Offshoring Knowledge Intensive IT Tasks via the Internet: Criteria and Organizational Implications

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Abstract

Organizations offshore knowledge intensive Information Technology (IT) tasks for a labor cost arbitrage via the Internet. We empirically examine criteria reflecting organizational concerns with regard to offshoring knowledge intensive IT tasks and the accompanying software applications via the Internet. Organizations pay attention to negative implications for their on-site organizational dynamics and routines and the competitive relevance of tasks. Building on the Internet as a coordinating mechanism, they do not refrain from dividing labor in knowledge intensive IT tasks based on coordination cost arguments. They take into account though upsetting effects such as (1) a deterioration of core capabilities which triggers a replacement of hierarchical coordination with increasing use of markets, (2) an offshoring-induced division of labor which acts as an unwanted catalyst for disintegration and reduces access to resources, and (3) resistance from remaining employees in the home countries. Being confronted with internal turbulences, organizations can lower the upsetting effects by standardizing and commoditizing processes and actively undertaking coordinative countermeasures.

Keywords: Offshoring, Outsourcing, Knowledge Intensive Tasks, Information Technology, Internet

1 Introduction

Over the past decades, business has increasingly become global. Political changes, especially in the East, are transforming formerly socialist systems into market economies, and have facilitated globalization. For organizations, globalization added not only new sales opportunities but also new factor markets with lower wages in developing economies (Friedman 2005).

In developed Western countries particularly, organizations have acknowledged the opportunity of lower wages and aimed to benefit from labor cost arbitrage (Venkatraman 2004). They have exploited differences in local and offshore wages by offshoring tasks to low-cost countries. With the emergence of outsourcing service providers in offshore locations, organizations in Western countries obtained

quicker and less complicated access to low-cost labor. They could offshore tasks[1], i.e., outsource tasks to offshore locations. Different from moving parts of the own organization offshore, this does not require committing resources long-term (Evaristo et al. 2005).

Initially, organizations offshored entire production units - mainly blue-collar work - to low-cost regions (Lewin, Peeters 2006). More recently, however, organizations also began to shift knowledge intensive tasks such as Information Technology (IT) or engineering offshore (Dedrick, Kraemer 2006). However, organizations soon recognized that offshoring – and especially offshoring of knowledge intensive tasks – had many pitfalls such as delays, unsatisfactory quality, and diluted and depreciated know-how (e.g., Ang, Cummings 1997; Ang, Straub 1998; Kern et al. 2002).

Whereas offshoring of some tasks seemed to involve less risk and be overall beneficial for organizations, offshoring of other tasks obviously caused trouble. Therefore, distinguishing between tasks that are suitable and unsuitable for offshoring, and consequently offshoring only appropriate tasks to external service providers, promised to address that issue (Kern 2002; Loebbecke, Huyskens 2006). However, offshoring tasks also meant fragmenting processes, which created new coordination challenges with regard to reassembling processes.

In that respect, the Internet as enabling infrastructure not only facilitated uncomplicated transfers of knowledge intensive IT tasks to offshore locations, but also allowed for enhanced coordination when reassembling fragmented processes regardless of their dispersed geographical locations (Aron et al. 2007).

Nevertheless, it remained unclear whether organizations could benefit from offshoring knowledge intensive IT tasks via the Internet – and if so – which knowledge intensive IT tasks to select for offshoring and how to distinguish them.

In that context, we derive criteria that account for organizational concerns with regard to the division of labor in knowledge intensive IT tasks between the organization and offshoring service providers connected via the Internet. With an empirical study of some of the largest German companies, we examine the relevant criteria and discuss how and under which conditions, offshoring of knowledge intensive IT tasks could upset organizations.

2   Criteria for Dividing Labor in Knowledge Intensive IT Tasks

The organizational decision concerning offshoring of knowledge intensive IT tasks is an organizational decision concerning the division of labor between the organization and offshoring service providers connected via the Internet. To explain the division of labor in knowledge intensive IT tasks, we select criteria from Strategic Management and Transaction Cost Economics.

In *Strategic Management*, the division of labor is determined by its effects on the competitive position that possibly outweigh implicit cost advantages. In our case, it acknowledges the variety of software applications to support offshoring knowledge intensive IT tasks, reaching from commoditized and packaged applications to specifically developed and customized ones. According to *Transaction Cost Economics*, the division of labor in knowledge intensive IT tasks occurs based on an assessment of

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1   In this paper offshoring relates to offshore outsourcing and does not include the establishment of internal facilities in offshore locations. Hence, offshoring service providers are outsourcing service providers in offshore locations.

coordination costs emerging from asset specificity, uncertainty, and frequency of transactions. It is hence based on the cost of market usage. Together, Strategic Management and Transaction Cost Economics contribute seven criteria to the 'offshoring decision':

- *Competitive Relevance* can be attributed to resources that cannot be imitated by competitors at reasonable cost and which present potential sources of unique value. It serves organizations to accomplish a competitive edge as they exploit the associated resources and their unique sources of value. If disregarded, competitive relevance dilutes competitive edge and causes a deterioration of value (Nelson et al. 1996; Feeny, Willcocks 1998).

- *Strategic Vulnerability* originates in critical capabilities such as specialized or strategically important applications. With offshoring, strategic vulnerability exposes organizations to the risk of negative implications for their on-site organizational dynamics and routines such as losing critical skills needed across several functional areas (Quinn, Hilmer 1994; Vital, Benoit 2002).

- *Technical Specificity*, characteristic of software customization, antagonizes cost savings from mass production efficiency (Stuckey, White 1993; Lacity et al. 1996). Hence, it limits cost savings from offshoring software applications that are tailored to specific organizational requirements.

- *Site Specificity* relates to IT assets that are dependent on a specific location. When shifting such assets across geographical and organizational boundaries, site specificity exposes organizations to risks of escalating costs and leakage of information (Stuckey, White 1993).

- *Human Capital Specificity* points to organization-specific know-how possessed by an organization's personnel. It suggests that organizations with highly dedicated personnel may obtain better performance from in-house operations (Cheon et al. 1995; Aubert et al. 1996).

- *Transaction Frequency* determines the frequency of vendor search, screening, and negotiations, i.e., coordination costs (Aubert et al. 1996). Hence, a high transaction frequency, including upgrading and maintaining software applications, may limit financial benefits from offshoring.

- *Transaction Uncertainty* emerges from complex and indirect performance measurement (Poppo, Zenger 1998). It can only be mitigated by raising the intensity of control, which is typically associated with a cost increase (Earl 1991; Cheon et al. 1995; Benoit et al. 2004).

We investigate whether these criteria concern organizations with respect to offshoring and discuss the upsetting effects selective offshoring may have on organizations.

3   Methodology and Data Collection

To investigate which influence the seven criteria exert on the division of labor in knowledge intensive IT tasks, we apply logistic regression analysis to a suitable dataset. To that purpose, we use a questionnaire asking Chief Information Officers (CIO) or IT directors to assess the software used in their organization concerning the seven criteria. We cover each criterion with one statement to be assessed on a five-point Likert-scale. Having sent the questionnaire to a systematically sampled group of 238 of the- based on sales - largest German organizations across all sectors and industries in 2004, we achieved a response rate of 36.97% (88 CIOs or IT directors). In the dataset, we did not find any significant non-respondent bias.

4 Results and Findings

From the 88 responding organizations, 54 organizations used offshore outsourcing whereas 34 did not.

From Strategic Management, both criteria showed a significant impact on the division of labor in knowledge intensive IT tasks. The occurrence of competitive relevance and strategic vulnerability inhibited the shift of IT tasks to offshore locations and influenced organizations to keep knowledge intensive IT tasks on-site. Combined, both criteria account for 22.5% (based on Nagelkerke's R^2) of the variance in the organizational decision concerning the offshoring of knowledge intensive IT tasks.

From Transaction Cost Economics, four of five criteria did not have any significant influence on the division of labor in knowledge intensive IT tasks. None of the asset specificities, technical specificity, site specificity, or human capital specificity inhibited offshoring of software. Nor did transaction frequency exert a negative influence on offshoring of knowledge intensive IT tasks. Even though, transaction uncertainty showed a statistically significant influence, it did not explain a sufficient degree of the variance in the organizational decision concerning the offshoring of knowledge intensive IT tasks (11.5% based on Nagelkerke's R^2).

Whereas support for the two Strategic Management criteria confirms findings from full IT outsourcing, lack of support for the five Transaction Costs Economics criteria contrasts with the full IT outsourcing literature (Loebbecke, Huyskens 2006). Figure 1 summarizes the results of the logistic regression analysis conducted on the dataset from the survey among the largest German organizations in 2004.
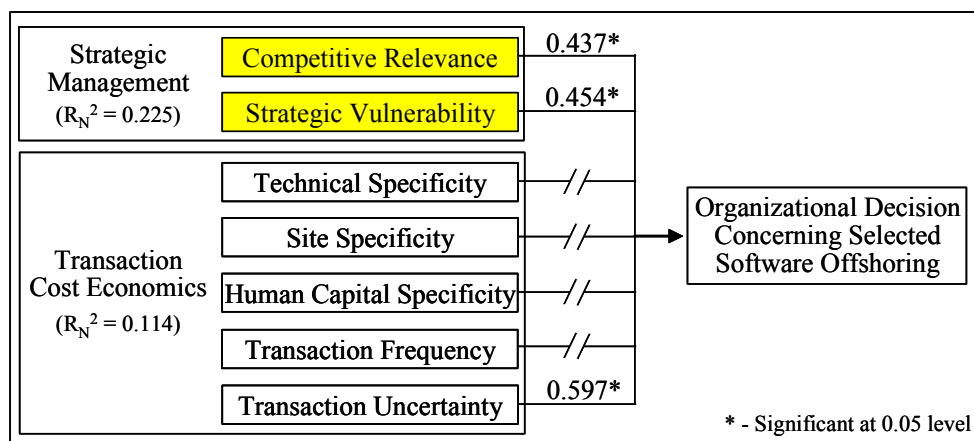

Figure 1: Criteria Influencing Organizational Decision Concerning Software Offshoring (Source: Loebbecke, Huyskens 2006, p. 420)

We find that organizations avoid offshoring of knowledge intensive IT tasks from which they anticipate negative implications for their on-site organizational dynamics and routines or which they consider competitively relevant. The more a knowledge intensive IT task and software application is competitively relevant to an organization, the less likely that organization will offshore it. Similarly, the more a knowledge intensive IT task exposes an organization to strategic vulnerability with negative implications for organizational dynamics and routines, the less that organization is inclined to offshore it.

However, organizations barely refrain from offshoring knowledge intensive IT tasks because of coordination cost arguments arising from transaction cost economics. Offshoring software applications, having software customized, or managing external personnel may increase coordination cost. However, the cost increase is often smaller than the offshore-related cost savings as suggested by offshoring

service providers. Concerning coordination costs, the Internet as common technical infrastructure appears to ease, even if not fully resolve typical communication-related coordination issues such as the ability to exchange thoughts, ideas, and technical requirements (e.g., Weisband 2002). Organizational commitment reflected in longer lasting contracts contributes to dismantling various barriers to offshoring knowledge intensive IT tasks (see also van den Hooff, de Ridder 2004).

Overall, however, the majority of organizations make use of offshoring also in the context of knowledge intensive IT tasks. Organizations clearly distinguish between tasks suitable and unsuitable for offshoring in order to avoid unwanted organizational disruptions. They offshore the suitable ones and thus reap benefits that were previously out of reach due to the exposure to a few critical tasks. Also, fewer criteria reflecting organizational concerns increase the share of tasks that are suitable for offshoring.

5   Discussion

Increasing offshoring of knowledge intensive IT tasks can be ascribed to institutional pressures to which organizations adapt. Organizations are compelled to operate within the competitive and uncertain global market, exacerbated by financial markets which exercise growing pressure to shape the internal working patterns and practices of organizations (Perrons 2004). They engage in substantial employment restructuring to simultaneously cut costs and increase employee effort (e.g., McCann 2008). Benefiting from eased restrictions on internal and external trade and deregulated labor markets, many organizations look for contract labor in offshoring countries. They conduct offshoring of knowledge intensive IT tasks within a wider strategy of segmenting core functions and routinizing and standardizing processes. Organizations subsequently shift the routinized and standardized processes as commodities to the periphery, make them mobile, and eventually - apart from site-specific tasks - offshore them (Howcroft, Richardson 2008; Sahay et al. 2003). They aim to - eventually - source software applications as tradable commodities in a global economy of services. They increase their productivity and move to 'higher value-added' processes (Sako 2006).

Organizations decide to offshore knowledge intensive IT tasks in order to grasp benefits in terms of (1) cost, (2) flexibility and (3) service quality. Prior to offshoring knowledge intensive IT tasks, organizations often gained experience in offshoring low-level, transaction-based service tasks as found in call centers (Taylor, Bain 2004). With experience from offshoring call centers etc., organizations then extend the offshoring scope to business processes involving knowledge intensive IT tasks. Such tasks typically include the development and operations of supply chain management software. Even though, the complexity level seemingly increases with extending offshoring from simple transactional to transformational processes instead, organizations can seize reliable service fulfillment by applying management techniques related to legal systems and contract fulfillment (Kundu et al. 2007).

When offshoring knowledge intensive IT tasks, organizations build on highly skilled personnel in the offshore location. Thus, they take advantage of national development trajectories in typical offshoring host countries (Lazonick 2007). Further, offshoring organizations profit from science and technology infrastructures, which can provide lower-cost, high quality service subsidized by governments in those host countries.

Finally, when offshoring, organizations rely on contractual labor. Hence, organizations can benefit from flexibility in transitional phases and, in the end, new ways of hierarchically organizing work in

their home and host countries (Biao 2007). As organizations undergo the transition from in-house legacy systems to standardized and modular IT systems, they often rely on contracting knowledge intensive IT tasks to typical offshore locations.

However, when organizations offshore knowledge intensive IT tasks, they also have to face effects of offshoring that upset the organization. Firstly, offshoring knowledge intensive IT tasks deteriorates organizations' core capabilities and becomes a catalyst for overall disintegration (e.g., Zenger, Hesterley 1997). Thus, the increasing division of labor, embedded in offshoring arrangements, upsets organizations. It makes it difficult for organizations to attract sufficient newcomers who want to pursue an IT career. It also exposes organizations to a vicious circle of increased offshoring of knowledge intensive IT tasks, decreased core capabilities, growing inability to attract important human resources, and hence further increased offshoring (e.g., Hirschheim et al. 2007).

Further, offshoring knowledge intensive IT tasks to low cost countries often coincides with a shift of hierarchically organized employment to contractual employment through subcontracting, employment restructuring, and de-/reskilling. Offshoring organizations are exposed to a varying availability of skills and working conditions in offshoring countries. At home, they face employee dissatisfaction due to less job security and lower wages and possibly employee resistance in the form of less engagement and motivation and decreasing initiative (Prasad, Prasad 1998). On-site personnel at home may even organize counteractions against organizational offshoring decisions (Rust et al. 2005), especially if work loads are intensified and performance pressures increase. Overall, offshoring knowledge intensive IT tasks is likely to destabilize the personnel in the home country and hence upset the offshoring organizations.

Some of the negative implications of offshoring knowledge intensive IT tasks may be mitigated though as organizations undertake countermeasures. Obviously, organizations need to pay attention to the technology transfer process with regard to knowledge extraction, ownership, work identity, commitment, and job security. Coordinative activities can ease the crossing of place, space, time, and culture with regard to highly complex rearrangements of offshore and onshore facilities (D'Mello 2006). More specifically, developing and implementing a transactive memory system, which allows for capturing and codifying knowledge through standardized templates, may allow organizations to take advantage of offshoring some knowledge tasks while maintaining control in the headquarters and thus reduce upsetting effects of offshoring (Kotlarsky et al. 2007).

6   Summary and Future Research

Organizations increasingly offshore knowledge intensive IT tasks to low-cost countries. However, they barely offshore competitively relevant tasks or those with expected negative implications for their organizational dynamics at home. In contrast to the IT outsourcing literature, organizations barely refrain from offshoring IT tasks because of coordination cost arguments.

Building on the findings of our empirical analysis and the early-stage discussion of upsetting effects of offshoring knowledge intensive IT tasks, future research may want to conduct comparative studies in various 'home' countries around the world and investigate how global companies organize their labor and knowledge intensive IT tasks at home and offshore. Further it may want to examine how organizations manage the implications of offshoring for their partners and contractors in a global network. Finally, future research may want to replicate our empirical study in other knowledge

intensive contexts such as media production and management consultancy, contexts where processes - for quite some time - seemed too complex for standardization and offshoring.

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