can be achieved due to the variety of projects worked on by vendors (Loh et al., 1992b).

In addition to financial savings, outsourcing solves a problem that exists in the workplace today caused by the shortage of skilled IT employees (Violino & Caldwell, 1998). When the supply of these workers is low relative to the demand, the wages afforded IT employees is extremely high. Smaller companies sometimes cannot afford these specialists that have a great IT knowledge depth. And even if they can employ these workers temporarily, employers cannot permanently employ the best specialists as they often get better job offers (Greer, Youngblood,

& Gray, 1999). These companies must then utilize an outsourcing vendor in order to fulfill their IT needs.

While some companies outsource to save money, gain economies, or solve staffing problems, still others outsource to focus more on their core competencies (Benko, 1993; Harrar, 1993; Lacity, Hirschheim, & Willcocks, 1994; Merrill, 1999; Quinn, 1999; Scannell, 1999) or to attempt to gain strategic organizational advantages (Li et al., 1997). By outsourcing non-core IT needs, managers can focus more of their attention on the core business competencies of the firm. Although allowing the focus on core competencies is often cited as a driving force behind IT outsourcing, some research does not support the idea that this is actually the case (Smith et al., 1998).

Another advantage of outsourcing arises when companies sell their existing IT assets to vendors. This provides short-term cash flows that can be used by the business. This cash flow opportunity is particularly attractive to those companies having excessive debt, short-term liabilities or low cash reserves (Smith et al., 1998). As an example of the large amount of cash that can be generated, General Dynamics received \$200 million in the early 1990s from its sale of facilities and equipment to Computer Sciences Corporation (Harrar, 1993).

In some cases, firms outsource not because of financial or economic reasons but because of the popularity of the idea (King, 1994; Smith et al., 1998). This desire to follow a trend has received considerable attention in the popular press lately. Imitative behavior is still another reason some firms enter into outsourcing agreements (Lacity et al., 1994; McFarlan & Nolan, 1995).

Although there are many beneficial aspects to the outsourcing decision, there are also drawbacks. Companies that outsource should be concerned about the skills that may be lost when they outsource (King, 1994). Once gone, these skills are very expensive to get back due to hiring, retraining and the fixed costs associated with equipment purchase. Other disadvantages of outsourcing IT operations include the over-dependency on the vendor, the loss of control and timing (Ketler et al., 1999), and the potential that exists for the vendor to sell or leak information to competitors (Quinn, 1999).

Sometimes, there are costs that go unforeseen when the outsourcing agreement is initially agreed upon (Ketler et al., 1999). These unforeseen costs surprised 40 percent of companies responding to a survey (Schwartz, 1992). Causes of these unexpected costs include low vendor estimates and/or misunderstandings related to the contract. These unexpected costs lead some companies to outsource IT functions when it may actually result in higher costs.

Companies often outsource IT functions to decrease administrative and coordination costs or to avoid the management problems associated with IT. These problems are often not dismissed rather; they are simply transferred to the managing of outsourcing (King, 1994). Contract management caused by unforeseen changes can be very time consuming and costly, thus possibly providing a net difference of zero in relation to administrative costs.

SAMPLE SELECTION AND RESEARCH HYPOTHESES

The companies included in this study were selected from the September 22, 1997, issue of *InformationWeek*, which listed the 500 companies that best demonstrate technological, procedural, and organizational innovation. Only companies with at least one billion dollars in annual revenue were included in the study. Including only those companies that had all pertinent data available reduced the data set to a final sample size of 104 companies.

When evaluating the outsourcing decision many performance measures can be used. Profitability is commonly used as a measure of success because it is undeniably one of the most important criteria used when evaluating firm performance. Three measures of profitability were utilized in this study. These measures were selected because they had been employed in past research. ROA (Cron & Sobol, 1983; Tam, 1998) was the first measure selected. It measures how efficiently a company utilizes its existing capital compared to income. The second measure, ROE (Cron et al., 1983; Tam, 1998), furnishes a look at the amount of return a firm receives on financial capital. Finally, profit margin (Cron et al., 1983) was used. It is calculated as net income over sales, which measures the overall profitability of a firm.

Cron and Sobol (1983) studied the influence of computer usage on operating results and profits in medical supply companies. In their paper, they concluded that the number of software capabilities regularly used by a firm had a significant relationship with ROA, but not ROE. Similarly, they concluded that the type of software capabilities regularly used by a firm had a significant relationship with ROA, but not ROE. They also tested for a relationship between type of computer ownership (own/lease versus time-share) and ROA and ROE, but did not find a relationship.

Tam's study (1998) looked at the correlation between IT investment and the business performance ratios ROA, ROE and profit margin. The sample consisted of companies from the following four countries: Hong Kong, Malaysia, Singapore, and Taiwan. Tam's results were mixed, showing positive, negative and no relationships between IT capital spending and the three performance measures. Table 1 summarizes the results.

Table 1. Sign and Significance of Computer Capital Coefficient in One-Year Lag Performance Regressions

Country	ROE	ROA	Profit Margin
Hong Kong	+	ns	-
Singapore	Ns	+	ns
Malaysia	Ns	ns	ns
Taiwan	-	-	ns

Based on the review of literature performed, the following hypothesis was developed. It was then tested for firms that outsourced at least a portion of their IT needs:

Hypothesis: There is no difference in the profitability measures of companies with small percentages of outsourcing and those with large percentages of outsourcing.

DATA ANALYSIS AND FINDINGS

The 104 companies were categorized based on their percentage of outsourcing. No distinction was made in the data between companies which had outsourced for the first time in the previous year versus companies that had been outsourcing for more than one year.

The percent outsourcing figures were derived from the percentage of a company's IT budget that was spent on outsourced projects. They were reported in the September 22, 1997, issue of *InformationWeek* and based on their research. Four groups resulted. Group 1 consisted of companies that outsourced less than or equal to five percent of their IT budget, Group 2 companies outsourced greater than five and less than or equal to ten percent. Group 3 companies spent more than ten and less than or equal to 20 percent, while Group 4 companies outsourced greater than 20 percent of their IT budget. The percent outsourcing figures relate to outsourcing during the year 1997. Table 2 provides summary statistics for this variable.

Table 2. Frequency Output

Percent outsourcing	Frequency	Percent
>5%	32	30.8
5%-9.9%	22	21.2
10%-19.9%	28	26.9
>20%	22	21.2

Table 3 provides a look at some descriptive measures for the data. The data suggests that there is not a consistent relationship between the percent outsourcing and the profitability measures of the companies.

Table 3. Means of Financial Measures By Groups

	Variable	Group 1	Group2	Group 3	Group 4
1999	Profit Magin	.0584	.0822	.0754	.0706
	Return on assets	.0494	.0699	.0610	.0592
	Return on equity	.1220	.1830	.1820	.1710
1998	Profit margins	.0661	.0821	.0766	.0692
	Return on assets	.0543	.0720	.0628	.0573
	Return on equity	.1720	.1950	.1990	.1610
1997	Profit margins	.0674	.0717	.0696	.0585
	Return on assets	.0559	.0610	.0571	.0510
	Return on equity	.1000	.1770	.1840	.1490

This study focused on the variance of the three financial measures (ROA, ROE and profit margin) between the four groups of companies. Analysis of variance (ANOVA) was selected as the primary statistical tool for testing the relationship between the level of outsourcing and the profitability measures because it allows categorical and continuous variables to be analyzed concurrently. The Compact Disclosure database was used to obtain the financial measures.

Since outsourcing may cause lagged profitability changes, each of the profitability variables were analyzed for 1997, 1998 and 1999 in relation to the 1997 outsourcing data. Table 4 contains these ANOVA results.

Table 4. ANOVA Results

	Variable	F	p-value
1999	Profit margin	1.074	.364
	Return on assets	1.014	.390
	Return on equity	2.553	.060
1998	Profit margin	0.555	.646
	Return on assets	0.793	.500
	Return on equity	0.715	.545
1997	Profit margin	0.328	.805
	Return on assets	0.212	.888
	Return on equity	1.393	.249

The table shows that the means are not significantly different between the measures. This implies there are no significant differences in the financial measures of companies with a small percentage of the IT budget spent on outsourcing versus companies that have a larger percentage of their IT budget spent on outsourcing.

CONCLUSIONS AND IMPLICATIONS

Case studies, empirical evidence (Smith et al., 1998) and surveys of top managers (Ketler et al., 1999) suggest that IT outsourcing leads to reduced costs. This is one of the main reasons cited for leading firms to outsource. If IT outsourcing does indeed reduce costs, it would seem logical that the reduced costs would lead to changes in profitability measures of outsourcing firms.

The results of this study imply that there is not significant differences between the amounts of IT outsourcing companies perform and any of the profitability measures used (ROA, ROE, and profit margin) during the sample period.

If firms are outsourcing IT functions for cost savings as the literature suggests, why are the profitability measures not reflecting those savings? One possible answer is that firms may be reducing IT costs in-house, but the management of the outsourcing is consuming the savings. If this is the case, the net financial effect of IT outsourcing could be zero. In addition, IT departments may be outsourcing functions to vendors which provide less support to users. In these cases, users could spend money bringing IT expertise into particular departments, thus reducing the company-wide financial benefit of outsourcing.

If firms outsource their IT functions but do not reap profitability gains, the question must be asked, "Why should IT outsourcing be done?" Other benefits, such as focusing on core competencies, reducing or removing the difficulty of attracting and retaining IT personnel, etc., may exist that make the IT outsourcing decision still beneficial. But it should be remembered that disadvantages also exist, such as an over-dependency on the outsourcing agent and permanent loss of IT personnel and skills in the firm.

A limitation of the current study is that all variables are not included which could impact the profitability measures. Similar to the Tam (1998) study, the relationship between degree of outsourcing and profitability measures could be confounded by institutional factors. The relationship could be affected by management orientation and techniques and even financing decisions (Tam, 1998). Lee and Blevins (1990), found that performance depends on factors such as firm size, plant and equipment, and level of diversification, as well as "deeper cultural and societal factors." These, and other factors, could have an affect on the relationship between outsourcing and profitability. Future research to determine how additional variables affect the relationship is needed.

A possible second limitation is that the profitability measures used in this research could be affected by other economic factors. The authors acknowledge this, but all firms should be af-

ected in a similar manner. Consistent with previous studies the authors have elected to control for this impact by using a stable period of economic activity such as the late 1990s.

Further research is necessary to determine if profitability gains require an even longer amount of time to appear. The one and two year lags used in this study may not be long enough to show the benefits of the outsourcing decision.

In addition, the amount of IT outsourcing that firms continue to perform may have an impact on the profitability measures. This study strictly focused on the amount of IT outsourcing companies performed during one year. Evaluating the amount of outsourcing those firms continue to perform may provide a different conclusion due to learning curves and efficiencies that may be gained over time.

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