

Determinants Of Output Quality In Offshore Outsourcing Of Services: Evidence From Field Research

Introduction:

Global sourcing of business services by firms – often referred to as Business Process Outsourcing - has grown considerably in that last decade and it is now as widespread as the global sourcing of physical goods. A recent research report¹ forecasted that the global sourcing of services could become a 300 billion dollar industry by 2010. Another research report by Gartner Inc. estimated that the outsourcing business processes was a 234 billion dollar industry in 2005. While a lot of the initial media attention was centred on outsourcing of call centres, outsourcing of business processes now spans knowledge-intensive functions such as radiology, equity research, cash flow forecasting, supply chain coordination, market research, claims processing (insurance) and tax accounting. The rapid growth in both the scale and scope of offshore service production brings in its wake the challenges of maintaining consistently high levels of output quality. Recent surveys of output quality by research firms such as Forrester Research and consulting firms such as Price Waterhouse Coopers show that there has been a fall in the quality of offshore service providers as compared to the early years 1996 – 2000 and further, there has been a lowering of customer satisfaction levels experienced by clients (buyers) who now claim that they are less happy with the quality of offshore service providers. A NASSCOM² study points out that the loss to Indian service providers from poor quality of service output could be as high as \$ 3.5 billion by 2010. This does not include the costs experienced by buyers, which is likely to be of even greater magnitude. Our paper addresses this issue: what factors determine the quality of output in the offshore production of services?

Prior research has looked at the question of output quality either as a problem in the domain of Principal-Agency or as a problem that has to do with the structure of work – or more specifically, about the structure of the process. Researchers that looked at this problem through the prism of Principal-Agency tended to emphasize contracts and contract structures. They looked at aspects of contract structures and studied how these could have an impact on the various problems of misaligned incentives – the canonical issues in this domain being aspects of Moral Hazard, effectiveness of penalties and incentives, opportunistic renegotiation (in part leading to the hold-up problem) and governance-based solutions (JVs, Captive Centers³, etc.) to the problem of sub-optimal effort exerted by the agent. Others have studied the problem through the prism of process structure (or the impact of work) and how it influences such as aspects as the decision to offshore, the ease of knowledge transfer, the choice of governance structure for the offshore process production center, etc.

We see the problem of output quality to be influenced by the two issues discussed above – the problems of agency and the nature of work. In other words, we believe that output quality of services sourced offshore are influenced both by the problems of Principal-Agency and the attendant issues of incomplete contracts and by the nature of the work or

¹ By NASSCOM and McKinsey & Co.

² National Association of Software and Service Companies, based in India

³ A captive center is a fully owned subsidiary of a (usually) western MNC that is (usually) located in a lower wage regime and that executes services offshore for the MNC.

process structure. Where our research differs from the above is that we posit that the quality of output is *jointly determined by aspects of process structure that interact with and influence the dynamics of Principal-Agency*. Thus, our research investigates how these two sets of factors will interact and jointly determine the quality of output in the offshore outsourced production of services.

Principal Agency and Process Structure:

The link between the nature of the process and the problems of agency in general and moral hazard in particular merits investigations. Problems of agency are exacerbated when the buyer of offshore services (in this case the client firm) is unable to fully verify the level of effort made by the supplier of these services. The optimal response of the buyer under these circumstances is to write a contract that links the transfer paid to the supplier – via a scheme of penalties and rewards – to the quality of output of the supplier. Herein arises the second problem of agency. The cost of inspecting the supplier's quality of output is not insignificant. Very often the buyer has to exhaustively inspect the output of the supplier to identify if there are some errors of production that are a result of shirking (or the exerting of sub-optimal effort) by the supplier. This entails significant effort – and therefore, costs incurred – by the buyer. For instance, when a supplier of financial research services performs technical analysis on a corporation and writes a M&A report for an offshore client, the extent of analysis that the client needs to do to determine if the report's style and substance are fully compliant with the client's in-house standards for such reports, entails almost as much work on the part of the client as the work involved in producing the forecast. Some processes on the other hand, are relatively easy to inspect and the client incurs at most a small fraction of the cost of the actually producing the work. In our interviews with managers we were frequently informed that the nature of work or *the process structure determined both the ease of inspection and the accuracy of inspection*⁴. Some processes by their very nature are easy to inspect (for errors) while others are costly to inspect. During our interviews with managers of client firms we were often informed that where the processes are relatively easy to inspect the quality of output of the supplier was usually acceptable to the client. However, where the processes were difficult to inspect the incentives for quality built into the contract were blunted and the client also had to exert comparatively greater effort to inspect the output quality. Managers of both client firms and their offshore suppliers also advanced the view that the process structure – the kinds of information work that needed to be done to execute the process – determined the ease and accuracy of inspection. Many managers believed that greater the extent of the quantitative and analytical work⁵ involved in executing the process, greater was the ease and accuracy of inspection. Conversely, where work involved qualitative communication⁶, the ease of inspection was low and it was costly to inspect the output. When inspecting such work it became necessary for client firms to inspect a greater proportion of the finished output of the supplier to estimate the quality of work. Based on the above, we collected detailed process-level data on what aspects of process structure had an impact on the ease and accuracy of inspection and their resulting impact on the quality of output.

⁴ The client would inspect the output of the supplier.

⁵ Work involving quantitative analysis, mathematical formulation, optimization and techniques of Operations Research, uses of statistical tests, algorithmic execution, etc.

⁶ Work involving persuasion, interpretation, subjective judgment, context sensing, disambiguation, etc. We will provide a more detailed description and taxonomy of both kinds of work.

Research Issues:

We address the following research issues.

1. What aspects of process structure impact on the accuracy of inspection?
2. How does the accuracy inspection impact on the inspection effort made by the buyer?
3. How do the ease and accuracy of inspection when combined with contractual features result in output quality?

To address the questions above we collected *panel data on 196 processes from 13 firms over a period of 18 months*. We captured measurements each quarter thereby generating 6 complete data sets drawn from a balanced panel⁷.

Research Model:

We propose a model of effects in which the attributes of the contract, the characteristics of the process (the nature of information work) and the use of technology-enabled monitoring interact and determine the quality of output.

Hypotheses:

We present below some of the principal hypotheses – for expositional brevity we leave out the full set of hypotheses.

H1A: Processes that are characterized by higher levels of quantitative work index will result in higher inspection accuracy.

H1B: Processes characterized by higher codifiability will result in higher inspection accuracy.

H2A: Higher the inspection accuracy of a process, lower the inspection effort.

H2B: Use of Inter-Organizational Information Systems to monitor work in progress leads to lower levels of inspection effort (of finished output).

H3A: The presence of onsite managers of the buyer managing the execution worker at the supplier's site will improve quality of output.

H3B: Use of Inter-Organizational Information Systems will result in higher levels of output quality.

H3C: Penalties for sub-optimal quality (specified in contracts) will have a lower relative impact on quality for processes characterized by high levels of Quantitative Work.

Refer to Figure 1 for the proposed model of effects.

⁷ All firms and processes represented in the data set were present in all 6 periods.

We outline below a set of variables of interest. For considerations of expositional brevity we do not discuss the full operationalization of variables. We do however, provide brief descriptions of variables and the research model.

Process Attributes:

1. QWI – Quantitative Work Index
2. CWI – Communication Work Index
3. RWI – Routine Work Index
4. COD – Process Codifiability [1 to 5 scale]
5. INSPACC – Accuracy of Inspection [1 to 5 scale]
6. INSPEASE – Ease of Inspection [1 to 5 Scale]

Contract Features:

1. PEN – Penalty for falling below SLA specified quality level - as a fraction of price (percentage)
2. INCENT – Incentive for exceeding SLA specified levels - as a fraction of price (percentage)
3. ONSITE– Was the process managed by an onsite manager during the measurement period
4. S – Extent of output sampled by the buyer or an agent representing the buyer during the measurement period
5. INTIS – Use of an Inter-organizational IS to monitor work during the measurement period – [1 to 5 scale]
6. VOL: Volume of work executed in the current period as a multiple of the volume executed in the first period - $RV_{it} = \frac{V_{it}}{V_{i1}}$
7. QUAL: Quality of the i^{th} process at the t^{th} measurement period. Define by $Q_{it} = 1 - E_{it}$ where E_{it} is the error rate of with the i^{th} process at the t^{th} measurement period.
8. QUALSLA: The difference between the actual quality and the quality deliverable specified in the SLA $QS_{it} = Q_{it} - Q_i$ where Q_i is the quality deliverable of the i^{th} process specified in the SLA.

Dummies:

We use the following dummy variables to control for effects that result from factors other than those discussed in the model.

1. Industry
2. Country
3. Client
4. Provider

We use a three-stage regression model to analyze the impact of process structure on inspection ease and effort and the impact of the ease of inspection on the output quality.

The Three-Stage Regression model:

Stage 1: $INSACC_{it} = X_{it}\beta + e_{it}$

Where INSACC is the endogenous variable Inspection Accuracy and X_{it} is a vector of process characteristics – {QWI, CWI, RWI, COD } – and β s are the parameters that we wish to estimate.

Stage 2: We regress Inspection Effort – as manifest in Sample Size inspected – on the following variables:

$$S_{it} = \beta_0 + \beta_1 ONSITE_{it} + \beta_2 INTIS_{it} + \beta_3 INSACC_{it} + e_{it}$$

Stage 3: We regress the quality of output, Q as a function of the following:

$$Q_{it} = \beta_0 + \beta_1 S_{it} + \beta_2 INSACC_{it} + \beta_3 PEN_{it} + \beta_4 INCENT_{it} + \beta_5 INTIS_{it} + \beta_6 ONSITE_{it} + RV_{it} + e_{it}$$

Initial Results:

Preliminary analysis suggests that process structure does interact with the contractual features in determining the quality of output. There is also evidence in support of the following:

1. The use of inter-organizational information systems to monitor work in progress has a positive impact on output quality (results in higher quality of output).
2. The use of an onsite manager (client's) to manage the processes during execution produces higher levels of output quality.
3. Processes characterized by higher levels of Quantitative Work show sharper overall improvements in quality over time.

Completion Plan:

The data collection has been completed. We are currently collating some of the data from the later time periods and will complete collation and error proofing the data. We will analyze the data for the main effects discussed in the research model and investigate the extent to which process structure and contractual features result in determining output quality.

We plan to present the result of the completed analysis during the conference.

Figure 1:Determinants Of Output Quality: A Model Of Effects

