

KNOWLEDGE INTEGRATION AS A DRIVER OF GROWTH: THE CASE OF INDIAN IT FIRMS

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Abstract. *This paper argues that knowledge integration processes are critical in explaining firm performance and growth. We propose a framework in which efficiency, scope and flexibility of knowledge integration is promoted by a firm's learning, market and improvement orientations. Using a qualitative case study methodology, we compare two high-growth firms with two moderate/low growth firms in the Indian IT industry. We found that the high growth firms were high on learning, market and improvement orientations, whereas the medium and low growth firms did not score high on these orientations. Our findings also highlight specific aspects of these orientations that contributed to efficiency, scope and flexibility of knowledge integration. Our findings have both practical and theoretical implications.*

Keywords: inter-firm knowledge integration, market orientation, learning orientation, quality orientation.

In the last two decades, the resource-based view as emerged as the dominant paradigm to explain why firms differ in terms of performance (Wernerfelt, 1984). It argues that differences in resources and capabilities account for variations in firm performance (Helfat & Peteraf, 2003; Nelson, 1991; Peteraf, 1993). Resources and capabilities are not synonymous. Resources refer to assets or inputs that are used in production and are owned, controlled or accessed on a semi-permanent basis by an organisation. An organisational capability, on the other hand, refers to “the ability of the organisation to perform a co-ordinated set of tasks, utilizing organisational resources, for the purpose of achieving a particular end” (Helfat & Peteraf, 2003). While it is widely agreed that capabilities, along with resources play a key role in accounting for firm differences, it is not clear how these capabilities are created and sustained.

This paper aims to unpack the notion of organisational capability to explain firm differences in growth in the Indian information technology (IT) industry. Using a qualitative case study methodology, it compares and contrast two high-grow firms in the Indian It industry with two low-growth firms. While the methodology is qualitative, it is not a grounded theory approach without any apriori assumptions. The paper is based on the presumption that development of capability is predicated on learning. Therefore, creation, acquisition and transfer of knowledge within an organisation contribute to the development of capability (Grant, 1996a).

This paper specifically focuses on knowledge integration within firms, as a mechanism of capability development (Grant, 1996b).

In the literature, numerous knowledge integration mechanisms such as team autonomy, functional diversity, team dedication, resource complementarity, market orientation, information sharing and scope of knowledge domains have been identified following either authority-based directions or organisational routines (Das, Narasimhan & Talluri, 2006; Enberg, 2012; Erkelens, Van den Hooff, Vlaar & Huysman, 2010; Grant, 1996; Grant & Bader, 2004; Grandori, 2001; Lin & Chen, 2006; Tyre & Orlikowski, 1994). However, there is limited research on specific knowledge integration mechanisms in IT firms (Ahuja, Sinclair & Sarker, 2011; Bergek et al., 2013). More importantly, it is not clear why some firms are more successful in integrating knowledge than others.

Berggren et al. (2013) note that, while firms need strong absorptive capacity to integrate external knowledge, knowledge integration is a dynamic capability which evolves over a period of time and is dependent on the quality of a firm's *internal* integration mechanisms and operational capabilities, a view that is consistent with other researchers (Azadegan, Dooley, Carter & Carter, 2008; Lane, Koka & Pathak, 2006; Wagner & Boutellier, 2002). To this end, it is important to understand knowledge integration mechanisms, particularly for geographically-dispersed knowledge-intensive firms, where integrating dispersed specialist knowledge can often be challenging (Eppinger & Chitkara, 2006; Sosa et al., 2004).

Knowledge integration in IT firms is critical because knowledge resides within and across multiple actors who may be internal (for example, across teams and distributed work units) or external (for example, multiple client locations and suppliers across the globe) to the vendor firm. Moreover, the nature of knowledge is highly differentiated (for example, business domain knowledge, technical IT knowledge, legislative and contextual knowledge) and requires the presence of certain internal capabilities to facilitate its integration. Recent studies

have looked at the impact of Indian IT firms' offshoring business model, as well as its impact on knowledge integration and innovation outcomes (Ahuja et al., 2011; Lema, 2010). The work organisation and coordination mechanisms needed in this industry require strong functional, temporal and geographical coordination (Ahuja et al., 2011; Lema, 2010; Malik & Blumenfeld, 2012; Malik, Sinha & Blumenfeld, 2012).

The contribution of this paper is to conceptualise knowledge integration in terms of learning orientation, market orientation and quality management orientation in a firm (Day, 1994; Powell, 1995; Reed, Lemak & Mero, 2000; Senge, 1990; Sinkula, 1994). Organisation's learning orientation refers to a firm's commitment to learning, its open-mindedness, and development of a shared vision (Argyris & Schon, 1978; Garvin, 1993; Senge, 1990). A firm's market orientation is its ability to *sense* critical information and market intelligence from its customers and competitors and *disseminate* it cross-functionally within the organisation to frame an appropriate *response* and has been noted as a key knowledge producing behaviour in sustaining high performance and competitive advantage (Baker & Sinkula, 1999; Narver & Slater, 1990; Sinkula, Baker & Noordweier, 1997). A firm's quality management orientation refers to maintaining a strong customer focus, continuous improvement and the sharing of internal and external information within the organisation (Prajogo & McDermott, 2006; Reed, Lemak & Montgomery, 1996; Reed et al., 2000). If knowledge integration is to be a key capability differentiating firms, then these three orientations are critical for high performance.

The rest of the paper is organised as follows. First, a brief contextual background of India's IT industry is presented. This is followed by the development of a theoretical framework that unpacks the notion of knowledge-intensive organizational capability in terms of three firm orientations. Third, the paper discusses the research methodology employed and the data sources. Next, the findings are discussed based on the data collected from in-depth interviews

of four IT firms. The findings suggest that the adoption of quality management practices coupled with strong marketing and learning orientations lead to the development of firm-specific process management and service delivery capabilities that result in better knowledge integration and superior performance. Finally, the implications of these findings are discussed.

Context of the Study

The Indian IT industry has grown rapidly at an average compounded annual growth rate of around 30-40% between early 1990s and mid-2000s.. During this period, the revenues increased more than fifteen-fold, from an estimated US\$ 150 million in 1989 to aggregate revenues of about US\$ 100 billion in 2012 (NASSCOM, 2012). Explanations of the growth of the IT industry have mostly centred on cost arbitrage, government policies resulting in accumulation of human capital, availability of English speaking professionals, geographical advantage and economic reforms, including a lack of governmental interference (Arora, Arunachalam, Asundi, & Fernandes, 2001; Athreye, 2002; Ethiraj, Kale, Krishnan, & Singh, 2003; Ghemawat & Patibandla, 1999; Heeks, 1996, October, 1998). However, recent research has focused on the role of firm-specific organisational capabilities in fostering the growth of the Indian IT industry (Athreye, 2005; Ethiraj et al., 2005).

More recently, the the research focus has been on open innovation and networked offshore business models (Arora, Forman & Yoon, 2008; Ahuja et al., 2011; Lema, 2010; Tiwana, Bharadwaj & Sambamurthy, 2003) wherein the work organisation requires the effective integration of distributed specialist knowledge. Vendors need to integrate business process knowledge with technical knowledge to design, develop, maintain and test software applications and provide offshore business process services as per clients' needs.

Organizational Capability as Knowledge Acquisition and Integration

Organisational capability is constituted of routines that include both the performance of individual tasks and the co-ordination of those individual tasks. Organisations have two types of capabilities: (a) operational capabilities that involve performing a complex task, such as manufacturing a product or delivering a service, using multiple, repetitive activities or 'routines' (Nelson & Winter, 1982; Winter, 2003); (b) dynamic capabilities that refer to the "firm's ability to integrate, build and reconfigure internal or external competencies to address rapidly changing environments" (Teece, Pisano & Shuen, 1997: p. 516). In other words, dynamic capabilities assimilate, develop or reconstruct operational capabilities (Helfat, 2000; Helfat & Peteraf, 2003).

In knowledge-intensive firms, such as IT firms, the acquisition and integration of knowledge constitutes a dynamic capability (Berggren et al., 2013; Tiwana et al., 2003). Knowledge acquisition and integration can differ on three characteristics: (a) the extent to which specialist knowledge is acquired and integrated, referred to as the *efficiency* of integration; (b) the span of specialized knowledge that is drawn upon, referred to as the *scope* of integration; and (c) the extent to which existing knowledge can be reconfigured based on new inputs, referred to as the *flexibility* of integration (Grant, 1996). Therefore, activities that promote efficiency, scope and flexibility of knowledge integration will develop the core capability of a knowledge-intensive firm. In order to unpack the notion of organisational capability as knowledge acquisition and integration, we argue that, rather than simply focusing on acquiring and integrating specialist knowledge into organisational routines, it is critical to identify the key knowledge integration mechanisms that promotes efficiency, scope and the transformation of knowledge integration. This can be achieved through a firm's quality management orientation and its market-based organisational learning capabilities. The following section discusses the development of the study's framework.

Learning Orientation

This study defines organisational learning as the processes that add or modify an organisational stock of knowledge that drive its operational routines. In organisational settings, learning can lead to both tacit and explicit knowledge (Argote & Miron-Spektor, 2011; Levitt & March, 1988; Nonaka & von Krogh, 2009; Zollo & Winter, 2002). Tacit knowledge is a product of accumulating experience while explicit knowledge involves deliberate cognitive processes for generating and storing knowledge. Tacit knowledge is mostly the outcome of individual experiences. Explicit knowledge, on the other hand, involves collaborative activity aimed at the interchange of ideas and collective reasoning (Argyris & Schon, 1978). Tacit knowledge solely based on individual experiences is at the risk of serious erosion if the individuals were to depart. Explicit knowledge is not completely immune from such a risk either. However, formalising the common knowledge in organisational routines can mitigate the risk posed by employee turnover. The co-evolution of tacit and explicit knowledge leads to the emergence of dynamic capabilities (Zollo & Winter, 2002).

While the accumulation of experience and formal training can lead to individual implicit and explicit learning, such learning may not benefit the organisation unless it is formalised and embedded in the organisation's operational routines. The organisation also needs a set of routines that can sense opportunities and constraints in the environment, translate them into knowledge and modify its existing routines. These set of routines constitute the dynamic capabilities of the organisation. Although numerous organisational learning processes have been advanced in the literature (Deshpande & Webster, 1989; Huber, 1991; Sinkula, 1994), learning orientation involves the acquisition and development of new knowledge that can potentially change an organisation's operational routines. The process of market-based organisational learning is facilitated by three elements: (a) organisational values that promote

learning; (b) an organisation's market-information processing behaviours; and (c) organisational actions (Sinkula et al., 1997). To achieve high levels of learning and performance, then, organisations need to: (a) develop a learning culture that values investment in the training and development of employees; and (b) develop systems that support the creation, acquisition and integration of new knowledge.

Developing a learning culture is contingent on an organisation's learning orientation, which is defined as a constellation of three values: (a) commitment to learning; (b) knowledge questioning values or open-mindedness; and (c) developing a shared vision (Argyris & Schon, 1978; Garvin, 1993; Senge, 1990). Commitment to learning (LO1) fosters learning through ongoing training, the development of employees and the allocation of resources for such development, and drives the acquisition and integration of knowledge in firms. A low commitment to learning will result in inefficient and insufficient knowledge acquisition and/or inadequate integration. Open-mindedness (LO2) fosters the unlearning of established mindsets, values, beliefs and assumptions that may no longer be relevant in a changed environment (Senge, 1990; Sinkula, 1994). Open-mindedness influences the degree to which an organisation is satisfied with its theory-in-use and, hence, the degree to which proactive learning occurs (Senge 1990; Sinkula et al., 1997). Open-mindedness promotes flexibility of knowledge integration. A high level of open-mindedness will promote the acquisition of new knowledge, the challenging of existing mindsets and the reconfiguring of existing knowledge. A firm that is low on open-mindedness is more likely to exploit existing knowledge rather than explore new opportunities and knowledge (March, 1991). Shared vision (LO3) provides the direction of learning by clarifying organisational expectations and by motivating individuals to learn (Day, 1994; Senge, 1990; Sinkula et al., 1997). More importantly, shared vision promotes the scope of knowledge acquisition and integration by fostering cross-functional collaboration towards a common goal. Smith, Oczkowski, Macklin, and Noble

(2004) found learning orientation (Sinkula et al., 1997) to be highly correlated with a number of training factors, such as increased training expenditure, a proportionately greater attention to the training of managers, increased focus on the development of behavioural skills, a greater use of coaching and mentoring and an increased decentralisation of responsibility for training to line managers.

Market-oriented Learning

While learning orientation is an organisation's knowledge questioning values, the organisation needs specific knowledge producing behaviours to translate this value into specialist knowledge. Slater and Narver (1995) and Day (1994) have suggested that market orientation is a culture or a value system that allows firms to develop the capacity to learn from its customers and competitors. Market information processing is the process by which external market information is acquired and transformed into knowledge (Kohli et al., 1993; Narver & Slater, 1990; Sinkula, 1994). We label these market orientation elements as sensing (MO1) and disseminating (MO2) information from the external market across the organisation. Of more importance is knowing what information to sense or generate from a customer's needs and the external competitive environment. If information acquisition is done well, disseminating it across the relevant parts of the organisation and then framing a response is relatively easy. Information sensing and dissemination promote knowledge acquisition and integration respectively. Specifically, information sensing (MO1) promotes efficiency while information dissemination (MO2) promotes the scope of knowledge sharing. Information dissemination is the ability to diffuse the information generated, vertically and horizontally (Argyris & Schon, 1978).

Sinkula et al. (1997) found that organisations with high levels of learning orientation are more likely to question their current theory-in-use, challenge basic assumptions and be open to new ideas and knowledge. While new knowledge is procured through an organisation's

market orientation abilities, it can be refined, redefined and challenged through its learning orientation, depending on the extent to which its learning and market orientations are developed. In recent years, researchers have focused on the association between learning and market orientations and organisational performance outcomes (Baker & Sinkula, 1999, 1999b). Together, they are sufficient to promote knowledge-intensive organizational capability since they promote the three components of capability – efficiency, scope and flexibility of knowledge acquisition and integration. However, a third component significantly enhances knowledge integration capability by promoting each of the three components. This is referred to as the improvement or quality management orientation.

Quality Management Orientation

Quality management orientation is defined as a set of management values that focuses on customer satisfaction, continuous improvement and treating the organisation as a total system (Dean & Snell, 1991; Sitkin, Sutcliffe & Schroeder, 1994; Snell & Dean, 1992; Reed et al. 1996, 2000) and often requires top leadership commitment, training and education and having an appropriate work culture. An integrated quality management approach can inform and implement functional integration between a firm's marketing, operations and people management functions. Quality management or improvement orientation can be encapsulated into three broad values. We label these values as an organisation's: commitment to investment in quality and information sharing (QM1) (e.g. leadership commitment and shared beliefs and values regarding systemic information sharing); focus on continuous improvement (QM2) comprising internal and external customer focus and process management; and (c) team working including functional teams and cross-functional integration (Prajogo & McDermott, 2006). Information sharing promotes the scope of knowledge integration. Focus on continuous improvement promotes the scope and flexibility of knowledge integration. Team working (QM3) promotes all three components of the

knowledge integration system. Malik et al. (2012) and Malik and Blumenfeld (2012) noted that quality management capabilities of Indian offshore business process outsourcing vendors acts as a set of phronetic (prudent or practical wisdom) values that develops knowledge questioning values (learning orientation) and knowledge producing behaviours (market-based learning). Since efficiency, scope and flexibility of knowledge integration were not directly measured in this study, learning and development indicators are included in the theoretical framework that informs the study. This is as shown in Figure 1. Figure 2 shows the relationship between the different components of the three value orientations and the components of knowledge integration as a key organizational capability.

Insert Figures 1 and 2 about here

As Figure 2 shows, the addition of quality management orientation significantly enhances the efficiency, scope and flexibility of knowledge acquisition and integration. The basic premise of this study is that superior knowledge integration capability leads to sustained growth and performance in dynamic markets. Therefore, differences in a firm's market, learning and quality management orientations should lead to differences in its knowledge integration ability. Unpacking organizational capability in terms of learning, market and improvement orientations gives a much more nuanced view of how the integration mechanisms of direction and routine can be strengthened through these values and behaviours.

RESEARCH DESIGN & METHODOLOGY

This study employed a qualitative case study design to identify the specific knowledge integration mechanisms used in Indian IT firms. A maximum variation purposive sampling approach was followed in the selection of cases (Eisenhardt, 1989; Miles & Huberman, 1994; Yin, 2003). Such a sampling approach was important considering the firm level differences in performance and the uneven profile of firms that exist in India's software industry (Ethiraj et al., 2005; Heeks, 1998). Case selection utilised the following criteria to observe the

phenomenon in a diverse set of circumstances. The criteria were developed using extant literature on India's software industry (Banerjee, 2004; 2006; Ethiraj et al., 2005; Heeks, 1998): *enterprise size*, including large (1001–3000) and very large organisations (more than 3000); *ownership*, including multi-national (MNC), Indian or a joint venture of Indian and MNC firms; *nature of services*, including IT product development, project (IT software services) and process (BPO) environment; and *nature of product-market strategy*, including slightly differentiated services (with medium to high billing rates and service complexity) and highly differentiated and specialised services (with high value and service complexity).

Using the National Association of Software and Services Companies (NASSCOM) directory of software organisations in India and the author's contacts, six organisations agreed to participate in the study, however, only four were selected based on the extent of their willingness to participate and provide data and support for the study. Table 1 provides a descriptive account of the four organisations involved in the study as well as a summary analysis of the strength of the three key orientations, extent of training and workplace changes.

Insert Table 1 about here

Following careful content analysis and a review of the literature, the main elements of each concept/theory were noted and semi-structured questions were developed for each sub-construct or aspects that were critical in answering the study's research questions. The use of an interview schedule helped in cross-checking the data from different informants. The semi-structured nature of the questions allowed for flexibility in data collection, especially when new information emerged in the course of the interview that needed further exploration. While the interview schedule ensured consistency across multiple informants and case sites, a semi-structured approach enabled the collection of organisation-specific contextual information. Given the diverse nature of values being explored, a purposive maximum

variation sampling strategy was appropriate and in line with previous studies (Malik & Blumenfeld, 2012; Malik et al., 2012) to obtain data from the following informants: country head, human resource and training managers, project, product or process managers, project, product or process employees, business development managers and quality or business excellence managers.

To help obtain consent for participation, details of the key organisational contact were provided via email communication to case study organisations. Depending on the level of access provided, the number and nature of informants varied in each organisation. A total of 30 respondents were interviewed in this study (see Table 1 for details). On average, the interviews ranged from 60 to 90 minutes. All the interviews were conducted in English. They were transcribed (with grammatical corrections, where necessary) and coded by the first author. The key informant from each participating case study organisation was sent a copy of the case study's draft report for validation and accuracy. Each case organisation was asked to comment on the technical accuracy of the data collected, keeping in mind the state of affairs when the researcher visited the organisation.

All transcripts were read at least twice to allow for reflection on the field notes and observation summaries. The interview transcripts were coded based on *a priori* concepts. However, given the open and flexible nature of the coding scheme adopted in this study, additional codes emerging from the data were inductively added for further exploration and analysis. Such an approach allows for rival explanations to be accommodated in the analysis and helps in refining or extending *a priori* concepts or identifying new codes. The use of pattern codes helped in the identification of themes and relationships that emerged from various *a priori* and new theoretical categories. Each theme and pattern was based on multiple observations and was accompanied by an analytic text in all the case reports. Field notes, reflective remarks, organisational documents and narratives were used in the

development of a case study database. Key codes used to analyse the data are shown in Table 2. Specific data were collected on the extent of the three orientations present in the cases and the employee training provided by each firm. Training provided was used as one of the measures of operational capability since training is primarily meant to upgrade the existing stock of knowledge.

Insert Table 2 about here

The increase in employee numbers between 2010 and 2012 was used as a measure of organisational growth because the nature of ownership (wholly-owned MNC subsidiaries, private Indian firms) made it difficult to collect financial measures of performance such as revenues and profitability. Growth in employees is a valid measure of performance in this industry because offshore IT vendors realise a significant proportion (more than 95%) of their revenues based on time and billable resources from their customers on the basis of ‘service seats’ or the full-time equivalent cost of resources (Malik et al., 2012), indicating that a large percentage of employees are billable or revenue earning resources. A separate database was created for each case organisation (to enable focused within-case analysis). A database was also created for cross-case analysis. The database included field notes, transcripts, coding manual, protocol, organisational documents, news clippings, operational data, quality management performance data and tables, matrices, displays and figures for analysis. Following Yin (2003), pattern-matching and explanation building analytic strategies were applied to different data from within- and cross-case analysis to the study’s theoretical constructs.

FINDINGS

Firm Classification

On the basis of the growth in employee numbers, the four firms were clustered into three categories – high, medium and low growth firms. Firms were also classified as high, medium or low based on the strength of their orientations: market, learning and improvement orientations. The measures of workplace change and extent of training are also included as they are a reflection of changes in resources, task sets and coordination protocols, that is, operational capabilities. These measures were also classified into high, medium or low.

Firms A and C were classified as high growth, Firm D was classified as medium and Firm B was classified as a low growth firm. Firms A and C reported high growth rates. Firms A and C also scored high on all the three orientations, had high levels of structural change and invested in significant employee training. Firm D was moderately high on improvement orientation, medium on market and learning orientations, structural and technological changes and medium to low on training provision. This study classifies Firm B as a low growth firm, however, it was medium on all the three orientations including structural and technological changes. It did provide high levels of training but the focus of the training was more on bridging the gap between what the industry needed and what the national engineering curriculum covered. Despite offering higher volumes of training, managers reported a lack of strong cross-functional team approach, poor information sharing mechanisms and the need for more domain- and industry-specific training to deliver better IT services and solutions. Table 3 summarises these findings.

Insert Table 3 about here

Efficiency of knowledge acquisition and integration

There was significant diversity in the way firms integrated new and specialised knowledge in their routines. This can be partly explained by the diverse nature of product markets and the strategic choices exercised by vendor firms' senior leadership in acquiring, developing and assimilating certain specialised knowledge. Although there were different authority structures

and internal routines to achieve efficiency of integration, the sub-elements of market, learning and improvement orientations affected the level of knowledge integration. Successfully sensing information from its parent firm, clients and network partners (MO1), upholding a commitment to investment in learning and development infrastructure (LO1) and team working (QM3) enabled efficient knowledge acquisition and integration. Strong quality management orientation provided direction for training to develop knowledge that was critical to the performance of a project, process or product. For example, Firm A's manager noted:

We hire 3000-4500 people every month and train them. ...So, for the first six months, year-to-date, we would have trained 19,000 people on the floor and we have another 3000 people in [the training system].... [Training] is a large scale, high volume engine. [Our focus is on] the baseline of average handling time cost ...in that [time] limit the agent has to deliver on certain areas such as call quality, customer experience and CSAT [customer satisfaction]. ...time is cost [and] there are limits... there are thresholds for all of that the agents has to meet. There are 7th and 11th week [productivity] thresholds. The focus is on getting [agents] down to optimal levels of performance in the 5th week. Only then we are in high positive territory financially.

Although Firm B invested heavily high on learning and development, it was unable to diffuse (MO2) the frequent changes to its knowledge base geographically and also found it difficult to communicate effectively the dynamic changes requested by its new clients as such changes had to go through its new parent organisation. As one manager noted:

There are client updates sent from different locations for different levels. Being a captive centre [wholly owned subsidiary], we do not talk much to the clients...we simply liaise with our parent firm in the US.

Firm C, a high-end semiconductor microprocessor product development company, designed a different path to acquire and integrate knowledge. It had a smarter work design than the larger and established microprocessor rival firms and employed certain generic technology tools (LO1, MO1 and QM 3) for knowledge diffusion and chip design efficiencies. This was

a deliberate strategic design choice by the top management team when they were setting up operations in India. They had a choice to make India an execution centre or mirror the high-end product development work organisation in the US. Firm C chose the latter path. As one manager observed:

By and large, product design sensibility for producing the chip is the same. ... so you have to tweak bits here ... Those things are horizontal [in design] and cut across the organisation. ...our software development – writing the drivers and compliers and working on the hardware and software interfaces are a horizontal team that would cut across the organisation...that will drive efficiency and cuts down the costs using same methodologies. [We] also make sure you have common pool of competencies across the activities that are similar but not necessarily identical in nature.

Firm D followed its UK parent's global competency framework for all its technical and behavioural knowledge categories. Sharing and accessing (MO1, LO1 and QM3) such knowledge through its global technology infrastructure was challenging as it had a small pool of internal and external resources. Furthermore, with the onslaught of the global financial crisis, there was a cutback on external training and other discretionary expenditures. Quite unexpectedly, this change had a positive impact on its learning and development infrastructure.

To summarise, Firms A and C demonstrated high levels of LO1, MO1 and QM3 in their routines whereas Firm B was weak on team working and inter-functional coordination, which affected its overall efficiency of learning. Being part of the rather conservative financial services industry, Firm D encouraged its employees to pursue alternate career paths (LO2 and QM2) rather than reducing its headcount. As a result, a number of its employees became trainers, which helped it to develop its scope of knowledge integration capabilities.

Scope of knowledge acquisition and integration

The efficiency of common task knowledge is not enough. The scope of knowledge integration was developed through the strength of firms' information dissemination and

sharing abilities (MO2 and LO3), as well as the overall strength of its quality management orientation. Firms needed stronger sharing mechanisms (MO2 and LO3) for acquiring and disseminating units of complementary knowledge relevant to the products and services markets. Development and application of the business domain knowledge and equipping managers and leaders with such knowledge was critical. It was necessary that the managers articulate the importance of such knowledge to employees by using performance metrics that were developed through the organisation's quality management capability (QM 1 and 2) and other process methodologies. Relative to Firms B and D, Firms A and C were more effective in achieving the scope of knowledge integration as they had strong internal process maturity and quality management standards. Firm B had coordination problems in relation to knowledge flow between the Indian facility, its clients, and the US parent.

We now have very deep experiences. We have multiple clients and our domain experience is relatively high. We already know what is the pain [point] of this industry ...what are its key external factors so it is very easy for us to ask very specific questions. It is through experience ...there are methodologies, systems, metrics trainings and technology... So, if someone has 10-15 years' experience in a domain he better know what the pain points are – our interactions are very specific and we extract the information from the client in a very targeted way [**Firm A**]

... people who write the code are excellent technologists, but they will have very little domain expertise in banking, corporate finance, retail, etc. ... If we don't inculcate this aspect of training at an early stage then it will have a follow-on effect ...That [domain knowledge] is very essential and that's a universal problem. [**Firm B**]

Firm C had an innovative approach to developing people through informal and incidental learning mechanisms to integrate knowledge. Part of this could be attributed to protecting its product knowledge from the competition and partly to developing deeper problem solving and framing skills for creative product development.

... In general, our orientation is people should be stretched. How we do it by rotating them on different aspects of product development in different areas and we have taken a conscious decision to go down this path... [**Firm C**]

Scope of knowledge integration was further enhanced by complementary learning:

One is a brown bag lunch series. ...Second part is a deep dive, to enhance the domain expertise or go lateral [external recruitment] to enhance their concept and skills of how the other groups are doing their verification. ... The third kind of training is intense external training for different tools...from external [training] vendors. [Firm C]

Firm D relied heavily on its migration and cross-functional teams of parent firm managers to identify new opportunities for knowledge integration. By accessing the rich domain and technical knowledge base of reporting and accounting it renewed its scope of knowledge.

Flexibility of knowledge acquisition and integration

Flexibility of knowledge integration is often the most difficult integration to achieve as it involves extending the existing knowledge bases by recombining or reconfiguring existing and new knowledge to develop new 'game changing' knowledge. Often described as architectural innovations that lead to strategic innovations (Abernathy & Clark, 1985; Buaron, 1981), this integration requires radical and discontinuous change. The move of Indian IT firms from an onsite business model through an offshore business model to a global delivery business model is one such example of flexible acquisition and integration of knowledge.

Firms A and C employed a combination of internal and external knowledge sources and routines to achieve this highest order of knowledge integration. Their open-mindedness (LO2) and continuous improvement (QM2) allowed the challenging of clients and of own business assumptions for flexible knowledge integration. Further, the business process and performance knowledge of what had worked in the past in different situations played a critical role in deciding how and when to extend existing knowledge bases. Such granulated knowledge of 'what works' aided decisions of whether to develop or buy new knowledge. It also helped them decide when to discard redundant knowledge or renew its knowledge bases. For example, Firm A strategically acquired units that filled its knowledge portfolio gaps as

well as accessed specialist knowledge through strategic alliances to allow it to expand its global footprint and offer a mix of offshore, in-shore, near-shore and right-shore business process outsourcing services. Firm A combined the strengths of its enterprise resource technology platform and quality standards set by its partner, Customer Operations Performance Centre (COPC), or what Firm A described it as, “the McKinsey of quality in BPO world”, to deliver its “world on a platter” proposition. Firm A’s manager noted:

In our acquisitions, we rarely see customers as a decision. We look at the site’s ability to scale up and apply the skills and contextualise the skills and tools to local conditions. ...look at the strategic synergies of costs, scale, and skills sets ...how does it fulfil the strategic gaps so we can offer the world as your platform solution....

In a similar vein, in order to expand into the high growth market of developing high-end microprocessors for mobility devices such as smart phones and tablets, Firm C recombined its competencies and knowledge in graphic processor units by developing and acquiring new mobility device vendors. Strong levels of cross-functional team working and exploiting external knowledge from clients had allowed the application of existing knowledge into new areas and the development of innovative solutions.

It’s cross pollination that happens...it’s not [about] people going to the US - there are other ways to deal with it or work with engineers with extended periods of time. We get feedback from OEMs like Dell, Samsung, etc. NASA is a customer and gives us a lot of feedback. High-end gaming users are willing to pay up to US\$2000 for a high-end graphics card. Dell is doing it. AUSUS is doing it. We went to gamers, you know the Grand Theft Auto video game. They [gamers] said that I want the [high-end] tessellation that when I am crashing into something I want a smoke wave to happen. I just want to feel the reality of [the crash]. [Firm C]

The impact of technology induced change requires an agile reconfiguration of a firm’s specialised knowledge bases to exploit the opportunities. This requires high LO2 and QM2.

As a firm C manager observed:

Technology causes change. Markets cause change. People’s acceptance of what is a good product causes change...how do you build something that is 360 degrees

new? ... It isn't enough how to build a blazing fast chip; and to build this blazing fast chip at half the power. Now, the second part of the sentence [half the power] is very critical as it changes the entire design and the way we develop the chip. Everything [changes], ...power and reset the programmes...[Firm C].

Firm B had difficulties in developing flexibility in the acquisition and integration of new knowledge due to weaker cross-functional integration and low LO2 and QM2. Firm B's manager noted:

...being a services organisation we have no clue over what our future business is going to be like...For instance, this year, they have asked us to do some training on mobility and cloud computing- I can't hire people in this area because beyond this immediate need I would not know what to do with these people.

DISCUSSION

Our findings indicate that firms operating in different strategic milieus will adopt different paths to acquire and integrate knowledge. The first high growth case organisation, Firm A, underwent rapid structural and process change, provided high levels of training (LO1) and had high levels of quality management and market orientations. Firm A's small group of quality management employees (about 200) had high levels of open-mindedness and process knowledge. This group was able to embed the processes into daily routines through standardised and repeatable steps using prior process metrics. Its work organisation was highly modularised and the tasks were streamlined to an extent that the call centre agents had to simply execute the process as per the exacting requirements. Using a modular work design and a uniform global technology platform, Firm A realised several economies of scale, and was able to offer consistency in its customer service experience.

Firm C, the second high growth firm, also underwent major technological changes in its high-end graphic processors market, computing capacity and the hand-held mobility devices areas. Being a high-technology product development organisation, Firm C demonstrated high levels of LO2, critical in developing new products or finding better ways of arriving at the same

problem. In a product environment, providing informal and incidental learning allowed employees to learn in their own time through experimentation with product dictionaries, indexed materials and through team member interactions, as well as finding ways of creative problem framing and solving. Like most product development firms and being market leader in its business line, Firm C had a high product superiority mindset and medium levels of market orientation. Although Firm C did not have any formal quality management accreditation, this does not mean that it was low on its quality management orientation. As a market leader in the graphics processor market, over the years, it had developed its own design and development protocols and internal standards, which were codified for use by its engineers. Nevertheless, it still encouraged its engineers first to explore through trial and error and then learn from the established development templates and protocols.

Although Firm D had reported high growth rates in employee numbers, it ranked medium to low on a number of key orientations. It invested in limited training and its quality management infrastructure was evolving, which affected its learning and market orientation abilities. Collectively, these orientations had a medium impact on its knowledge integration.

Firm B reported a decline of 9% of its employee headcount. Its work organisation was very different to a typical IT product development firm such as Firm C. Firm B serviced short- to medium-term IT software service projects and, as a result, had high knowledge diversity, which proved to be challenging for integration. Furthermore, it relied extensively on the contracts secured by its new parent company. Consequently, it faced numerous challenges of coordination and information sharing between its clients, the new parent, and its own business development teams. This is reflected in its medium levels of market and learning orientations. This dynamic had an adverse impact on the resource allocation decisions and, consequently, its growth.

CONCLUSION

Our paper supports our theoretical framework suggesting that quality management, market and learning orientations are the critical in strengthening knowledge acquisition and integration. More specifically, the study highlights the importance of commitment to learning (LO1), sensing information (MO1) and teamwork (QM3) as key in achieving efficiencies in integration of knowledge. Our findings suggest that the scope of knowledge acquisition and integration can be improved by strong information dissemination (MO2), shared organisational vision (LO3) and continuous improvement (QM2) and by investing in higher order training such as leadership, domain-and industry-specific human capital and by utilizing cross-functional expertise. Finally, we suggest that flexibility of knowledge acquisition and integration requires open-mindedness (LO2), sharing information (QM1), and continuous improvement (QM2).

The study also found some support for the notion that accessing complementary knowledge through strategic alliances develops flexibility. This requires a strong leadership team to orchestrate the recombination of capabilities through their vision and understanding of meta-trends. Overall, our findings, in general, support the proposition that the presence of high levels of these orientations facilitates better acquisition and integration of knowledge.

For understanding the key barriers to knowledge integration and consequently growth, the findings suggest that a lack of information dissemination (MO2) and shared vision (LO3) adversely affect the development of capability. A further lack of standardized tools and templates and a shared vision was also noted as a barrier. Finally, leveraging specialized external knowledge outside of the Indian geography posed a major challenge: the situation where no strategic alliances existed was problematic. For example, even Firm C highlighted the need to interact with the original equipment manufacturers in South Asia as they felt that being out there in “the corridors” and near “the water coolers” of its parent firm’s partners

would allow them to “get a pulse” of the new technology envelope. Such knowledge is critical to product innovations.

Several managerial implications arise from the above discussion. First, investment in appropriate levels of quality management systems is necessary for standardisation, continuous improvement and developing knowledge about performance metrics that are critical to organizational performance and growth. With such granulated knowledge, managers can direct when, where and to what extent certain resources should be allocated. Second, managers should also pay attention to cross-functional team designs and benefits for sharing knowledge and expertise in teams. Third, investing in domain and industry-specific knowledge is critical. Overall, firm performance and growth in competitive, dynamic environments requires organizations to both efficient and flexible in acquiring and integrating knowledge. Obviously, not all firms are able to develop such an ambidextrous capability.

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Figure 1: Market, Learning & Improvement Orientations and Organizational Growth

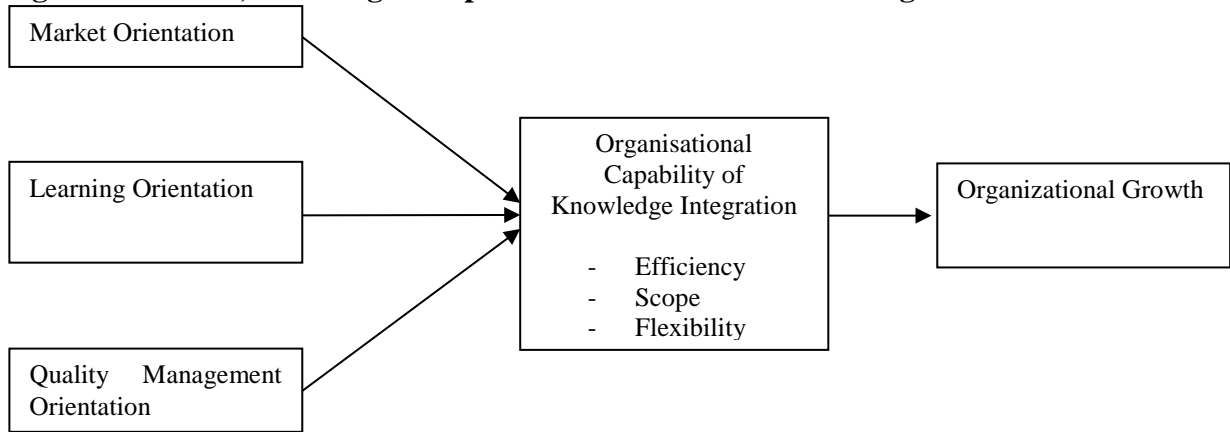


Figure 2: Organizational Capability as Knowledge Acquisition & Integration

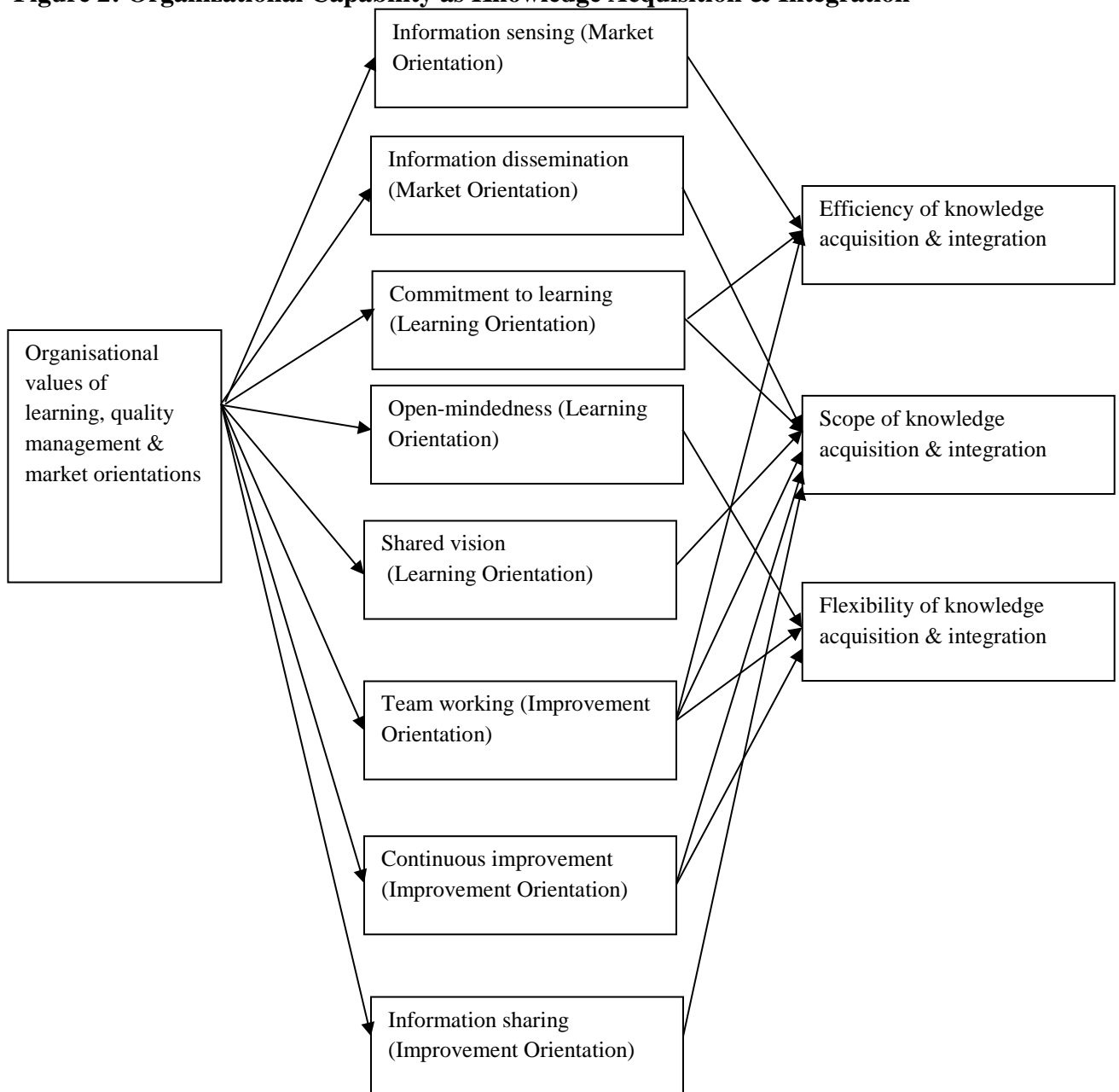


Table 1: Case description, respondents and analysis of key orientations

Case organisations	A	B	C	D
Case description and impact of key factors on training				
Ownership	Owned by a diversified Indian business house	Indian ITSS now owned by a large and diversified US IT firm	Subsidiary of a US-based microprocessor MNC	Wholly owned subsidiary of a UK-based bank
Business Model	Global delivery model	Offshore delivery centre and a global delivery model	Offshore design centre and a co-product design and development model	Specialist high-end offshore process centre
Nature of services & product-market strategy	Slightly Differentiated	Highly Differentiated	Extremely differentiated	Higher end of the slightly differentiated services market
Respondents	10	10	8	2
Approximate number of employees December 2010	47,000	40,000	1150	1400
Approximate number of employees December 2012	55,000	36,500+	1600	2200
Industries served <i>Legend:</i> <i>BFSI: Banking, Financial Services and Insurance</i> <i>SAP: SAP is an integrated enterprise resource planning (ERP) software product developed by SAP-AG (Germany)</i>	BFSI, Energy, Travel, Telecom, IT, Retail, Healthcare, Media.	BFSI, Automobiles, IT, Consulting, Telecom.	Automobiles, manufacturing telecom, health, defence aerospace, R&D, gaming, internet content and education.	Internal banking and reporting needs
Key business lines <i>Legend: AMS: Application management and development</i> <i>GPU: Graphic processor units</i> <i>BPO: Business process outsourcing</i>	BPO – mainly contact centre services (domestic and international)	Software products, AMS, BPO, consulting, reengineering, testing, product engineering IT infrastructure	High-performance GPU Workstation GPU General purpose PC GPU Mobil GPU	Accounting and reporting services for the bank
Workplace change <i>(structural, ownership, & technology)</i>	H	M	M-H	M
Market orientation (MO) - <i>Information sensing, Information dissemination and organisational response</i>	M-H	M	M	M
Learning orientation (LO): <i>Commitment to learning, Open-mindedness and shared vision</i>	M	M	M-H	M-L
Quality management capability (QMC) <i>Investment in quality resources Sharing of information and continuous improvement & teamwork</i>	H	M	H	M-H

Legend: H=High; M=Medium; L= Low; M-H= Medium-to-high; M-L= Medium-to-low.

Table 2: Codes used for Data Analysis

Category	Coded for
Market orientation	(MO1) information sensing. (MO2) information dissemination & (MO3) organisational response. (Based on Kohli et al., 1993; Sinkula et al., 1997)
Learning orientation	(LO1) commitment to learning, (LO2) open-mindedness, &, (LO3) shared organisational vision. (Based on Sinkula et al., 1997)
Quality management orientation	(QM1) sharing information, (QM2) continuous improvement, & (QM3) teamwork. (Based on Reed et al., 2000; Prajogo & McDermott, 2006)

Table 3: Classification of Firms on the Key Factors

Category	High	Medium	Low
Firm growth	A & C	D	B
Market orientation	A	B,C & D	-
Learning orientation	C	A & B	D
Improvement orientation	A & C	B & D	-
Structural change	A & C	B & D	-
Extent of training	A	B, C	D
Overall knowledge integration capability	A&C	B	D