Is More IT Offshoring Better? An Exploratory Study of Western Companies Offshoring to South East Asia

Ajay Bhalla[a] <a.bhalla@city.ac.uk>

ManMohan S. Sodhi[b,]*<m.sodhi@city.ac.uk>

Byung-Gak Son[c] <b.g.son@city.ac.uk>

[a, b, c] *Cass Business School, 106 Bunhill Row, London, EC1Y 8TZ, UK*

** Corresponding author*

May 9, 2006

Abstract: We explore the link between a company's performance and the extent of its offshoring of IT-enabled services, focusing on large western companies. Our performance measures comprise sales, profit as percentage of sales, profit/employee and sales/employee over 1999-2004. To measure offshoring, we consider the extent to which these companies have offshored (1) software development and other IT-related development and maintenance, (2) business processes such as payroll or claims processing, and (3) call centers. We performed cluster analysis using the three corresponding offshoring variables to obtain broad patterns of offshoring. Then we compared the average performance of the companies in different clusters using ANOVA; did a regression analysis of the performance measures against the extent of offshoring for the three types of offshoring activities; and performed non-parametric correlations within industry sectors. None of these tests indicated a clear link between company performance and the extent of offshoring thus suggesting that further study is needed to understand when to offshore and how best to do it.

Keywords: Offshoring; IT outsourcing; regression/cluster analysis; service operations; global operations

Introduction

We seek to understand broad patterns of offshoring activity by large western companies and to test the link between company performance and the extent of its offshoring. Such companies have led the movement to offshore IT-enabled services to India and some other countries in South East Asia so we focus on such companies from the 2004 Fortune Global 500 list. Previous empirical work has been descriptive (e.g., Pfannenstein and Tsai, 2004; Kliem, 2004); based on interviews and case studies (e.g., Aron and Singh, 2005; Carmel and Agarwal, 2002; Sahay, Nicholson and Krishna, 2003); or based on industry surveys by consultancies or practitioner publications (e.g., Gentle, 2004; Ware, 2003). Our study, using objective performance measures and a relatively large sample complements this research. As a result of our relatively large sample, we obtain four broad patterns of offshoring activity. Our analysis does not establish a clear link between performance and the extent of offshoring, thereby providing a basis for future research on how best to offshore.

We consider broad objective measures of performance including return on sales, (pre-tax) profit per employee per year and sales per employee per year averaged over 1999-2004 assuming that offshoring to South East Asia was not significant before that period. As regards extent of offshoring, companies offshore many different types of IT-enabled activities (UNCTAD, 2004; Dossani and Kenney, 2004) at different levels of commitment ranging from fee-for-service arrangements to captive centers (Rottman and Lacity, 2004; Carmel and Agarwal, 2002). We use this idea to give a numerical score to the "depth" of offshoring by a company along each of three different IT-enabled offshoring activities: (1) software development and other IT-related development and maintenance, (2) business process such as payroll, and (3) customer care including call centers.

We started with cluster analysis with the extent of offshoring for the three types of offshoring activities to obtain four clusters that reflect four different "levels" or patterns of

offshoring. Then we performed three types of analyses to try to establish a link between the extent of offshoring and company performance. First we compared the performance for companies in different clusters using ANOVA. Second, we used regression of the performance measures against the three offshoring variables individually. Third, we used non-parametric tests, Spearman and Kendall correlations, to relate performance to aggregated offshoring level. None of these tests indicated any clear link between performance and extent of offshoring. Our results therefore imply that more research is needed to obtain a finer-grained picture of how offshoring can provide positive net benefits.

There are a number of limitations of this exploratory study. The scores we used for depth of offshoring do not reflect the amount of investment or duration for offshore activities; however, they can be argued as providing a proxy. The performance measures are broad in scope and influenced by factors other than offshoring although it is these very performance measures that companies seek to improve through offshoring. The number of companies in some industry sectors in our sample was quite small. Finally, many companies have been offshoring functions equities research, clinical trials, and other types of activities that we did not consider; however, these activities are sector-specific and do not affect our across-sector view.

1 Literature Review

Much has been written on IT outsourcing but this research may or may not apply to offshoring because a company can outsource without going offshore or can offshore without outsourcing. Indeed, IT outsourcing -- “the significant contribution by external vendors in the physical and/or human resources associated with the entire or specific component of the IT infrastructure in the user organization” (Loh and Venkatraman, 1992) -- does not capture offshoring. Nor does it capture the focus on business processes (Lacity, et al., 2004) that are considered for offshoring.

1.1 Motivations for Offshoring

Similar to the motivations for *outsourcing* as noted, for instance, by Barthelemy and Adsit (2003); Quelin and Duhamel (2003); Quinn (2000); and Quinn and Hilmer (1994), generating cost efficiencies is often the key reason for offshoring. Offshore vendors may provide similar or better level of service at a lower cost than available in-house (Barthelemy and Dominique, 2004). These vendors may also provide a way to respond to environmental uncertainty without increasing costs (D'Aveni and Ravenscraft, 1994). Companies also seek to outsource their non-core activities to specialist offshore vendors to speed innovation and obtain related benefits at lower costs (Quinn, 2000). Or, they may seek to bring people and technical know-how in-house necessary to maintain existing systems or to develop and implement new technologies (DiRomualdo and Gurbaxani, 1998).

Companies offshore mainly to seek cost efficiencies by exploiting the wage differentials. For IT, hourly rates for workers in Asia and other emerging markets are reported to be anywhere from 30 to 75 percent lower than they are in the United States, generating close to 50 percent savings for offshoring an activity (Pfannenstein and Tsai, 2004). Even in case of firms setting up captive offshore facilities that involve significant ongoing operational cost, net savings are reported to be in the range of 45 to 55 percent (Agarwal, et al., 2003). In a recent survey, firms offshoring IT enabled services to India claimed that savings on a given activity had to be at least 40 percent for them to offshore and that in practice these savings could be as high as 80 percent (Dossani and Kenney, 2004). The NASSCOM-McKinsey report (2002) found that General Electric (GE), one of the pioneers of offshoring services to India had achieved an annual savings of $340 million per year from its Indian captive operations since 1997.

However, net benefits of offshoring need not be as high as the wage differentials would suggest. Reliance on offshore outsourcing can damage the ability of firms to innovate

(Chesbrough and Teece, 2002). Firms may lose internal capabilities in the long run such as research and development (Teece, 1987), and lose touch with new technological breakthroughs that offer opportunities for product and process innovation (Kotabe, 1992). Furthermore, in-house IT enabled services may be key contributors to competitive advantage (Lacity, et al., 2004). There may be such "hidden" costs as vendor search cost, travel, transition costs, layoffs, and ongoing costs of managing the contract (Barthelemy, 2001). Firms may also experience opportunistic behavior by the vendors when they promise huge savings to win the contract, and thereafter exercising pressure to re-negotiate fees diluting expected benefits (Kern, et al., 2002). Firms also face risks stemming from the complexity of operations, from the geographic separation from the vendor, and from not transforming their organization appropriately (Aron, et al., 2005; Aron and Singh, 2005).

Given the attraction of potential benefits along with questions regarding whether companies can realize these in practice over and above potential costs, it is worthwhile to explore the impact of offshoring on companies' top-line- and bottom-line-related performance.

1.2 Offshoring Models

Carmel and Agarwal (2002) propose a four-stage maturation model of offshore outsourcing: (1) companies that outsource only domestically, (2) companies that outsource a project or two ("fee for service") to cut costs without coordination among different groups within the companies, (3) companies that have the capability to manage their offshore relationships and therefore are more willing to outsource their non-core activities, such as maintenance or testing, to offshore locations, and (4) companies that either form a strategic alliance with an offshore vendor to set-up a dedicated offshore delivery center or set up a wholly-owned offshore captive center. For example, EADS, the manufacturer for Airbus airplanes has a strategic partnership with HCL Technologies, a leading Indian software vendor, to run a dedicated center for developing embedded software for flight warning systems (HCL, 2003).

With fully owned facilities, companies can benefit from enhanced information transfer and coordination across activities (Leiblein, Reuer and Dalsace, 2002) as well as greater control, internalize know-how, and shorten innovational lead time (Kotabe, 1992).

For instance, the British bank HSBC set up its first captive offshore back office center in Guangzhou (China) in 1996 to provide back office operations. In 2005, it operated ten offshore service centers in Asia providing back office and customer service facilities for HSBC businesses globally (Borland, 2005). It also established its first offshore global technology center in Pune, India as the software development hub for its global operations.

Companies such as the British insurance firm, Aviva, have opted for a hybrid between dedicated and captive facilities termed *built-operate-transfer* (BOT). In this case, the company forms a strategic alliance with an outsourcing vendor to set up and manage an offshore facility with an option to own the facility after the expiry of a specified period (Gentle, 2004). Motivations may be efficiency-related, e.g., cost-and-risk sharing, mutual specialization of tasks, or strategic in the sense of getting a toehold in a growing business, entry into a new geographic market, and developing new capabilities (Colombo, 2003). Aviva started with offshore outsourcing software development and claims administrative services to specialist vendors in India. In 2003, it deepened its commitment to offshoring as it opted for the *built-operate-transfer* (BOT) model by securing services of three Indian vendors, WNS, EXL and 24X7. Aviva's Noida and Pune (India) centers, which mainly operate as business processing centers with some customer services, are run by EXL in collaboration with WNS. 24X7 operates Aviva's customer service call centre in Bangalore, India (Patel and Ullatil, 2004).The company claims offshoring has enabled it to improve the service levels and attain savings up to 40% of the costs of equivalent onshore activities (Aviva press release, 2004).

Some companies go further and establish what Venkatraman (1997) calls profit or "value" centers by becoming a specialized vendor offering IT-enabled services to diverse

clients. An example is WNS Global services that was set up in 1996 by British Airways (BA) as a wholly-owned business process center. BA's expected savings amounted to $14 million annually (Robinson and Kalakota, 2004: 141). The scope of the center quickly evolved from ticket processing and passenger revenue accounting to handling customer relations. By 1999, BA had become so adept at handling its offshore center that it started operating WNS as a value center, contracting work from Cathay Pacific, and American Airlines. Ramping up its operations rapidly, WNS set up a second site in Pune, India offering services to other industry sectors too. In 2002, BA sold a 70% stake in WNS to Warburg Pincus. WNS continues to grow rapidly, and in 2004 reported revenues of $103 million, an increase of 84% from 2003 (Raman, 2004).

1.3 Extent of Offshoring

Researchers have considered both the breadth and the depth of outsourcing and/or offshoring. Gilley and Rasheed (2000) define *breadth* as the number of activities in which the firm could be engaged in outsourcing so we can interpret breadth as the number of activities encompassing the IT-enabled services being offshored. Following Dossani and Keeney (2004) and the UNCTAD report (Table 2), we define breadth in terms of IT-enabled services encompassing (1) IT (Carmel and Agarwal, 2002), (2) business processes and (3) customer service centre (Lacity, et al., 2004; Gentle, 2004).

Harrigan (1984) conceptualizes *depth* as the portion of the value of each outsourced activity. A study of IT offshoring practices followed by the large US firms indicates that companies follow a phased approach (Rottman and Lacity, 2004). As these firms engage in offshoring to seek lower costs and flexibility, they accumulate learning about how to realize the targeted cost savings. Eventually, they move to the next phase to exploit offshoring for quality as well as cost reasons.

As we already discussed earlier, a firm may offshore IT-enabled services in any of five

ways (Table 1) and we consider these to be at increasing depth. At the shallowest depth is the *fee-for-service* model with fairly low commitment. The next deeper model is a *dedicated offshore center* based on a strategic relationship with a vendor. Then there is the *build-operate-transfer* model whereby the vendor starts a dedicated facility that the company then has an option to own. The fourth level of depth is the *captive model* entailing a company-owned and operated facility. The deepest model is a *value center* where a company-owned facility caters to other customers (western companies) as well. Thus, we view depth on a five-point scale similar to Trent and Monczka's (2005) five "levels" in global sourcing.

"Insert Table 1 here"

2 Methodology

We seek to establish the impact of the extent of offshoring on company performance. To do so, we wanted to get as much objective data as possible about "large western companies" and hence relied on publicly available information about western companies in the Fortune Global 500 list for 2004. We averaged the performance data over 1999-2004 with the assumption that offshoring was not significant before 1999 for almost all the companies in our data set. As regards the extent of offshoring, we obtained information from news articles and company announcements and coded it ourselves (Appendix 1).

2.1 Extent of Offshoring

To determine the extent of offshoring for each firm, we used three variables to capture the *breadth* of offshoring of IT-enabled services (Table 2). The first variable, "IT", comprises two IT-related activities, software development (such as avionics in the aerospace industry) and IT maintenance. The second variable, "BO", comprises business processes including human

resources, accounting, auditing, tax preparation, claims processing, document management, and many other chores necessary for firm functioning. For such activities as call center and other customer care, we use a third variable, “CC”. We did not include sector-specific offshoring activities such as equities research in financial institutions or drugs testing in pharmaceutical companies.

"Insert Table 2 here"

For each of these three variables, IT, BO, and CC, based on the different offshoring models shown in Table 1, we assigned a numerical value for depth ranging from 1 to 5 (Table 3). The "total extent of offshoring" is the sum of the three variables.

"Insert Table 3 here"

2.2 Company Performance

For company performance, we used profitability and productivity measures along with sales over 1999-2004 as reported in the companies’ annual reports (in US $). Our productivity measures pertain to the number of employees as headcount reduction can be an important factor behind offshoring decisions. These are the measures we use for performance:

- Annual sales averaged over the 1999-2004 period
- Profit as a percentage of sales (PP) or return on sales as recommended for instance by Lu and Beamish (2004), obtained by dividing the cumulative earnings (pre-tax to eliminate tax-related quirks) by the cumulative sales over 1999-2004

- (Average) annual sales per employee (SE) obtained by dividing the total sales over 1999-2004 by the total number of employee-years over the same period
- (Average) annual profit per employee (PE) obtained by total pre-tax earnings over 1999-2004 divided by total number of employee-years over this period.

One of the key motivations for offshoring is cost reduction, and therefore it makes sense to test for higher profitability as a percentage of sales. Productivity measures in terms of sales or profits per employee are not only measures of efficiency but also help managers in deciding whether or not to engage in offshoring (or outsourcing). The sales measure is a proxy for industry rank within the Fortune Global 500 list.

2.3 Data Gathering

We started with 500 companies from fifty different Fortune-defined sectors in the 2004 Fortune Global 500 list and collapsed some of the sectors like different types of insurance into one. We dropped firms with corporate head office in locations outside Western Europe and North America to focus on western companies and were left with 369 firms. Next we dropped companies which we could not find any information on offshoring. We also dropped firms operating in the computers and diversified outsourcing category, because many of these firms, for example, EDS, Accenture, IBM, and HP, are engaged in providing offshore IT and BPO services. We were left with 144 firms.

Next, we did keyword searches in the FACTIVA database, the EBSCO database, and the Google search engine to gather information on offshoring of IT, business processes and customer services. We also accessed company web sites for any press releases on offshoring. We found over one thousand announcements that appeared between 1994 and 2004 in such Indian publications as the *Business Standard,* the *Economic Times, and The Hindu* and in such US-based publications as the *Wall Street Journal,* the *Financial Times*, the *New York Times,*

the *CIO*, and the *Computer Weekly*. We examined each article for phrases indicating the match with our depth scale (Table 2). We looked for such phrases as “captive offshore centre”, “will manage the firm’s business processing activities”, “setting up a offshore development center”, “setting up a dedicated lab”, and “set up a subsidiary to handle IT-related services”, and assigned numerical scores for the three offshoring variables for each of the 144 companies.

For performance information, we used Datastream (supplied by the Thomson Corporation) to obtain pre-tax earnings, employee numbers, and sales for the five years 1999-2004. We could not determine all the measures for all five years for nine of the companies in our sample and therefore we could not include these in some of our analyses.

2.4 Analytical Techniques

First we used cluster analysis to identify different patterns of offshoring by western companies. Next we used three analytical techniques: (1) ANOVA to compare the performance of the different clusters identified by the cluster analysis, (2) regression analysis to link performance to the three offshoring variables, and (3) non-parametric correlation of performance with the total extent of offshoring.

Other researchers have used cluster analysis extensively for empirically based classification (Hair, et al., 1998, Punj and Stewart, 1983). We used a two step approach. First, we used Ward’s method to determine the number of clusters and seed points. To determine the number of clusters, we used agglomeration coefficient, Pseudo *F*, cubic clustering criterion and Pseudo t^2. These criteria suggested the optimum number to be four. Taking these seed-points and the number of cluster, we used the non-hierarchical *K*-means partitioning algorithm to obtain the final cluster solution (Punj and Stewart 1983).

We checked the validity of the clusters in three ways. First, we did an ANOVA test using the three partitioning variables in our cluster solution and found significant differences

among the clusters for IT (F = 64.1, p = 0.00), BO (F = 276.7 and p = 0.00) and CC (F = 169.5 and p = 0.00). Second, we assessed predictive validity by doing an ANOVA test to compare the clusters using the performance measures (these were not part of the cluster analysis). Again, the two productivity measures -- PE (F = 5.912, p = .001) and SE (F= .4.954, p= .003) -- were significantly different across the four clusters although profits as percentage of sales PP (F = 0.750, p = .524) was not. Finally, we tested the stability of the cluster solution first with another non-hierarchical *K*-means analysis with random seed points and then with hierarchical analysis using different similarity measures and linkage methods. The results suggested consistent patterns in terms of the size of clusters as well as their membership.

Having obtained the clusters, we used ANOVA to compare company performance across the clusters. We also compared the clusters within each of the five largest industry sectors using average values of the performance measures. Next we used regression to find the sensitivity of performance to the level of offshoring for each of the three activities, IT, BO, and CC. We repeated the same at the industry sector level for the largest five sectors but using the sum of the three variables (total extent of offshoring). Finally we used non-parametric tests of correlation to see if there was any simple relation between performance and the total extent of offshoring in the entire sample as well as in each of the largest five sectors in the sample. We determined both Spearman's *rho* (ranked correlation) and Kendall's *tau* (relative proportion of concordant and discordant pairs of data points).

3 Results of the Cluster Analysis

Cluster analysis with the three offshoring variables IT, BO, and CC yielded four clusters reflecting four corresponding patterns of how companies offshore. Each of these clusters had different extent of offshoring (as measured by the sum of the three variables) and therefore we interpret these clusters as having different "levels" of offshoring. Accordingly, we labeled these clusters as Level I to IV in increasing order of the extent of their offshoring.

Most of the companies in our data set, 80 out of 144, comprise Level I and exhibit low extent of offshoring (Figure 1). At the other extreme are companies that comprise Levels III and IV and significantly offshore more than one of the three activities. The remainder, Level II companies, are deep into software development and IT maintenance but not into any other activity. The composition of these clusters by sector varies considerably with banking being the only sector in our sample with a footprint across all the clusters (Table 4).

"Insert Figure 1 here"

"Insert Table 4 here"

The extent of offshoring of Levels II, III and IV companies suggests that a typical company starts with IT offshoring and gradually branches off into business process offshoring and/or customer care if these are relevant to its business model. Below, we look at each of the four clusters in detail.

Shallow IT Offshoring (Level I): This cluster represents basic offshoring focused on IT activities. The average total extent of offshoring for companies in this cluster is only 2.24 (out of 15). The mean depth score for the IT variable was only 1.59 (out of 5) suggesting that vendors provide IT on a fee-for-service for about one-third of the companies in this cluster and on a dedicated basis for the remaining two-thirds. There is even less offshoring of the other two types of activities. Only a few companies offshore their business processes or call centers, and that too only on a fee-for-service basis or via dedicated offshore centers run by vendors.

Deep IT Offshoring (Level II): These companies are deep into offshoring IT with the

mean for the variable IT being the highest among all clusters at 4.11 out of 5. But the average total extent of offshoring for companies in this cluster is only slightly more at 4.48 out of 15 because the companies in this cluster have the lowest levels of offshoring business processes and call centers. 89% of the companies use the captive model for offshoring IT-related activities and the remainder run value centers. Companies from manufacturing-related sectors have high memberships in this category: three-fourths of the companies in this cluster are manufacturing companies from such sectors as aerospace, automobile, etc. One reason may be that such companies do not need call centers or back office business process operations to the same extent as companies operating in services, e.g. banks and insurance companies.

Broad Offshoring (Level III): Companies in this category offshore both IT-related and business process-related activities at high levels. The average total extent of offshoring for companies in this cluster is 6.59 out of 15. The companies in this category are deep into offshoring business processes and the average is the highest among all clusters at 4.0 out of 5 with all the companies operating business process captive centers. They exhibit moderate amount of offshoring activities for their IT activities in diverse ways but mainly through offshore dedicated centers run by vendors (36 % of the companies) or through fully-owned captive centers (also 36 %). None of the companies does any offshoring of customer care.

Advanced Broad Offshoring (Level IV): Companies in this category offshore all three types of IT-enabled-services at high levels. The average total extent of offshoring for companies for this cluster is the highest among all at 10.60 out of 15. The companies in this cluster offshore all the three types of activities and have the second highest average extent of offshoring business processes, 3.93 out of 5, and the highest score regarding customer care, 4 out of 5. One in six companies run their call-center offshoring on a built-operate-transfer basis and nearly two-thirds (62%) in the form of captive offshore centers. The remainder have already reached the highest level of call-center offshoring running value centers with depth

score of 5 out of 5 to provide services not only for themselves but also to provide services to other western firms.

4 Results of Performance-Related Analysis

As mentioned before, we conducted three types of analysis: ANOVA for performance measures on the clusters, regression of the performance measures against the three offshoring variables, and non-parametric correlation of the performance measures against the total extent of offshoring. None of these tests indicated any straightforward link between performance and offshoring.

4.1 ANOVA and Cluster-by-Cluster Comparison

Having obtained clusters, we used ANOVA to determine whether or not the clusters are significantly different as regards the four performance measures. As we mentioned earlier in the context of the predictive validity of the cluster analysis, the clusters are indeed different for the two productivity measures, profit per employee and sales per employee (Table 5).

"Insert Table 5 here"

Next we conducted post hoc analysis to compare each cluster to every other cluster to determine which cluster, if any, is better than the others as regards performance. For the two productivity measures, we find that the Level III cluster is significantly better than the other clusters regardless of the test statistic used – Tukey, Gabriel, Hochberg, or Games-Howell (Table 6).

"Insert Table 6 here"

This would suggest that company performance, at least as regards productivity, is best for companies at Level III that offshore both IT and business processes significantly but not customer care. However, when we compared the clusters within each of the largest five industry sectors, we could not establish this. Indeed, the picture from the five sectors is quite different and it is only the insurance sector of the five we analyzed for which the Level III cluster appears to be better than the others.

Given the small number of companies in each sector, rather than doing ANOVA, we compare only the average values of the four performance measures (1999 – 2004) for companies at each level of offshoring (Table 7). For the automotive sector, companies in Level I offshoring out-performed the other while for the banking sector, Level II companies turned out to have the highest performance in profit percentage, profit per employee and sales per employee. For the insurance sector, Level III companies performed best in terms of average profits (as percent of sales) and the average profit per employee per year and for the retail sector, Level IV and Level I retail companies performed better than the others. Finally, for the telecommunication sector, it is difficult to draw a meaningful comparison, but overall, Level I companies outperformed the three other clusters. Therefore, we do not find support at the sector level for Level III companies being significantly better than others as indicated by the ANOVA results above for the overall sample.

"Insert Table 7 here"

4.2 Regression Analysis

We used regression, an easy and popular way to determine sensitivity of the dependent

variables to the independent ones, to link the four performance measures to the three offshoring variables.

"Insert Table 8 here"

A mixed picture emerges from the regression results using all the companies in the sample barring nine for which there were missing values for the performance measures (Table 8). While sales is positively impacted by both IT and business process offshoring, profit/employee is positively impacted by business process offshoring but negatively by customer care offshoring. Sales/employee is impacted (positively) only by business process offshoring. Another way to say this would be that only business process offshoring seems to impact all the performance measures positively. The impact of customer care appears to be negative but this impact is significant only for profit/employee.

Next we repeated the regression analysis by industry sector separately for the largest five sectors as before. However, the small number of observations in each sector requires us to aggregate our offshoring variables and we do so by using the total extent of offshoring. Overall, none of the measures is significantly related to the total extent of offshoring and this is true at the sector level as well. An exception is the automobile sector for which the relationship is negative. The banking and the insurance sectors do exhibit the same positive significant relationship with sales as the overall sample; however, a positive relationship with sales simply suggests that larger companies offshore more rather than offshoring increasing sales.

"Insert Table 9 here"

4.3 Non-Parametric Correlation

Two well-known non-parametric tests are based on (a) the ranks of the values for the two variables being correlated and (b) the difference between the relative percentage of concordant and discordant pairs. These are given by the Spearman rho and the Kendall tau statistic respectively. In our case, for the largest five industry sectors in our sample, the results of the two analyses are very similar (Table 10). Both indicate that for the automotive industry performance may be negatively correlated with the extent of offshoring while for the banking sector, sales are positively correlated to offshoring (regardless of direction of causation). None of the other correlations is significant so we cannot conclude anything about the other sectors.

"Insert Table 10 here"

4.4 Discussion of the Results

We found that the companies fall into four clusters that represent different levels of offshoring. These clusters had different average performance levels as well as different levels of offshoring. But comparing the industry sectors for dominant clusters within each sector, we did not find any particular level or cluster of offshoring being always better than other clusters as regards performance. Likewise, we did not find any link between individual company performance and its extent of offshoring through regression for each of the industry sectors although we got mixed results for the sample overall. Finally, the non-parametric tests also do not show any clear pattern across industries.

We can only speculate as to the reasons for the absence of any straightforward link

between company performance and its extent of offshoring. It is possible that although companies have different levels of offshoring, they are also subject to different "hidden" costs (Barthelemy, 2001). Possibly, as with IT outsourcing, offshoring is a “game for losers” with worse performing companies to offshoring more (Hall and Liedtka 2005) and that some these companies catch up in performance over time with their peers owing to benefits from offshoring. It could be that developing offshoring capability detracts the company’s management from running its other activities. Or it may be that, as companies offshore more -- this is especially true at the lower two-three levels of offshoring depth -- they do not gain any competitive advantage over their competitors as their own level of control over the eventual output remains low. It could also be that some of the risks identified by Aron and Singh (2005) and Aron, et al. (2005) materialized for offshoring companies over the 1999-2004 period, resulting in costs that diluted or exceeded the realized benefits from offshoring.

5 Conclusions and Further Research

We sought to understand broad patterns of offshoring activity by large western companies and to test the link between company performance and the extent of its offshoring focusing on large western companies that have offshored various IT-enabled services to South-East Asia. There appear to be four patterns of offshoring among companies in the Fortune Global 500 based on the extent to which these companies had offshored three categories of IT-enabled services. We called these patterns (Level I) shallow IT offshoring, (Level II) deep IT offshoring, (Level III) broad offshoring, and (Level IV) advanced broad offshoring. We tested the link using profitability and productivity as measures of performance and employed multiple tests but could not establish any clear link across clusters or industry sectors.

The results of our analysis should not be misconstrued to conclude that offshoring does not benefit the top or the bottom line of the company. Rather, our work should motivate researchers and companies to better understand the relative benefits of different ways of

offshoring including not offshoring at all. Companies also need to see the offshoring decision in the context of their motivation -- opening new markets versus having a cheaper call center.

Our results therefore warrant taking a closer look at offshoring benefits by studying when should companies offshore and what the factors behind successful offshoring are. The limitations of our exploratory study also suggest further research to include developing depth measures that are cognizant of the amount of investment and the time for offshoring activities. Likewise, performance measures could be more fine-grained and applied to the division level data rather than the company as a whole. Companies could be compared for performance against those with similar business models rather than simply in the same industry sector. Expanding the data to include more companies using, for instance, Fortune Global 1000 or Forbes Global 2000 instead, would be useful to overcome the problem of small numbers. Future work could also expand the types of offshoring activities to include research and development for the relevant sectors.

6 References

Agarwal, V., Farrell, D., Remes, J. K., 2003. Offshoring and beyond. The McKinsey Quarterly Special Edition: Global Directions, 24-34

Aron, R., Singh, J. V. 2005. Getting offshoring right. Harvard Business Review 83 (12), 135-143

Aron, R., Clemons, E. K. , Reddi, S., 2005. Just right outsourcing: Understanding and managing risk. Journal of Management Information Systems 22 (2), 37-55

Aviva, 2004. Aviva and offshoring: press release, February, downloaded from http://www.aviva.com/files/reports/csr/2004report/pdf/off_shoring.pdf on December 9, 2004

Barthelemy, J., 2001. The hidden costs of IT outsourcing. MIT Sloan Management Review 42 (3), 60-70

Barthelemy, J., Adsit, D., 2003. The seven deadly sins of outsourcing. Academy of Management Executive 17 (2), 87-101

Barthelemy, J., Dominique, G., 2004. The determinants of total IT outsourcing: An empirical investigation of French and German firms. Journal of Computer Information Systems 44 (3), 91-98

Borland, B., 2005. Fears for call centre jobs after HSBC plan. Scotsman, 16 March 2005, downloaded from http://edinburghnews.scotsman.com/business.cfm?id=285692005 on March 25, 2005

Carmel, E., Agarwal, R., 2002. The maturation of offshore sourcing of information technology work. MIS Quarterly Executive 1 (2), 65-78

Chesbrough, H.W., Teece, D. J., 2002. Organizing for innovation: When is virtual virtuous? Harvard Business Review 80 (8), 127-136

Colombo, M.G., 2003. Alliance form: A test of the contractual and competence perspectives. Strategic Management Journal 24 (2), 1209-1229

D'Aveni, R., Ravenscraft, D., 1994. Economics of integration versus bureaucracy costs: Does vertical integration improve performance? Academy of Management Journal 37 (5), 1167-1206

DiRomualdo, A., Gurbaxani, V., 1998. Strategic intent for IT outsourcing. MIT Sloan Management Review 39 (4), 67-81

Dossani, R., Kenney, M., 2004. The next wave of globalization: Exploring the relocation of service provision to India. Working Paper, Asia Pacific Research Centre, Stanford University, Stanford, CA

Everitt, B., Landau, S., Leese, M., 2001. Cluster Analysis, 4th ed. Oxford University Press, London

Gentle, C., 2004. The titans take hold. Deloitte Research Report, Deloitte Consulting, London

Gilley, K., Rasheed, A., 2000. Making more by doing less: An analysis of outsourcing and its effects on firm performance. Journal of Management 26 (4), 736-790

Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1998. Multivariate Data Analysis, 5th ed. Prentice Hall, New Jersey

Hall, J.A. and Liedtka, S. L. 2005. Financial performance, CEO compensation, and large-scale information technology outsourcing decisions, Journal of Management Information Systems 22 (1), 193-221

Harrigan, K., 1984. Formulating vertical integration strategies. Academy of Management Review 9 (4), 638-652

HCL, 2003. Airbus and HCL Technologies ink embedded software development deal, June 16, downloaded from http://www.hcltech.co.jp/investerreleases2003.asp?more=1&cat_id=229 on November 25, 2004

Kern, T., Willcocks, L. P., van Heck, E., 2002. The winner's curse in IT outsourcing: Strategies for avoiding relational trauma. California Management Review 14 (2), 47-70

Kliem, R., 2004. Managing the risks of offshore IT development projects. Information Systems Management Journal 21 (3), 22-27

Kotabe, M., 1992. Global Sourcing Strategy: R&D, Manufacturing, and Marketing Interfaces. Quorum, NY

Lacity, M., Willcocks, L., Feeney, D., 2004. Commercializing the back office at Llyods of London: Outsourcing and strategic partnerships revisited. European Management Journal 22 (2), 127-141

Leiblein, J., Reuer, J., Dalsace, F., 2002. Do make or buy decision matter? The influence of organizational governance on technological performance. Strategic Management Journal 23 (9), 817-826

Loh, L., Venkatraman, N., 1992. Diffusion of information technology outsourcing: Influence sources and the Kodak effect. Information Systems Research 3 (4), 334-358

Lu, J.W., Beamish, P.W., 2004. International diversification and firm performance: The s-curve hypothesis. Academy of Management Journal 47 (4), 598-610

Nasscom-McKinsey, 2002. NASSCOM-McKinsey Report 2002. Nasscom, New Delhi.

Patel, F., Ullatil, P., 2004. Aviva BOTs three BPO units. Rediff, April 23, 2004, downloaded from http://www.rediff.com/money/2004/apr/23bpo.htm on January 3, 2005

Pfannenstein, L.L, Tsai, R.J., 2004. Offshore outsourcing: Current and future effects on American IT industry. Information Systems Management 21 (4), 72-81

Punj, G., Stewart, D.W., 1983. Cluster analysis in marketing research: Review and suggestions for application. Journal of Marketing Research 20 (2), 134-148

Quelin, B., Duhamel, F., 2003. Bringing together strategic outsourcing and corporate strategy: Outsourcing motives and risks. European Management Journal 21 (5), 647-661

Quinn, J.B., 2000. Outsourcing innovation: The new engine of growth. MIT Sloan Management Review 41 (4), 13-29

Quinn, J.B., Hilmer, F.G., 1994. Strategic outsourcing. MIT Sloan Management Review 35 (4), 43-56

Raman, K. 2004. WNS aims at 60-pc revenue growth, The Hindu Business Line, September 13, 2004, downloaded from http://www.thehindubusinessline.com/2004/09/13/stories/2004091301080200.htm on March 17, 2005.

Robinson, M., Kalakota, R., 2004. Offshore Outsourcing: Business models, ROI and best practices. Mivar Press, Alpharetta, GA

Rottman, J., Lacity, M., 2004. Twenty practices for offshore sourcing. MIS Quarterly Executive 3 (3), 117-130

Sahay, S., Nicholson, B., Krishna, S. 2003. Global IT Outsourcing: Software development across borders. Cambridge University Press, Cambridge

Teece, D., 1987. Capturing value from technological innovation: Integration, strategic partnering, and licensing decision. In B. Guile & H. Brooks (Eds.), Technology and global industry, Washington, National Academy Press. 65-95

Trent, R. J., and Monczka, R. M. 2005. Achieving excellence in global sourcing, MIT Sloan Management Review 47 (1), 24-32

UNCTAD, 2004. World investment report 2004: The shift towards services. United Nations, New York, downloaded from http://www.unctad.org on March 21, 2005

Venkatraman, N., 1997. Beyond outsourcing: IT resources as a value centre. MIT Sloan Management Review, 38 (3), 51-65

Ware, L.C., 2003. Weighing the benefits of offshore outsourcing. CIO Magazine, 2 September, downloaded from http://www2.cio.com/research/surveyreport.cfm?ID=62 on January 10, 2005

	Model	Description	Potential Benefs
1	Fee-for-service model	A fixed or tiered fee is payable to the vendor for his services.	No set-up costs, low financial risk, Internal gains.
2	Dedicated offshore center	The vendor owning the operation dedicates part of its facility to the customer.	Low set-up costs, cost savings, scalable, by-pass political resistance, Capitalize on external skills.
3	Built-operate transfer	The vendor owns, builds, staffs, and operates the facility on behalf of the customer. Customer has the option where ownership and employees are transferred at pre-agreed future date.	Cost efficiencies, scalability, benefits from specialist know-how, transferable skills.
4	Captive model	The customer builds, owns, staffs, and operates offshore facility.	Internalization of knowledge, ability to control costs and service levels, potential for continuous focus on ongoing learning and innovation.
5	Value center	The customer runs the facility as a profit center, offering services to other firms.	Realizing value from internal competencies, new market and revenue opportunities, potential to establish alliances

Table 1: Models of offshoring, representing different "depths"

IT services	Business processes	Call centers and other customer care
Software development Application testing Content development Engineering and design Product optimization	Claims processing Accounts processing Transaction processing Query management processing Customer administration processing HR/payroll processing Data processing Logistics processing Quality assurance Supplier invoices	Help desk Technical support/advice After-sales Employee inquiries Claims inquiries Customer support/advice Market research Answering services Prospecting Information services Customer relationship management

Table 2: Three different types of activities targeted for offshoring. Modified from UNCTAD and OCO Consulting (UNCTAD 2004).

Model	*Depth Score*
Fee-for-service model	1
Dedicated offshore center	2
Built-operate transfer/ Joint venture	3
Captive model	4
Value center	5

Table 3: Depth scores based on offshoring model

Industry Sector	Level I	Level II	Level III	Level IV
Aerospace	3	2	-	-
Airline	2	1	-	1
Automotive*	6	5	-	-
Banking*	11	2	7	4
Beverages	1	-	-	-
Chemicals	2	2	-	-
Computer	-	1	-	-
Consumer Food	1	-	2	-
Diversified Financials	-	-	1	2
Electronics	2	2	1	-
Entertainment	3	-	-	1
Household Prod	-	-	1	-
Industrial Equipment	-	2	-	-
Insurance*	5	-	4	4
Mail and Freight	3	-	1	-
Misc	2	-	-	1
Network Equip	1	4	-	-
Petroleum	3	-	2	-
Pharmaceuticals	7	-	-	-
Retailer*	12	2	-	1
Scientific Photo, Control, Equipment	1	-	-	-
Securities	-	1	3	-
Semiconductor	-	1	-	-
Telecommunications*	11	2	-	1
Utilities	4	-	-	-
Total = 144 companies	80	27	22	15

Table 4: Breakup of each industry sector from our data set across the four clusters I-IV. Sectors marked (*) had the most companies in our data set and were subjected to more analysis.

Dependent variable		Sum of Squares	Df	Mean Square	F	Significance
Sales	Between Groups	7.16158E+15	3	2.38719E+15	1.854	0.141
	Within Groups	1.68705E+17	131	1.28783E+15		
	Total	1.75867E+17	134			
Profit as percentage of sales	Between Groups	2.63E-02	3	8.75E-03	0.75	0.524
	Within Groups	1.529	131	1.17E-02		
	Total	1.555	134			
Profit per employee	Between Groups	56129101114	3	18709700371	5.912	0.001***
	Within Groups	4.146E+11	131	3164883603		
	Total	4.70729E+11	134			
Sales per employee	Between Groups	3.29835E+12	3	1.09945E+12	4.954	0.003**
	Within Groups	2.90733E+13	131	2.21934E+11		
	Total	3.23717E+13	134			

*$p < .05$, **$p < .01$, ***p<.001

Table 5. ANOVA for the four dependent performance measures against the cluster type for the four clusters Level I-IV.

Dependent Variable	(I) Cluster no. of case	(J) Cluster no. of case	Mean Difference (I-J)	Std. Error	Test Statistics	Sig.
Profit per employee	3	1	54,824.93	13,682.58	Tukey HSD	0.000
					Gabriel	0.000
					Hochberg	0.001
					Games-Howell	0.018
	3	2	53,910.97	16,296.77	Tukey HSD	0.005
					Gabriel	0.007
					Hochberg	0.007
					Games-Howell	0.046
	3	4	58,724.12	19,233.34	Tukey HSD	0.012
					Gabriel	0.015
					Hochberg	0.016
					Games-Howell	0.029
Sales per Employee	3	1	376,964.45	114,577.88	Tukey HSD	0.006
					Gabriel	0.001
					Hochberg	0.005
					Games-Howell	0.002
	3	2	498,304.65	136,469.11	Tukey HSD	0.008
					Gabriel	0.002
					Hochberg	0.018
					Games-Howell	Not significant

Table 6: Cluster-to-cluster comparison for the two productivity measures, profit per employee and sales per employee. Only pairs with significant differences ($p < 0.05$) are shown.

SECTOR	Type	Sales	Profit%	PE	SE
Automotive	L1	78,337,176	3.6%	11,644	343,613
	L2	66,185,704	-0.5%	-1,078	284,433
	L3	-	-	-	-
	L4	-	-	-	-
Banking	L1	27,886,666	16.3%	60,069	404,121
	L2	31,684,040	11.5%	40,446	410,909
	L3	46,215,071	12.0%	59,249	544,152
	L4	60,290,975	22.3%	74,083	333,794
Insurance	L1	31,936,954	0.9%	21,691	1,276,242
	L2	-	-	-	-
	L3	46,649,587	7.7%	87,994	1,271,018
	L4	49,277,266	0.4%	13,535	995,751
Retailer	L1	22,476,422	4.7%	9,571	215,962
	L2	38,576,261	4.8%	7,673	162,790
	L3	-	-	-	-
	L4	38,407,773	4.9%	10,918	220,629
Telecommunication	L1	24,738,127	2.5%	-1,308	368,149
	L2	59,848,835	2.8%	11,615	252,317
	L3	-	-	-	-
	L4	29,849,270	7.9%	20,072	254,253

Table 7: Average values of performance measures (1999 – 2004) for companies at different levels (L1-L4) in each of the five largest industry sectors.

Variables	Mean	s.d.	1	2	3	4	5	6
1. Sales	37,609,230	36,227,618						
2. Profit %	0.08	0.11	.061					
3. PE	38,490	59,269	.321**	.741**				
4. SE	478,867	491,507	.354**	.027	.525**			
5. IT	2.37	1.27	.184*	-.055	.007	-.082		
6. BO	1.30	1.75	.224*	.089	.249**	.289**	.100	
7. CC	0.60	1.33	.040	-.077	-.112	-.027	.101	.425**

n = 135, *p < .05, **p < .01

Variable	1	2	3	4
	Sales	Profit Percentage	Profit per Employee	Sales per Employee
5. IT	.168*	-.057	-.002	-.101
6. BO	.242**	.153	.363**	.374***
7. CC	-.080	-.136	-.266**	-.176
R^2	.082	.027	.120	.121
Adjusted R^2	.061	.005	.100	.101
ANOVA *F*	3.888**	1.219	5.970***	6.016***

*p < .05, **p < .01, ***p < .001

Table 8: Results of the regression of the four performance variables (1-4) against the three independent offshoring variables (5-7) including descriptive statistics and correlations for the four dependent performance variables (1-4) and the three independent offshoring variables (5-7). Nine companies with missing values for the performance variables were excluded and hence the sample size here is 135.

Industry	Variables	1	2	3	4
		Sales	PP	PE	SE
OVERALL	Total Extent	.224**	-.005	.097	.121
	R^2	.050	.000	.009	.015
	Adjusted R^2	.043	-.007	.002	.007
	ANOVA *F*	7.008**	.004	1.273	1.969
Automobile	Ext	-.187	-.820**	-.814**	.313
	R^2	.035	.673	.662	.118
	Adjusted R^2	-.086	.632	.620	.007
	ANOVA *F*	.289	16.458**	15.668**	1.066
Banking	Total Extent	.729***	.034	.171	.093
	R^2	.531	.001	.029	.009
	Adjusted R^2	.505	-.054	-.025	-.046
	ANOVA *F*	20.358***	.021	.540	.158
Insurance	Total Extent	.479**	.116	.040	-.277
	R^2	.229	.013	.002	.077
	Adjusted R^2	.159	-.076	-.089	-.007
	ANOVA *F*	3,267**	.150	.017	.914
Retail	Total Extent	.254	.066	.111	.062
	R^2	.066	.004	.012	.004
	Adjusted R^2	.111	-.072	-.064	-.073
	ANOVA *F*	.062	.056	.161	.051
Telecommunication	Total Extent	.165	.070	.114	-.199
	R^2	.027	.005	.013	.040
	Adjusted R^2	-.061	-.086	-.077	-.048
	ANOVA *F*	.309	.054	.145	.454

*$p < .05$, **$p < .01$, ***$p < .001$

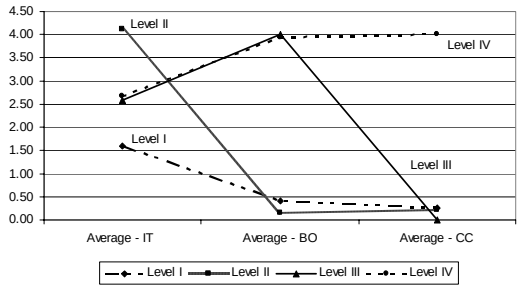
Table 9: Results of regression of the four performance variables (1-4) against the total extent of offshoring for the entire sample as well as by industry sector.

Correlation statistic	Industry sector	Number of companies	Sales	Profit%	PE	SE
Kendall's tau_b	Automobile	10	-0.249	-0.793**	-0.803**	-0.360
	Banking	20	0.515**	-0.041	0.017	0.098
	Insurance	14	0.314	0.029	0.041	-0.041
	Retail	15	0.096	0.103	0.139	0.353
	Telecommunication	13	0.363	-0.076	-0.030	-0.061
	OVERALL	135	0.217**	-0.006	0.067	0.177**
Spearman's rho	Automobile	10	-0.315	-0.860**	-0.905**	-0.415
	Banking	20	0.662**	-0.099	-0.001	0.126
	Insurance	14	0.473	0.033	0.011	-0.062
	Retail	15	0.154	0.129	0.205	0.465
	Telecommunication	13	0.464	-0.100	-0.053	-0.091
	OVERALL	135	0.306**	-0.012	0.101	0.252**

*$p < .05$, **$p < .01$

Table 10: Non-parametric correlation of "extent of offshoring" as measured by the sum of the three offshoring variables against the four performance variables by industry sector and overall.

(a) Cluster Profile



(b) Extent of Offshoring (By Areas of Offshoring Activities)

	Level I	Level II	Level III	Level IV
No. of Companies	80 (56%)	27 (19%)	22 (15%)	15 (10%)
Average - IT	1.59	4.11	2.59	2.67
Average - BO	0.40	0.15	4.00	3.93
Average - CC	0.25	0.22	0.00	4.00
Average - Extent of Offshoring	2.24	4.48	6.59	10.60

Figure 1: (a) Clustering variables' profiles in terms of the average value of each variable for each cluster, and (b) the average numbers for the clustering variables' profiles.

Appendix 1: Examples of Companies in Our Data Set and the Associated Data

Industry Sector	Company name	Performance Measures				Depth of Offshoring		
		Avg. Sales ($ millions)	Avg. ROS (%)	Avg. SPE/yr ($)	Avg. PPE/yr ($)	IT	Back office	Customer Service
Automotive	Delphi	27,899	1.15	141,574	1,632	4	-	-
	General Motors	184,899	1.76	527,982	9,316	2	-	-
	Johnson Controls	20,976	4.58	184,331	8,441	4	-	-
	Ford Motors	166,019	1.03	486,782	4,993	4	-	-
Banking	ABN AMRO Holdings	36,966	12.49	331,601	41,420	4	4	-
	Bank of America	54,369	26.50	393,119	104,180	2	4	-
	HBOS	30,329	14.78	490,887	72,546	2	-	-
	Citigroup	103,878	21.97	445,353	97,828	5	4	4
Insurance	Allianz	82,359	2.41	502,937	12,110	4	4	-
	Aviva	54,963	(0.12)	826,023	(1,011)	2	3	3
	AXA	83,617	3.81	1,003,708	38,229	2	4	4
	Prudential	37,207	2.09	1,692,555	35,386	2	4	4
Retail	Home Depot	59,089	10.09	222,560	22,449	2	-	-
	Safeway	34,010	3.65	177,833	6,486	4	-	-
	Target	43,141	6.00	147,747	8,860	4	-	-
	Tesco	38,407	4.95	220,629	10,918	4	4	4
Telecommunications	Bellsouth	23,131	21.03	268,363	56,443	2	-	-
	Comcast	13,801	9.42	232,349	21,891	2	-	-
	Deutsche Telecom	52,367	(8.79)	211,895	(18625)	4	-	-
	Vodafone	35,237	(27.25)	628,753	(171,365)	2	-	-