The Emergence Of The IT-Enabled Extended Organizational Form In Knowledge-Intensive Firms – An Empirical Study

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Abstract:

We investigate the emergence of IT-enabled organizational forms wherein firms outsource information-intensive work to offshore (and onshore) partners. We will identify knowledge intensive firms in the Financial Services and Biotech industries (in Singapore) and study the governance structures associated with strategic outsourcing in these firms. We formulate two important theoretical scales, the Knowledge Continuum which disaggregates knowledge work into its constituent units and the Value Hierarchy of Processes which orders processes by their revenue implications to firms. We use these to study the evolution of BPO contracts and explore how governance forms may evolve over time in knowledge-intensive sectors of the economy. The panel of firms that we survey will be drawn from the US, Singapore, Manila (Philippines) and India.

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1.0 Introduction

Advances made in information technology and Telecommunications in the recent years have enabled firms to create real-time linkages between their information systems and share large data sets relatively costlessly. An additional factor that made such data sharing possible is the convergence in corporate computing platforms. Corporations are increasingly standardizing on a few enterprise wide platforms (such as Relational Databases, networking standards etc.) and software tools are making it easier to port large data sets between geographically dispersed information systems, thereby making the flow of data and information between corporations both viable and nearly costless. This trend has given rise to the phenomenon of firms outsourcing their entire back-offices to off-shore (and onshore) third party service providers who execute these processes for them. Consulting firm Gartner estimates that cross-border Business Process Outsourcing (BPO) will grow into a $178.5 billion business by 2005 from $123.6 billion in 2001 [Gartner 2002]. Other estimates suggest that the BPO industry will grow to over 200 billion in 2005. The BPO business is the fastest growing sub-segment of the Biotech industry.

With growth in BPO, a variety of interesting governance structures are beginning to emerge. Many of them are hybrid structures that display both the features of hierarchies and markets. We term these collectively as the ‘Extended Organizational Form’. These hybrid governance forms are enabled by information technology and have significant implications for the coordination of economic activity in knowledge-intensive sectors of the economy such as Biotech industries and the financial services industry. We propose to investigate (through empirical means) the nature of these hybrid governance forms and the nature of information work that is being outsourced.

2.0 Review of Literature

The prevailing view that the natural boundaries of the firm were determined by technology, technological nonseparabilities and economies of scale was first challenged by Coase who held that the firm and the market were alternatives for organizing the very same set of transactions [Williamson and Winter 1993]. The firm-as-production-function approach and applied price theory combined with technological determinism do not entirely explain all the transactions that take place within the firm [Williamson 1993]. Early work by Kaldor and Robinson suggested that the size of the firm was limited because of diminishing returns to management [Kaldor, Robinson 1934]. Transaction Cost Economics (TCE) was developed to justify the firm as economizing on transaction cost, i.e., to identify the most economically efficient governance structure [Williamson 1979]. Central to TCE is the role played by transaction frequency, investment idiosyncrasy and uncertainty. These are the critical dimensions of contractual relations that yield transaction cost and thus lead to different governance structures in TCE scheme of things. Furthermore, TCE

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3 We use the term “User” to refer to firms that outsource their processes and the term “Provider” to refer to firms that execute processes for user firms.
emphasizes the role of investment idiosyncrasy as the key reason for vertical integration (or long-term contractual relationships) when the transactions are recurrent and are executed under uncertain outcomes. TCE has been readily used by researchers in the field of Information Systems to explain the impact of information technology (IT) on the boundaries of the firm. Malone, Yates & Benjamin (1987) argue that IT influences the optimal governance structure by reducing the costs of communication and coordination and by alleviating the Asset-Specificity and complexity of product description. The resulting impact is to increase the proportion of transactions that are coordinated by the price mechanism (market).

Another research paradigm that explains the boundaries of the firm is Incomplete Contracts and Property Rights theory pioneered by Grossman and Hart (1986) and Hart and Moore (1990). The key insight from Grossman and Hart that the ownership of an asset makes the owner the residual claimant and thus gives him ex-ante incentives to invest in mechanisms that make the asset optimally productive. In another word, vertical integration occurs when there is need to give one party disproportionately higher incentives to optimise the return on assets. Brynjolfsson (1994) incorporated the idea of an “information asset” into the GHM framework and shed light on the relationship between information technology and firm size. The main finding of Brynjolfsson [Brynjolfsson 1994] is that by treating the information as an asset is owned by the agent owns makes the informed agent indispensable to the production and it follows from the Grossman and Hart hypothesis that the increased contractibility (alienability) of the information asset will facilitate decentralization of managerial control and decision making since appropriate incentives can be offered via contract thus circumventing the need to offer ownership. The implication of this is as follows: advances in IT amplify the importance of information assets while at the same time making these assets more alienable leading to decentralization. This conclusion is similar as Malone et al.(1987), but under a different theoretical framework. Holmstrom and Milgrom (1994), explain the existence of the firm from an incentive perspective, and view the measured performance (Principal-Agent theory), asset ownership (Property Rights theory) and design of the job (from the TCE standpoint). They argue that these instruments are complementary for motivating workers. And they find that when the cost of measuring sales performance is high, it is more likely that the agent’s optimal incentives will conform to the attributes of employment.

Empirical studies of TCE and the theories of Incomplete Contracts have long lagged behind theoretical work until recently. The earlier empirical works mainly focus on testing the relationship between investment specificity and contract duration [Palay 1984, Joskow 1987, Crocker and Masten 1988] or vertical integration [Monteverde and Teece 1982, Masten 1984]. Almost all of them find that there exist positive correlation between the increased use of long-term relational contracting devices (or vertical integration) and the existence of highly idiosyncratic investments by the parties. Anderson and Schmittlein (1984) test the conditions under which firms would find it optimal to use in-house salespersons versus independent sales agents. They find that the most important variables that drive the choice is the difficulty of evaluating performance and the importance of nonselling activities.

There are no theoretical or empirical studies of the phenomenon of IT-enabled process outsourcing and nor has the emergence of extended organizational forms
created by multi-firm processes and information flows, been investigated. This phenomenon is fairly recent acquiring momentum in the last three years [Forrester 2001]. We propose to investigate the phenomenon of the extended organizational form and the issues surrounding this hybrid governance structure using empirical means. Towards this end we first propose a theory of Information Work and Information Flows in the section that follows.

3.0 A Theory of Information Flows and Information Work

We provide a theory of information flows and information work within organizations to explain the nature and extent of outsourcing of information-rich processes. The reason that the execution of processes is expensive is because the transformation of data into information and then into knowledge that can support decision making requires a combination of human intervention and automated routines that can be executed by computers. At every stage in the transformation of data into information, the intervention of the decision maker is necessary – it is this combination of human intervention and machine processing that create the information flows which combine to form business processes. If a business process is examined from end-to-end – i.e. from the point of data capture to managerial reporting it will be seen as a collection of multiple information flows. To understand the costs associated with these information flows, it is essential to understand the role played by the IWs. Towards this end we offer a model of information work which we term as the ‘Knowledge Continuum’.

3.1 The Knowledge Continuum: As raw data is transformed into knowledge that can support decision making, intervention by IWs is needed at various levels to convert, translate, transform and validate the data that is fed into corporate information systems. The transformation of data into knowledge that can support decision making is achieved through the combination of human intervention (by IWs) and computer processing (automated routines that sort and classify large data sets). The IW is asked to do those tasks in response to infrequently occurring information needs or where the information need is sufficiently unstructured for it to require human intervention as opposed a routine that can be run off a computerized menu. The Knowledge Continuum can be thought of as a having ‘data origin’ and a ‘knowledge end’ which services the decision makers within a corporation.

Figure 1: The Knowledge Continuum
It is thus clear that business processes are created by IWs who create and transform information flows. The nature of the work done by the IW depends on the locus of her intervention in the knowledge continuum. Since business processes are collection of information flows, the cost of executing a business process is determined by the extent of IW intervention required and the nature of the IW intervention required. If business processes have different cost structures then they must also different levels of ‘value’ associated with them. To understand the relative importance of business processes, we propose a framework called the Value Hierarchy of Processes.

3.2 The Value Hierarchy of Processes:

To understand the migration path of processes as well as the logic of process transfers to centralized service farms it is necessary to look at a related concept – the idea of *Value Hierarchy of Processes*. The location of a process within the Value Hierarchy can be described as analogous to the ‘distance’ between the locus of revenue capture by a firm and the process that supports the capture of revenue. The location of a process on the Value Hierarchy then is a measure of the revenue contribution of the process and can be understood as a combination of two elements: the first is the extent to which the process contributes to creating value for the customer and the second is the extent to which the process contributes to monetizing (appropriating or capturing) the value that a firm creates for its customers. In the financial services industry, for instance, high levels of competition make it necessary for firms to be able to create new sources of value and strengthen the means of monetizing this value. The ‘finished product’ that is delivered to the customer, the work in process, the inputs and raw materials are all information flows. Several processes are braided together to calibrate and customize the information, validate it, ensure legal compliance to create a revenue flow from or to the customer (for example, in the case of investment products) and the resulting financial service is delivered to the customer. Processes that help in monetizing the value would typically create trust, offer the consumer customized interactive experiences calibrated to her needs which, in turn, would create switching costs, and erect barriers that would be costly for competition to scale if it tried to acquire the firm’s customers. If all the processes that support the creation and capture of value by a firm are ranked in the order of their criticality, the most critical process would be located closest to the point of revenue capture while the least critical processes would be located farthest from the point of revenue capture. We define a term ‘*Value Hierarchy Index*’ (VHI from hereon) to indicate the proximity of a process to the locus of revenue capture. Processes with low VHI are highly critical to creation and capture of revenue by the firm while processes with higher VHI are typically the support processes that are performed by the firm’s “back office”.

Initial evidence from our field research reveals an aspect of these processes: the extent of analysis and expertise required of the IW (who executes the processes) is *inversely proportional to the VHI* of the process. For instance, a process that requires an IW to read an invoice or a billing claim and key it into a database (so that the payments to the vendor can be automated), requires relatively little expertise on the part of the IW and can be executed routinely by referring to a set of rules. In direct contrast is the skill set required of the IW responsible for managerial reporting. She often analyzes financial performance information, such as operating expenses and
customer balances, the yield on different financial products, etc. and needs to have considerable expertise and the ability to make decisions based on her understanding of a complex set of rules. The least important processes, indicated by a high VHI tend to be the ones that are outsourced first.

The migration path of processes to a centralized hub usually begins with the most distant processes first and traverses the path of decreasing VHIs. This trend is seen in the case of GE Capital as well. In the mid 1990s GE Capital began by operating call centers out of India. As the firm’s overseas operations stabilized, the firm relocated to India more knowledge intensive and strategic process such as data mining which are characterized by complex information flows to its captive service hub. Thus the Value Hierarchy of Processes often determines the sequence in which processes are outsourced to a third party provider. It is important to note that this trend is not limited to outsourcing of process to off-shore service providers. Large firms often outsource processes to third party provider firms in the same country to benefit from gains to specialization.

4.0 Research Issues and Hypotheses

We draw from two theories that explain the existence and the boundaries of the firm; the Firm-as-Production-Function theory and the Transaction Cost theory. The Knowledge Continuum determines the cost and productivity profile of the processes that are outsourced. A claim that has been made frequently by several sources in support of outsourcing is that outsourcing leads to two kinds of gains; the first is savings on wages paid to IWs usually because the processes are migrated to lower labor cost regimes. A second source of gains is often attributed to the superior skills of the workers found in these labor regimes. While the first can easily be verified and indeed there is very strong evidence in support of the claim that has been released by several research firms [Forrester 2001, Gartner 2002], the second claim is supported by largely anecdotal evidence and potentially apocryphal reports of some firm-specific practices. In theory the second claim should be easy to verify; if indeed the skills offered by the outsourcing firm are superior to those found in the user company, then controlling for wage costs, the marginal productivity of labor in the provider firm should be higher. To test this, it is necessary to formulate cost and production functions for information-rich tasks such as those found in the back offices of firms. While formulating a cost function is a relatively less complex task and can be achieved through administering a survey instrument, formulating a production function is a task fraught with several hazards. The first and most basic problem is one of measurement. The output of IWs (and by extension information-rich processes) is difficult to measure. For tasks that lie closer to data end (left) of the Knowledge Continuum (see figure 1), this less of a problem. Examples of such tasks include, medical transcription, data conversion, call centers and insurance claims data entry etc. As opposed to these tasks, the functions that map on to the Knowledge (right) end of the Knowledge Continuum are often more managerial in nature and have considerable strategic impact. The output(s) of these processes are difficult to measure and often it is even difficult to find other measures that would serve as for proxies for output. A second issue that confounds the problem of measurement relates to the idea of quality [Hitt 1999]. Measures of marginal productivity of labor usually assume a constant quality level of output of a good that has a uni-valued quality
function. Since the quality of processes executed by the Provider firm are difficult to measure it is difficult to 'control for quality' in computing the marginal productivity of labor. Nevertheless the question of productivity associated with outsourcing is too important to be left unaddressed. We formulate our hypotheses in this context and outline a possible method for operationalizing the factor variables.

**H1:** The difference in the marginal productivity of labor between the user and provider firms increases as the VHI of the process decreases.

Since processes with higher VHI also call for a greater degree of expertise on the part of the IW, the user firm would stand to gain by allowing a single provider firm to gain expertise in its domain by having richer information transfer through longer periods of contractual relationship. This observation leads us to the next set of hypotheses.

**H2A:** The extent of integration between the information systems of the user and provider firms is inversely proportional to the weighted mean VHI of the outsourced processes.

**H2B:** Processes with lower mean VHI will be outsourced to fewer provider firms and the relationships will be characterized by greater contractual stability.

**Expansion Path of Process Migration:** As firms start outsourcing processes, the sequence in which processes migrate from the firm is often determined by the location of the process on the Knowledge Continuum. Processes that are located toward the data end of the knowledge continuum often have deliverables that are measurable and the parameters of the risk of outsourcing these processes are quantifiable. As opposed to this, the process that are toward the knowledge end of the continuum are often difficult to measure and the risks associated with outsourcing these processes is often difficult to quantify. We would therefore, expect to see that the first processes to be outsourced would be located closer to the data end of the knowledge continuum and as the engagement model matures, the user firms start outsourcing processes closer to the knowledge end of the knowledge continuum. A key factor that drives the decision to expand the scope of outsourcing (move right towards the Knowledge end) is the level of risk associated with the provider firm (as experienced by the user firm). As the provider firm offers evidence of its process execution capacity at a given volume of processes (outsourced) the logical course of action for the user firms would be to test if the provider firm can be entrusted with a higher volume of processes. A second benefit to the user firm in outsourcing an entire set of processes is the savings on managerial costs and the overheads associated with maintaining an entire division. Therefore, we would also expect to see that the volume of outsourcing of lower order

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4 From an econometric standpoint, it is enough if comparative measures of the marginal productivity of labor (or capital) are taken on the iso-quality frontier if the good has a multi-valued quality function.

5 As manifest in richer information duplexing between the two firms.

6 The weights will be a combination of dollar volume of process outsourced and the frequency of information transferred. For expository ease we omit the details here which we can provide on request.
processes increase before the scope of outsourcing expands to higher order processes. This observation leads us to our first set of hypotheses.

**H3A:** The sequence in which process are outsourced will be inversely correlated with the mean VHI of the outsourced process.

**H3B:** As the engagement model matures, we would expect to see the volume of outsourcing of higher VHI processes increase before the scope of outsourcing expands to include lower (mean) VHI processes.

**The Extended Organizational Form: Control, Monitoring and Governance:**
Researchers have argued that the boundaries of the firm are determined inter-alia by Transaction Costs and the cost of writing incomplete contracts.(references??) In the context of firms that outsource their business processes, there is evidence to suggest that a combination of factors which include the extent of strategic risk faced by the firm in outsourcing its processes, the cost of monitoring the quality and accuracy of the process execution at a remote shared service center (third party or captive) and the relative cost advantage of the provider firm (or the captive center) all play a role in determining the boundaries of the knowledge-intensive Firm. When the costs of monitoring the outcomes and risk parameters associated with strategic outsourcing are high, firms may well choose to decouple monitoring and control related tasks. Thus we expect to see quasi-market structures emerge in which the user firm may do all the monitoring and control some of the provider firm’s managerial functions. The provider firm, in turn, may take over some monitoring function and cede some control to the user firm. Thus, managerial control which is essentially a feature of the hierarchy may be found even in the case of a market solution. The resulting organizational form that emerges is defined both by the control-monitoring trade-off. An extended organizational form that incorporates the elements of a market mechanism (incentives based on monitored outcomes) and a hierarchy (outcomes driven through managerial control) will emerge as the optimal governance structure.

We define two forms of the Extended Organizational Form based on the locus of the monitoring and control functions which we term as the *Strong and Weak Forms* of the Extended Organizational Form.

**Strong Form:** In the Strong Form of the extended Organization, the user firm does all of the monitoring and exerts some control over the provider firm (other than through price and incentives). Here the structure of the relationship resembles a hierarchy more than a market transaction. Managerial control, which is essentially a feature of hierarchies, is one of the means by which the user firm orchestrates coordination between itself and the provider firm.

**Weak Form:** In the Weak Form of the extended Organization, the user firm shares both the monitoring and control functions with the provider firm. The provider firm is compensated on the basis of the extent to which user firm believes that the SLAs\(^7\) were met by the provider firm. Some parameters of the service can be remotely monitored by the user firm while some others are costly to monitor remotely. In such

\(^7\) Service Level Agreement
cases, the user firm cedes some of the authority to the provider firm and accepts on trust the metrics provided by the provider firm. In return for this the user firm exerts some control over the provider firm’s agents that do the actual monitoring. When costs of monitoring the provider firm’s output quality via remotely located managers of the user firm are high we would expect to see the monitoring and control tasks be split between the two firms. This observation leads us to our next set of hypotheses.

**H4A**: As the extent of strategic impact of the outsourced processes increase, firms will move away from a market solutions to quasi-hierarchies.

**H4B**: As the cost of measuring the outcomes associated with outsourcing increases, firms will favor the Weak Form of the Extended Organization over the Strong Form.

**H4C**: Over a period of time, as the engagement model matures, the Strong Form of Extended Organization will evolve into the Weak Form to optimize on costs of monitoring and control.

### 5.0 Methodology:

There are two parts to the research agenda that we propose. An empirical part where we collect data and a theoretical part that results in the formulation of models of information sharing in knowledge intensive markets and an experimental part that validates managerial behavior and the resulting extent of information sharing.

We discuss each of these in brief below.

#### I. **Empirical Aspects:**

1. We have identified knowledge-intensive industries with complex, information-rich back office processes which are being outsourced to third party providers or migrated to shared service centers. The industries that we plan to study include:
   - Financial Services (retail/institutional)
   - Bio-Technology Firms
   - Health Care (and related Services)

2. We plan to use primary data which we will collect through an instrument that we will design to validate our hypotheses. We have identified some of firms from whom we will collect the data. We plan to meet with other firms in Singapore in summer 2003 and empanel them in the survey.

3. We plan to use longitudinal and cross sectional data collection methods. To validate hypotheses H2A, H2B, H3B, H4A and H4C, it is necessary to have a follow-up survey administered to the panel to track the changes over multiple periods.

4. Panel Composition: We plan to work with firms in USA, Singapore, Manila (Philippines) and India. In the case of Biotech Industry and
outsourcing of high-end processes, we plan to study firms in the US and Singapore.

II. Theoretical Framework:

1. Based on the patterns that we observe in the first part of the research, we will develop models of the Extended Organizational Form and inter-firm Governance relations in each industry segment. We are particularly interested in how firms in the Bio-Tech and Financial Services industries enter into off-shore contracts. Our model will investigate the following issues:

   i. Types of work outsourced by firms in the Biotech sector and financial services industries to their off-shore partners.
   ii. Pricing of services.
   iii. Monitoring and Control mechanisms that are featured in the BPO deals.
   iv. How Captive Service Centers differ from third party solutions and the determinants of the decision to go with either governance form.

2. We also plan to develop analytical models of a firm’s choice of governance forms and the resulting trade-offs that firms face between efficiency and the erosion of competence and domain expertise that follows the wholesale outsourcing of a firms back office.

6.0 Concluding Remarks:

This research agenda deals with an emerging trend in the knowledge-intensive sectors of the economy. In particular, it deals with the Biotech and financial services industries which are both of considerable interest to Singapore and factor prominently in its economic plans. Insights that emerge from our research which help explain what makes firm choose strategic partners overseas and the kind of businesses that could be migrated to the region will be of considerable value to economic planners and policy making bodies in Singapore.
Partial List of References


