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What habbo goers do in practice? decomposing attitudinal beliefs

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IMPACTS OF INFORMATION TECHNOLOGY (IT) OUTSOURCING ON ORGANIZATIONAL PERFORMANCE: A FIRM-LEVEL EMPIRICAL ANALYSIS

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Abstract

We investigate the impact of Information Technology (IT) outsourcing on firm performance from several dimensions, including changes in labor productivity, improvements in financial and operational performance variables, and stock market valuation of IT outsourcing initiatives as measured by Tobin's q . While our main objective is to better understand the economics of IT outsourcing, we also aim to contribute to the literature on the business value of IT in general. Our research contributes to the relevant literature from the following perspectives: (i) the change in the performance levels of firms due to IT outsourcing is measured against that of firms not outsourcing at all, (ii) panel data regression model is utilized in order to capture both cross-sectional and time-series differences among firms, (iii) the diversity of IT outsourcing initiatives is explicitly considered in the model, and (iv) a comprehensive data set covering the period between 1984 and 2007 is used..

Keywords: IT outsourcing, business value of IT, performance, panel data regression.

1 INTRODUCTION

Proliferation of the Internet and advancements in the Information Technology (IT) brought new opportunities to companies to conduct their businesses more efficiently than the past. The use of the Internet and IT not only changed the way firms do business, but also improved their existing processes. Today, firms can do business either by using their own resources and expertise, or by outsourcing some of the internal functions to outside contracting firms that specialize in certain functions.

Outsourcing, in its most succinct form, can be defined as the delegation to another party of the authority for the provision of services under a business contract that incorporates service-level agreements related to cost, quality, and the timeliness of deliverables. Given a diverse nature of business processes a firm has to manage today, it is nearly impossible for a firm to manage all of its processes by solely depending on its own expertise. Even if it is feasible, the firm may lose its focus and efficiency. Outsourcing some or all of non-core business processes can enable a firm to focus on core competencies, rather than services that fall outside of expertise. It will not only improve function effectiveness and flexibility by accessing a support network with highly qualified and specialized workforce, but also help firms control their costs and business risk by transforming high fixed costs to predictable expenditures.

Firms have been outsourcing various functions for years, ranging from assembly lines to Research & Development (R&D), from office documenting services to litigation. Although the very definition of outsourcing has not changed, its nature has evolved over time, expanding both the range and depth of services being outsourced. Firms today prefer outsourcing their business processes to firms that are highly specialized in using IT for business purposes. IT outsourcing, in this sense, is defined as “involving a significant use of resources (either technological or human resources) external to the organizational hierarchy in the management of IT infrastructure” (Loh & Venkatraman 1992a).

Despite its potential benefits, IT outsourcing may not be a straightforward decision for a firm because of potential risks involved, such as loss of control on outsourced activities, sharing critical company data with third-parties that may be used without consent of the firm, dependence on a firm whose internal operations may not be transparent generally due to autonomous nature of outsourcers, lack of knowledge on outsourcing process if the firm has not outsourced before, and existing firm culture that may resist to change.

Given the scale and popularity of IT outsourcing among firms today, the major organizational changes they entail, and the risk of failure, it is reasonable to expect that IT outsourcing has a significant and measurable effect on firm performance. Quantifying the impact of IT outsourcing on firm performance will not only help corporate managers make effective decisions on IT outsourcing, but also shed light on the prevailing debate over the outsourcing of U.S jobs to other countries (White House Joint Economic Committee Study 2001).

In this research, we investigate the impact of IT outsourcing on key firm performance variables by using a comprehensive data set compiled from primary and secondary sources. While our main objective is to better understand the economics of IT outsourcing, we also aim to contribute to the literature on the business value of IT in general. Our research contributes to the relevant literature from the following perspectives: (i) the change in the performance levels of firms due to IT outsourcing is measured against that of firms not outsourcing at all, (ii) panel data regression model is utilized in order to capture cross-sectional and time-series differences among firms, (iii) the diversity of IT outsourcing initiatives is explicitly considered in the model, and (iv) a newer data set covering the period between 1984 and 2007 is used.

2 LITERATURE REVIEW

Our research is strongly related to two streams of previous literature: the work on the business value of IT, and the more specialized and limited literature on IT outsourcing. In this section, we briefly survey previous studies in each of these areas that are most relevant to our research.

2.1 Business value of information technology

There is an extensive body of literature examining the business value of IT investments at the firm level. The roots of the debate can be traced back to 1990s when available data from 1980s and 1990s failed to show evidence of improved firm productivity due to investments in IT in the manufacturing sector (Morrison & Berndt 1990). This result, later called the “Productivity Paradox of IT,” was found to be even more pronounced in the service sector that had used over 80 percent of IT products during 1980s (Roach 1991). Researchers attempted to resolve the paradox by pointing out that the inability to show significant returns may be because of (i) measurement errors of outputs and inputs due to rapid price and quality changes in IT equipment, (ii) the time necessary for learning and adjustment, and (iii) mismanagement of IT resources by firms due to insufficient expertise to take advantage of the potential of using IT in traditional business environments (Brynjolfsson 1993). Other researchers rejected this paradox by providing empirical evidence to show a positive relationship between IT investments and firm performance (Brynjolfsson & Hitt 1995, Brynjolfsson & Hitt 1996, Lichtenberg 1995, Dewan & Min 1997, Bharadwaj et al. 1999, Kudyba & Diwan 2002, Anderson et al. 2003).

Not all studies, however, were able to show a clear payoff from IT investments. For example, Barua et al. (1991, 1995) both find that even though IT spending improves intermediate variables of organizational performance, such as capacity utilization, inventory turnover, or relative price, it does not necessarily lead to improvements in higher-level performance variables, such as Return on Assets (ROA) or market share.

Researchers also proposed innovative methods for measuring the business value of IT investments. For example, Brynjolfsson et al. (1994) show that effects of IT on firm productivity variables are substantially larger when measured over long time periods, since long-term returns represent the combined effects of related investments in organizational change. Devaraj and Kohli (2003) emphasize the importance of actual usage in driving the impact of IT on firm performance. In order to correctly measure the business value of IT, Kohli and Devaraj (2003) recommend that future studies explicitly report which complementary changes in business practices, such as Business Process Reengineering (BPR) and Enterprise Resource Planning (ERP), accompanied the IT investments. Barua and Mukhopadhyay (2000) emphasize that such analyses will help isolate and identify the effectiveness of complementary changes that lead to IT payoffs.

2.2 Information technology outsourcing

The main motivation for IT outsourcing is found to be cost reduction (Altinkemer et al. 1994, Gilley & Rasheed 2000). This is because paying for outsourcing generally costs less than maintaining equivalent services in-house. According to Malhotra (1995), factors that affect IT outsourcing decisions are reduction in operating costs, cost predictability due to fixed contract, sharing risk on technology investments, access to specialized expertise, political reasons that hinder internal IS efficiencies, and perception of efficiency of internal IS function. Clark et al. (1995) identify the changes in information technology, business trends, and technology management as the major factors that favour outsourcing. Outsourcing decisions may also be due to internal influence or imitative behaviour (Loh & Venkatraman 1992b).

The degree of IT outsourcing is found to be positively correlated to business and IT cost structure, and negatively related to the performance of the existing IT infrastructure (Loh & Venkatraman 1992a).

On the other hand, Wang et al. (2008) find that the level of business value created by IT outsourcing is contingent on firms' core IT capability. That is, firms with superior core IT capability have an advantage in leveraging their outsourcing initiatives to enhance firm value. Jiang et al. (2006) find empirical evidence for improved cost efficiency as a result of IT outsourcing, but no change in the productivity and profitability of the outsourcing firms.

Researchers also investigated the effects of IT outsourcing versus insourcing on firm productivity. For example, Lacity and Hirschheim (1995) argue that most cost reductions achievable through outsourcing can equally well be achieved by the in-house IT function if it is given freedom to reorganize. They present eleven generic cost reduction strategies that internal IT departments can implement to reduce costs.

3 HYPOTHESES

Many potential benefits of outsourcing have been identified in the literature. Outsourcing firms often achieve immediate cost advantages (Jiang et al. 2006, Lei & Hitt 1995). Thus, outsourcing may be an attractive method of improving a firm's financial performance, especially in the short run. Outsourcing firms may also achieve long run advantages compared to firms relying on internal production. In-house production increases organizational commitment to a specific type of technology and may constrain flexibility in the long run (Harrigan 1985). On the other hand, outsourcing firms can switch suppliers as new and more efficient technologies become available. In addition, outsourcing allows for quick response to changes in the environment (Dess et al. 1995). As a result, we expect firms engaging in IT outsourcing to experience an improvement in their performance variables during the period that starts when the initial outsourcing contract was signed. Thus, our first hypothesis is stated as follows:

Hypothesis 1. Firm performance improves as a result of IT outsourcing.

IT outsourcing initiatives vary considerably across firms; while some firms focus only on a single process, others may find it more profitable to outsource several business functions over the years. Diversification of outsourcing activities in this sense provides a measure of outsourcing intensity, and can affect the level of impact on firm performance (Gilley and Rasheed 2000). Besides, utilizing a diversity variable in our model provides the necessary linkage between IT outsourcing, which is implemented at the business unit level, with our performance variables, which are measured at the organizational level. Our second hypothesis is thus:

Hypothesis 2. The effect of IT outsourcing on firm performance increases with the diversity of outsourcing.

4 DESCRIPTION OF DATA RESOURCES

We used two leading online news sources, ABI/INFORM and Lexis/Nexis, to search and compile all press releases and news about firms announcing their IT outsourcing projects. We recorded the name of the outsourcing firm, the year of the initial outsourcing contract, and the type of the outsourcing projects conducted by each firm. We should note that our observations are unavoidably limited to those IT outsourcing projects that have been publicly announced. We may therefore have missed some of the projects that have not been announced, and consequently miscoded some companies as non-implementers when, in fact, they have undertaken an outsourcing project.

We observed that most of the projects announced were undertaken by large U.S. firms. Arguably, some of these firms may realize a higher level of performance benefits from IT outsourcing than others can do, which may affect the decision to undertake such a project. Therefore, in order to better understand the gains from IT outsourcing, we included in our data all of the firms in the Fortune 1000 list, regardless of whether they adopted IT outsourcing or not. Since firms frequently enter and exit the Fortune 1000 list every year, we took 1998 as the baseline year and included every firm that was listed

in that year in our analysis. We used the Standard and Poor's COMPUSTAT database to collect most of our data, which covers the period between 1984 and 2007. We also utilized the Information Week magazine's Top 500 lists that publish total annual IT budgets of large companies.

5 ECONOMETRIC MODEL

Since our data has both cross-sectional and time-series components, we utilize a panel data regression analysis in order to test our hypotheses. We use the STATA statistical software package to run our regressions. By indexing firms by i and years by t , we can express our panel data regression model as follows:

$$y_{it} = \mu_i + \sum_{k=1}^m \beta_k x_{itk} + \varepsilon_{it} \quad i=1, \dots, N \text{ and } t=1984, \dots, 2007.$$

where y_{it} is the dependent variable, μ_i is a separate constant term for each firm, x_{itk} are independent variables, m is the number of independent variables, β_k are regression coefficients, N is the number of firms, and ε_{it} is a classical disturbance term with $E[\varepsilon_{it}] = 0$ and $Var[\varepsilon_{it}] = \sigma_\varepsilon^2$. The general form of our econometric model is as follows:

$$\begin{aligned} \log(\text{performance measure numerator})_{it} = & \text{intercept}_i + \log(\text{performance measure denominator})_{it} \\ & + \text{implementation dummies}_{it} + \text{diversification dummies}_i \\ & + \text{firm controls}_{it} + \text{industry controls}_{it} + \text{year dummies}_t + \varepsilon_{it} \end{aligned}$$

We will perform the following regression diagnostics to avoid obtaining biased estimators. In order to see the level of possible multicollinearity in the regression model, we will create the correlation matrix among our independent variables, and visually examine its entries. As another check for multicollinearity, we will obtain the Variance Inflation Factors (VIF) for all of our independent variables, and check whether their values are less than the threshold level of 10. We will run our regressions by using robust covariance matrix for heteroskedasticity according to White's (1980) procedure to prevent inconsistent covariance matrix estimates. Finally, we will utilize the Hausmann Test in order to decide whether to use the Fixed Effects or Random Effects panel data model to run our regressions. In what follows, we describe our regression variables and explain the rationale for including them in our model by providing support from the literature.

5.1 Dependent and independent variables

We construct various measures to calculate labor productivity, financial and operational firm performance, and stock market valuation (all serve as dependent variables) using standard approaches found in literature (Brynjolfsson & Hitt 1996, Bharadwaj et al. 1999, Brynjolfsson & Hitt 2000, Hitt et al. 2002).

Labor productivity is calculated by dividing total sales by the number of employees. Financial firm performance is measured via three well-known variables: Return on Assets (ROA), Return on Equity (ROE), and Return on Sales (ROS). Operational performance is measured through two variables: asset utilization that is calculated by dividing sales by total assets, and inventory turnover that is the cost of goods sold divided by inventory. Finally, the stock market valuation of IT outsourcing initiatives is measured by using Tobin's q .

Tobin's q was first introduced as a predictor of a firm's future investments (Tobin 1969, 1978). Since then, it has been extensively used as a measure of a firm's intangible value, which is based on the assumption that the long-run equilibrium market value of a firm must be equal to the value of its

assets, giving a q value close to unity. Thus, a value of q greater than one implies an unmeasured source of intangible value generated by the firm.

Regression analyses featuring labor productivity or financial performance ratios have the advantage that they can capture different aspects of firm performance, and are commonly used in the literature. Their primary disadvantage is that they can not adequately incorporate future gains from IT outsourcing, which could substantially exceed current or past gains. The use of Tobin's q analysis mitigates these concerns because it is based on the expectations of future benefits that the firm may receive. For our purposes, we use the Tobin's q specification adopted by Hitt et al. (2002), which relates market value of a firm to its total assets. The derivations of our performance measures are outlined in Table 1 below.

Performance Measure	Numerator	Denominator
Labor Productivity	Sales	Number of Employees
Return on Assets	Pretax income	Assets
Return on Equity	Pretax income	Equity
Return on Sales (Profit Margin)	Pretax income	Sales
Asset Utilization	Sales	Assets
Inventory Turnover	Cost of goods sold	Inventory
Tobin's q	Market value	Assets

Table 1. Construction of Performance Measures.

Following Hitt et al. (2002), we use the logarithm of the numerator of each performance measure as a dependent variable, and the logarithm of its denominator as a control variable. This specification provides flexibility in the relationship between numerator and denominator, while retaining the interpretation as a performance measure.

Our key independent variable is the implementation dummy that indicates whether a firm conducts an IT outsourcing project during year t . For each firm, it takes a value of one during and after the years an outsourcing project takes place, and zero otherwise. In order to examine possible lagged effects of outsourcing, we lag the implementation dummy up to three years. For example, if a firm started its outsourcing project in the year 2000, its implementation dummy with a 1-year lag will take a value of one for the year 2001 and beyond, and zero otherwise. Similarly, its implementation dummy with a 2-year lag will take a value of one for the year 2002 and beyond, and zero elsewhere. In order to test the second hypothesis, we use another dummy variable that indicates whether a firm diversifies its IT outsourcing activities over the years. This dummy variable takes a value of 1 for firms that are engaged in several IT outsourcing activities, and zero otherwise.

5.2 Firm-level control variables

Our firm-level control variables are firm size, IT budget, advertising expenditure, and market share. First, we use the natural logarithm of the number of employees as a proxy for firm size, as is traditional in the literature. Second, in order to observe the effect of IT outsourcing on firm performance across firms with varying degrees of IT investments, we utilize IT budget as another firm-level control variable. Third, there is ample evidence in the economics, marketing, and strategy literature supporting a positive relationship between advertising expenditure and firm performance (Comanor & Wilson 1974, Nelson 1974, Schmalensee 1978, Aaker 1991, Megna & Mueller 1991). Finally, market share is included as a control variable given that efficiency theory (Day & Montgomery 1983, Buzzell & Gale 1987), market power theory (Smirlock et al. 1984, Martin 1988), and studies on product quality assessment (Smallwood & Conlisk 1979) provide evidence for a

relationship between market share and firm performance. Jacobson and Aaker (1985) and Jacobson (1990) emphasize further that market share can serve as a proxy for other firm-specific assets (such as managerial skill) not specifically captured in this study. Based on the results of previous research, we expect a positive relationship between market share and firm performance.

5.3 Industry-level control variables

The literature on industrial organization economics supports the view that the structure of an industry impacts the performance of firms within the industry (Porter 1980). We, therefore, utilize three variables frequently used in previous research to account for variation in firm performance due to idiosyncratic characteristics of different industries at the 2-digit Standard Industrial Classification (SIC) level: industry concentration, industry capital intensity, and industry average Tobin's q .

Consistent with the literature, industry concentration in our research is proxied by the four-firm concentration ratio, which is the total market share of the four largest firms in an industry. Industry capital intensity is calculated as the sum of all capital expenditures divided by the sum of all sales in an industry. It is included in our model to capture potential effects of entry barriers on firm performance. Since capital intensive industries are likely to face fewer competitors, incumbent firms could earn higher profits (Capon et al. 1990). This implies a positive relationship between industry capital intensity and firm performance. On the other hand, the relationship could be negative because high capital intensity requirements could take away resources from intangible investments, thereby reducing firm performance (Bharadwaj et al. 1999). Finally, the industry average Tobin's q is utilized in our regressions regarding the stock market valuation of IT outsourcing projects. Inclusion of this variable enables us to justify pooling of data from multiple industries, as well as to control for idiosyncratic industry characteristics not adequately captured by the other industry control variables (Dess et al. 1990, Bharadwaj et al. 1999).

5.4 Time control variables

Following Hitt et al. (2002), we use separate dummy variables for each year to capture transitory, economy-wide shocks that may affect firm performance in our data set.

6 RESEARCH STATUS

We have finished compiling our primary data from the ABI/INFORM and Lexis/Nexis, where we have recorded the following information: (i) the names and stock tickers of all firms that publicly announced their IT outsourcing projects, (ii) the year of their initial outsourcing contracts, and (iii) the scope of their outsourcing projects. We have also finished collecting our secondary data from the COMPUSTAT database and the Information Week magazine. Currently, we are in the process of analyzing the data, and we expect to obtain our initial regression results by the time of the ECIS 2009.

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