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Theme B: Knowledge Transfers within and between firms

ORGANIZATIONAL KNOWLEDGE GAPS: CONCEPT AND IMPLICATIONS

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Abstract:

The prior studies on organizational knowledge have attempted to provide explanations for the understanding of knowledge and its role in the development and the growth of the firm, confusion still surrounds regarding these issues. This paper introduces the concept of organizational knowledge gaps to provide a new explanation of the dynamics of knowledge in organizations. The study is based on in-depth semi structured interviews, which were conducted in two Pakistani companies. The findings of this study, based on retrospective processual analysis of the critical organizational events of the two companies, suggest that companies over the course of their development identify numerous knowledge gaps, which vary in term of their type, nature, and the role played in organization.

Keywords: (Organizational Knowledge, Taxonomies of knowledge, Processes view of the firm, Organizational Change)

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Introduction

The importance of knowledge in management studies has been discussed since at least 1945 (Hayek, 1945). However, despite a number of prominent studies since the time of Hayek (Polanyi, 1962; Boulding 1966; Nelson & Winter, 1982; Spender, 1996; Davenport & Prusak, 1998; Cook & Brown, 1999; Tsoukas and Vladimirou, 2001), which have contributed significantly towards developing insights in this field, there seems to exist an agreement that the understanding of organizational knowledge is as vague as ever (Tsoukas and Vladimirou, 2001; Orlikowaski, 2002). Particularly, issues such as types, nature, and the role played by knowledge in the organizational development require further attention. Moreover, knowledge has been often treated as a resource, a strategic asset, a source of competitive advantage in organizations but lacking in the literature are the explanations of how knowledge requirements change over time and how knowledge plays a different role, if at all, in different phases of organizational development.

Contrary to most of the existing studies on organizational knowledge which took a more philosophical and conceptual view of organizational knowledge, this paper looks into knowledge as it means to organizations by adopting a operational and functional approach of organization studies. In an attempt to contribute towards the understanding of organizational knowledge, this paper introduces the concept of 'knowledge gaps' which emerged from the processual analysis of the empirical data collected in two Pakistani companies. The paper argues that organizations' survival and growth depend on their ability to identify and fill their knowledge gaps.

Besides providing the definition of organizational knowledge gaps and organizational knowledge itself, the paper also introduces a new taxonomy of organizational knowledge which includes five types. According to the findings of this study, the different types of organizational knowledge gaps which companies identified over the years correspond to those five types of knowledge.

Confusion surrounding organizational knowledge

The importance of knowledge in management studies has been discussed since at least 1945 (Hayek, 1945). However, despite a number of prominent studies since the time of Hayek (Boulding 1966; Polanyi, 1966; Nelson and Winter, 1982; Nonaka and Takeuchi, 1995; Spender, 1996; Tsoukas, 1996; Davenport and Prusak, 1998; Teece, et al., 1997; Cook and Brown, 1999; Tsoukas and Vladimirou, 2001), which have contributed significantly towards developing the insights in this field, there seems to exist an agreement that the understanding of organizational knowledge is as vague as ever (Tsoukas and Vladimirou, 2001; Orlikowaski, 2002). Particularly, there exist confusion surrounding the definition, nature, types and role which knowledge plays in organizations. To add to that it has often been suggested that “it is not productive to attempt to define knowledge” (Snowden, 1997: 17), or that “it is of little use to engage in conceptual analysis of knowledge” (Davenport et al., 1998: 43). Boulding (1966: 1) explains the complexities involved by saying that “considering the difficulties of defining, categorising, and measuring knowledge, one feels that the efforts to do so lead into a philosophical mess from which the only escape is to climb out, clean oneself off, go home, have a dinner, and forget all about philosophy”.

Yet, no one is comfortable simply walking away from the complexities of knowledge, especially when there seems to exist a consensus that knowledge matters significantly in the survival and growth of the firms. Tsoukas and Vladimirou (2001) argue that more efforts are needed in an attempt to advance our understanding of what knowledge is and how it can become organizational. In Tsoukas and Vladimirou’s (2001: 975) words,

Our understanding of organizational knowledge (or any other topic of interest) will not advance if we resign ourselves to merely recycling common sensical notions of knowledge for, if we were to do so, we would risk being prisoners of our own unchallenged assumptions, incapable of advancing our learning. On the contrary, what we need is ever more sophisticated theoretical explorations of our topic of interest, aiming at gaining a deeper insight into it. Those who think such an attempt is futile need to ponder the great extent to which Polanyi’s notion of ‘personal knowledge’ has advanced our understanding of what knowledge is about and, accordingly, how much impoverished our understanding would have

been without that notion. If theoretical confusion is in evidence the answer cannot be ‘drop theory’ but ‘more and better theory’.

Resultantly, scholars supporting this view have come up with numerous explanations of what knowledge is and what constitutes knowledge. Hayek, for example, used the words ‘information’ and ‘data’ to describe knowledge of individuals and the society (Hayek, 1945: 519). These terms have been later on used by many scholars in their attempt to understand what knowledge is (e.g. Bohn, 1994; Davenport et al., 1998; Hedlund, 1994; Myers, 1996). Nonaka and his colleagues took a different approach and described knowledge as “a meaningful set of information that constitutes a justified true belief” (Nonaka et al., 1996) or “a dynamic human process of justifying personal beliefs towards the truth” (Von Krogh and Grand, 2000).

In more recent studies, some further explanations of knowledge have been put forward. For example, Orlikowski (2002) considered that knowledge is enacted in the collaborative processes of organizational members and it is emergent and dynamic. On the other hand, Tsoukas and Vladimirou (2001: 979), claimed that,

Knowledge is the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both.

On the bases of this assertion, Tsoukas and Vladimirou (2001: 973) defined organizational knowledge as,

The capability, which members of an organization developed, to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalisations whose application depends on historically evolved collective understanding.

Organizational knowledge has also looked into in the literature from two distinct perspectives. The first perspective proposes that organizations have different types of knowledge and that identifying and examining these types will lead to more effective means for generating, sharing, and managing knowledge in organizations (Nelson and Winter, 1982; Leonard-Barton, 1992; Hedlund, 1994; Nonaka and Takeuchi, 1995; Teece, et al. 1997). This perspective focuses on routines, strategies, and techniques through which different types of knowledge are created, codified, converted,

transferred, and exchanged. On the other hand, the second perspective on organizational knowledge argues knowledge to be processual, dispersed, and inherently indeterminate (Tsoukas, 1996) and this perspective on organizational knowledge is supported by Davenport and Prusak (1998) and Cook and Brown (1999).

While the above review of some of the definitions of knowledge shows that there does not exist any consensus on the definition of knowledge, confusion also exists with regard to the types of organizational knowledge.

Over the years, the researchers have introduced several important distinctions in the different types of organizational knowledge. Hayek (1945: 521) wrote in his article 'the use of knowledge in society' that,

“...knowledge is not the sum of all the knowledge... there is beyond question a body of very important but unorganized knowledge which cannot possibly be called scientific in the sense of knowledge of general rules: the knowledge of the particular circumstances of time and place.”

Hayek (1945: 519) further added that,

“...there is a kind of a knowledge which all the separate individuals possess and which by its nature cannot enter into statistics and therefore cannot be conveyed to any central authority in statistical form.”

Hayek suggested that besides the transferable data, individuals in society possess a certain type of knowledge that is not transferable. Polanyi (1966) further explored this non-transferable type of knowledge in his work on human knowledge. Polanyi argued that there is an inescapable and essential personal element that is a structural component of all the knowledge he called 'tacit knowledge'. Tacit knowledge was defined by Polanyi (1966) as knowledge that is non-verbalisable, intuitive, and unarticulated. He proposed the tacit dimension of knowledge using the dictum that "we can know more than we can tell" (Polanyi, 1966: 4). Polanyi further added that we have a "power to know more than we can tell" (1976: 336). He called such knowledge 'personal' and distinguished it carefully from the extremes represented by 'private: wholly interiorised' and 'objective: wholly exteriorised' knowledge.

Based on Polanyi's distinction between tacit and explicit knowledge, several authors have come up with taxonomies of organization knowledge. Examples of these taxonomies are conscious, objectified, automatic and collective knowledge (Spender, 1996); personal vs. propositional (Grant, 1996); tacit knowledge, rule-based knowledge, and background knowledge (Choo, 1998); procedural vs. declarative knowledge (Simon, 1996); and tacit/articulable, teachable/not-teachable, observable/not-observable, complex/simple, and system/ independent (Winter, 1987).

Confusion also surrounds the role played by knowledge in organizations. Knowledge has often been considered as a resource, strategic asset, and most importantly a source of competitive advantage. Knowledge by resource-based theorists is considered either just another resource among firms collection of resources such as capital, land, machines, etc. (e.g. Barney, 1991) or a resource which also create new resources which in turn create value and enhance firms' performance (Wernerfelt, 1984). Knowledge in itself fulfil Barney (1991) requirements of a resource important enough to help achieve sustainable competitive advantage i.e. knowledge is valuable, rare, difficult to imitate, and strategically difficult to substitute. Wernerfelt (1984) on the other hand argues that in order for firm to gain a competitive advantage it requires the capability to transform resources and knowledge provide that ability. On the other hand, Teece et al. (1990) argued that what matter to firms are not bundles of resources, but the mechanisms by which firms learn and accumulate new skills and capabilities, and the forces that limit the rate and direction of this process. Thus, a major research theme has been the inquiry into conditions for sustainable competitive advantage. An attempt to incorporate the role of 'knowledge' in competitive advantage has been made by the dynamic capabilities school of thought (Teece et al., 1990) which emphasises the importance of skills acquisition, learning, and capabilities accumulation as strategic issues for competing in a dynamic environment.

Nevertheless, knowledge is increasingly being recognised as a strategic asset (Winter, 1987) and a source of competitive advantage. According to von Krogh and Roos (1996) a firm's competitive advantage is a function of what knowledge a firm can accumulate and the resources that it can assemble. They argued that knowledge is an important basis for creating sustainable competitive advantage. In the similar vein,

Bartlett and Ghoshal (1995) stress that in the post-information age the most critical and scarce resource is knowledge composed of information, intelligence, and expertise. In addition, these authors claim that in contrast to capital, knowledge is most valuable when it is controlled and used by organization (Bartlett and Ghoshal, 1995). Unlike other resources, knowledge develops itself when used.

This recognition of the importance of knowledge for the survival and growth of the firm has thus attracted many theorists and has brought forward a new perspective, the knowledge-based view of the firm. The fundamental precept of this view is that knowledge is the overwhelmingly important productive resource in terms of its contribution to value added and its strategic significance (Grant, 1996). The foundations of the knowledge-based view can be said to exist within the resource-based theory literature, as well as the subset of this literature such as ‘core competencies’, ‘organizational capabilities’ and ‘dynamic capabilities’. Consequently, the knowledge-based view is often considered an outgrowth of the resource-based view of the firm (Grant and Baden-Fuller, 1995; Kogut and Zander, 1992).

Besides the contributions made by the authors on the different aspects of knowledge, as noted above, confusions surrounding the understanding of the organizational knowledge, nature and types, and the role played in organization development is not subsiding. This paper attempts to clarify some confusion on these issues by presenting organizational ‘knowledge gaps’ concept which emerged from the analysis of the data. However, before moving on to the discussion on this concept a review of the research settings under which this study was conducted is presented below.

Research Settings

This study was carried out in two Pakistani automotive companies. Both companies have reported going through tremendously changing environment and have faced many challenges over the course of their development. On the other hand, these companies also proud themselves as the pioneers in the automotive industry and have claimed to contribute substantially towards the development of the industry.

For the sake of this study fifty years historical data on the development and growth of these companies were collected and analysed to identify critical events according to the secondary and primary sources. Each critical event was analysed in term of the factors leading to this event and how companies manage it i.e. what actions were taken in this regards. This processual analysis of the critical organizational events shows that all these events can be explained in terms of some types of knowledge required to meet some specific requirements. These knowledge requirements were later on called organizational knowledge gaps and research was focused on identifying the nature and types of these knowledge gaps and that what role these knowledge gaps played in the development of the firm. In other words, it can be said the concept of organizational knowledge gaps emerged from the retrospective processual analysis of the empirical and secondary data. The initial analysis of the critical events of those companies shows that these events were either the result of organizations' efforts to meet existing organizational knowledge requirements or they led to the identification of future knowledge requirements.

These observations were further supported by the analysis of the interviews conducted during the second and third phases of this research. The analysis shows that the case study companies over the course of their development identified and filled a number of organizational knowledge gaps. The results indicate that the identification of knowledge gaps and the strategies adopted to effectively fill these gaps are critical for the survival and growth of the companies. Based on these results it can be deduced that it is imperative for the explanation of organizational knowledge to develop a proper understanding of these organizational knowledge gaps.

For example, the nationalisation of company 'Y' created numerous knowledge gaps, as that was the time when the company was given partial autonomy by the government along with the responsibility to develop the tractor and the ancillary industry in Pakistan. The empirical evidence shows that soon after that the company adopted a diversification strategy and formed many alliances to exploit organizational capabilities developed in the past. It was noted that these capabilities were developed by identifying and filling technology and skills related knowledge gaps over the years. Similarly, in the case of Company 'X', the government's deletion policy of 1980 under which company was forced to produce a certain percentage of parts with a

certain period of time, created new knowledge gaps and consequently the company invested heavily in developing and expanding production capabilities to fill these gaps. A recent example of such investments was reported that of the establishment of the gear manufacturing section and the crankshaft section by the respondents. On the other hand, analysis also shows that existing production, technological, and managerial capabilities encouraged the company to adopt an acquisition strategy. A detailed analysis of some of the critical events of case study companies is presented below in the tabular format where the critical events and the corresponding knowledge gaps are put in evidence (Table 1 and 2).

Table -1: Company ‘Y’: Critical events and organizational knowledge gaps

CRITICAL EVENTS	KNOWLEDGE GAPS ‘IDENTIFIED’ OR ‘IMPOSED’
Assembling and Manufacturing Operations and Nationalisation	Assembling and manufacturing capabilities gaps, equipments and skills gaps
	Moving away from assembling to manufacturing and achieving deletion targets. To start bring in technology and technical know-how.
	To assemble and manufacture low power capacity tractor
	Identified new markets/opportunities
	To solve casting quality control problems
Establishment of Engine Assembly Plant and Kaizen Practices	Growth in market coverage
	To start manufacturing and assembling engines locally
	Identified new market/opportunities
	Identified new market/opportunities
Deletion Policy	Identified market opportunities
	Government introduced Deletion Program (1981)
	To achieve government set deletion target
Machining Division	To procure better quality parts
	To start machining facilities in-house
Diversification and Privatisation	Identified new market/opportunities
	To assemble and manufacture fork-lifts in-house
	To produce quality Generators in company
	Identified market opportunities
	Identified market opportunities
	To achieve high quality and maximum output

Table -2: Company ‘X’: Critical events and organizational knowledge gaps

CRITICAL EVENTS	KNOWLEDGE GAPS ‘IDENTIFIED’ OR ‘IMPOSED’
Joint venture agreement with HMCJ	Manufacture Honda Motorcycles, gaps related to Shock absorber, R&D Wing and Tool Making facilities
	To start manufacturing and assembling locally
	Development of technically sophisticated parts
Merger of Panjdarya Ltd. with Atlas Autos Limited	Market expansions/ new opportunities
	To achieve synergistic effects
Changes in management system	Facing challenges of structural re-adjustment, re-culturalisation and re-organization of the company
Development of production capabilities	Developing facilities in-house
	Technical know-how for engineers, foremen and workers

Export and export agreement	Market opportunities
	Market opportunities
	Company has been striving to implement govt. policy
	Improving the quality of the parts procured locally
Diversification through acquisition	Develop motorcycle Clutches (FCC)
	Diversification. New markets
	Supply chain management
	Supply chain management
	For tractors, trucks, buses, cars, motorcycles, wagons, jeeps, and tanks
Gear project	Assembling and manufacturing of gears locally

The above tables shows the critical events and the consequent knowledge gaps identified or imposed. The difference between the identified and imposed gaps will be discussed in the later part of this paper. From these tables we can see that after filling a particular knowledge gap the companies identified new gaps or new opportunities. For example, in the case of Company ‘Y’, the establishment of the engine division was targeted to bring in new technology but was also in response to the company’s effort to increase the deletion rate. The outcome of establishing this department was more than just bringing in new technology and achieving deletion levels as it also built organizational capabilities.

It is evident from the tables that with the passage of time both companies have not only managed to identify new knowledge gaps but have also filled their existing and prior gaps. For example, in 1964 company ‘Y’, acting as a distributor of the product, identified the assembling and manufacturing capabilities knowledge gaps for the further growth and development of the company in the long-run. In order to fill these gaps, the company renewed its existing alliance agreement to include details like bringing in assembling and manufacturing capabilities. Due to this change in the alliance agreement, the company started importing units in semi knock-down condition and started assembling them at its own premises, instead of importing and selling them in completely build up condition. Once the company managed to develop the assembling capabilities, it again changed its alliance agreement with its partners to include manufacturing know-how to be transferred, as a consequence of yet another ‘identification’ of a knowledge gap. Having briefly discuss the research settings and the process of identifying the knowledge gaps next paper focuses on discussing the concept and the dynamics of the concept of knowledge gaps.

The concept of ‘Organizational Knowledge Gaps’

The concept of knowledge gaps in this research is loosely used for *all types of organizational knowledge which a company currently lacks but identifies to be critically important for its survival and growth and, hence, need to be filled*. These include knowledge regarding organizational capabilities, competencies, technical and technological know-how, general know-how, operational know-how, managerial know-how, employees’ skills, and hardware like machines and equipments. This broader definition of knowledge gaps has been used to understand the process of continuous identification and filling of the knowledge gaps by the case study companies in the course of their development. The discussion of the dynamics of the concept of organizational knowledge gaps, such as types of organizational knowledge gaps, forces behind the emergence of knowledge gaps and identification of fill-able knowledge gaps form the main part of this paper and are discussed below.

The most important aspect of the concept of knowledge gaps is the concept of knowledge itself. Various explanations of the understanding of ‘what knowledge is’ and ‘what constitutes knowledge’ as put forward by scholars have been noted earlier. The findings of this study, present a dynamic view of the understanding of knowledge and support Brown and Duguid’s (1998) approach which shares with Tsoukas (1996) the view of knowledge as emergent, but retains a distinction between types of knowledge in the organizations. In this study, organizational knowledge has been divided into five different types and is discussed in relation to tacit and explicit dimensions of each knowledge type, it is also concluded that organizations develop abilities to identify what to learn (know-what), how to learn (know what), and how to put what they have learned (know-how) into practice. According to the findings of this study, knowledge does not constitute just data and information but most importantly constitutes the aspect of understanding of the reasons and logics of the existence of data and information. In other words, while data and information are an important part of knowledge, by no means the sum of data and information is knowledge. The empirical evidence propose the view that *the integral part of knowledge is the ability to understand, comprehend, use, reuse, and combine data and information with existing knowledge in such a way that better results can be achieved*.

This broader definition of knowledge supports the dynamic view of knowledge as explained by Davenport and Prusak (1998), Tsoukas (1996), and Tsoukas and Vladimirou (2001) in their definition of knowledge. Similarly, findings also support Nonaka and Takeuchi's (1995) assertion that knowledge is action, as it should be used to some end.

The findings of this study also show that knowledge is not just a resource, instead, it can help organizations to develop resources. This study argues that the existing organizational resources are also a kind of organizational knowledge. For example, while the resource-based view of the firm includes physical capital resources, human capital resources, organizational capital resources (Barney, 1991), assets, capabilities, organizational processes, firm's attributes (Daft, 1984) under the category of organizational resources, this study shows that these resources constitute one or another type of knowledge and, hence, can be developed or improved by enhancing the repositories of organizational knowledge. On the bases of these discussions, it can be inferred that according to the findings of this study, the knowledge is everything in the organization and everything in organizations can be understood as consisting of certain types of knowledge.

A new taxonomy of organizational knowledge

While prior studies have identified and divided knowledge into many different categories, as noted before, this study has come up with a different categorisation of organizational knowledge, which is based on the operational and functional perspectives of the organization. During the process of identifying the critical organizational events and corresponding knowledge gaps, it was observed that organizations over the course of their development encountered different types of knowledge gaps. These different types of knowledge gaps correspond to different types of knowledge requirements in those firms. It was also noted that the types of knowledge to which respondents referred during their interviews were different from the categories of knowledge noted earlier. For a better understanding of these new types of organizational knowledge, the different types of knowledge gaps identified fall into five categories: physical capital related knowledge gaps, intellectual capital

related knowledge gaps, relationship management related knowledge gaps, social capital related knowledge gaps, and cultural capital related knowledge gaps.

Physical capital related knowledge gaps include knowledge gaps relating to the plant, building and departments, machinery and equipments, departmental and production plant layouts, production infrastructures, standards and critical tests, and production technology. The empirical evidence shows that companies in the course of their development identify many physical capital related knowledge gaps. One of the examples where a company acquired technology and technical know-how is cited below,

Bringing in the new technology is the main thing. When I joined company in 1991, there was just the engine assembly plant, which was considered complex technology. Since then, we are bringing in new technology slowly. Just as in 1997, we started gear manufacturing in which the latest and high-tech machinery was brought in. Similarly, in the case of heat treatment we brought in new technology. Bringing in this type of technology has occurred over the time.

Similarly at the crankshaft department we bring in different and, once again, quite complex machinery. So basic improvements in our company has been in a sense technology wise. We have quite good technology machine and equipment. We bring in new technology from abroad.

(In-charge Crankshaft Section, Company X)

Physical capital related knowledge gaps not only include knowledge gaps regarding physical capital but also the knowledge which relates to the functioning of those machines as explained by one respondent,

But, to handle machinery you need knowledge. Just like what we are producing this part (pointing to a part) no ordinary person can produce it. It is difficult to produce it on any ordinary machine. This is a kind of technology and now we are working on this technology..... If you take my own example, I was not that knowledgeable about it before. I learned some things from my training in Japan by observing their set-up and how it was working. But mostly you learn when you actually do it your own. That is the time when you learn a lot.

...one day we will get the designing capabilities.....Then we will be in a better position to use these facilities. We will know exactly what these functions actually are. We will know what will be the impact of introducing changes according to our atmosphere climate and what will be their effects. We will be able to change whatever we want and will be able to launch model changes as well. Right now, we don't have those capabilities.

(In-charge Gear Project, Company X)

The second type of organizational knowledge gap is ‘intellectual capital related knowledge gap’. The intellectual capital related knowledge gaps include knowledge relating to the organizational skills relevant to management know-how, operational know-how, decision-making know-how, and problem solving know-how from the top to the lower levels of the company. The most important aspect in the intellectual capital related knowledge gap is that it also includes knowledge regarding the ability to identify that a knowledge gap exists. Besides attending frequent training courses to bridge the intellectual capital related knowledge gaps outside the companies, both case companies provide training to their staff at their in-house training schools. One executive explains the contents of the courses as follows,

“[In our school] we provide training at all levels. Management level training and worker level training or others. We are offering refresher courses for workers. Seniors and people from outside come to our factory to train workers. We have also developed many tools and equipment in order to save time and reduce time wastages. We have emphasised the mutual co-operation and co-ordination. We have focused on such factors where we were losing time. In-house trainings are normally on the job trainings. In these trainings the in-charge or the manager, share their knowledge and skills with the staff. Our focus in the on the job training is that seniors train their juniors.”

(GM HRM, Company X)

The third type of organizational knowledge gap is ‘relationship management related knowledge gap’. The relationship management related knowledge gaps include knowledge regarding the management of relations with customers, markets, and most importantly contractors and sub-contractors. It was noted that this type of knowledge gaps includes not only the knowledge in regards to the maintenance of good relationships with existing customers but also the knowledge on how to develop such relationships with new customers. One of such example was quoted by a manager quality assurance as below,

“We have developed a vendor to supply us horn and we have arranged its technical collaboration with a Japanese vendor (vendor of our partner). In this way, our vendors have formed franchise agreements with their vendors. These agreements are formed with the consent of our company and our Japanese partners. We helped the vendors in this regard [by introducing them to Japanese]. We evaluate vendors and their capabilities i.e. are they good enough to form a franchise collaboration and then our partners helped us in forming a franchise agreement. Until now we have one agreement for the horn manufacturing vendor and now we have formed another with Showa.”

(Manager, Quality Assurance, AHL, p. 10)

The fourth type of knowledge gap found in the organizations is the ‘social capital related knowledge gap’. The social capital related knowledge gaps include knowledge regarding the building of trust and trustworthiness, the management of dependence, obligations, and expectations, avoiding opportunistic behaviours, and the embeddedness of companies’ relationships with their partners. This type of organizational knowledge gap is identified by organizations which are currently dealing with a number of partners or which intend to form more alliances in future. The most significant aspect of this type of knowledge gap is that it also includes the acquisition of knowledge on how to learn from its social network. Gulati (1998) has mentioned this type of knowledge in his study on alliances and he suggested that companies learn from their prior alliances and this learning shape companies’ decision on future alliances.

The fifth and final type of knowledge gaps which have been identified in the organizations are ‘cultural capital related knowledge gaps’. The cultural capital related knowledge gaps include knowledge regarding the improvements of the work practices, especially those aimed at changing the organizational culture. These gaps include the knowledge about the different techniques of Kaizen like cleanliness, teamwork, problem solving, communication, job rotations etc. According to one respondent, “self cleanliness, self maintenance system is part of our job and it is our responsibility to maintain it. Similarly, when other shops follow the same pattern, then it spreads all over automatically.” Despite the understanding and reasonably successful implementation of the new culture, he recognises the difficulties the company faced in developing this culture as most of the new practices were not part of our daily life. He also explained how the company is trying to maintain this culture. According to him:

Yes these practices are different from our daily routines, therefore the company has started a motivation scheme. Look at this trophy [3S trophy which is awarded to the section or department which scores higher on the evaluation sheet], it is a part of that motivational scheme. There are monthly, or weekly evaluations for each shop and we also have sudden audits from QC; when they want they can visit our shop any day and then they wrote a report on the existing conditions of the department. These reports are then evaluated and the best shop is awarded with the trophy. This trophy is handed over to the shop until a further evaluation.

While the above types of organizational knowledge gaps represent a functional and operational approach to organizational knowledge, the findings of this study show that this categorisation can be interrelated with the existing categories of organizational knowledge. Analysis of the different types of organizational knowledge gaps shows that all these knowledge gaps consist of both tacit and explicit dimensions, as discussed by Polanyi (1966). However, instead of dividing organizational knowledge into tacit and explicit dimensions, it has been observed that the degree or extent of tacitness and explicitness in these knowledge gaps differs. For example, the physical capital related knowledge is more explicit in nature as written details regarding the operations of the machines and equipment are commonly available, compared to cultural and relationship management related knowledge. Similarly, intellectual, social, cultural, and relationship management related knowledge also seem to have both tacit and explicit dimensions.

The taxonomy of organizational knowledge presented in this work can be further interrelated and explained using Zander and Kogut's (1995) constructs of organizational knowledge i.e. codifiability, teachability, complexity, system dependence, and product observability. Zander and Kogut (1995) have argued that the types of organizational knowledge can be understood by understanding how much knowledge can be encoded, is it teachable or not, what is its level of complexity, how much it is dependent on the system, and how easily competitors can understand and replicate it. According to the findings of this study, as in the case of the tacit and explicit dimensions of knowledge, the degree of Zander and Kogut's constructs of organizational knowledge varies across different types of organizational knowledge gaps. While the physical capital related knowledge and, to some extent, intellectual capital related knowledge are more easily codifiable and teachable, the social capital related knowledge and the cultural capital related knowledge are more complex and system dependent and, hence, difficult to be transferred to alliance partners. The study shows that most aspects of the physical capital related knowledge gaps can be filled in less time, as the knowledge required is easily codifiable and teachable. Whereas, on the other hand, social and cultural related knowledge gaps require knowledge which is

less codifiable, difficult to teach, more complex and system dependent and, hence, difficult to transfer and fill the related knowledge gaps.

The emergence of organizational knowledge gaps

The analysis of the case studies data shows that knowledge gaps emerge due to exogenous factors and endogenous factors. Exogenous factors include ‘institutional forces’ like changes in the government policies and/or regulations, etc. and ‘industrial forces’ like competitive forces and industry specific changes, etc. On the other hand, endogenous factors include changes in companies’ existing repositories of the knowledge, companies’ strategic directions, management intentions, and existing capabilities and competencies. It was noted that exogenous factors ‘impose’ knowledge gaps on the companies, whereas endogenous factors lead companies to ‘identify’ knowledge gaps. As mentioned earlier, besides identifying the location and the type of knowledge gaps, endogenous factors also lead to build capabilities regarding abilities to diagnose that knowledge gaps exist.

The ‘imposed’ knowledge gaps are problematic for the companies as these gaps are created by exogenous factors and are forced on companies. At the time of facing such gaps, companies might not be in a position to fill these gaps. This might be due to the companies’ existing strategic direction, which might not include the development of an ability to fill these gaps. Furthermore, companies might not be in a position to fill these knowledge gaps due to their lack of readiness or due to the lack of required absorptive capacity (Cohen and Levinthal, 1990) as these gaps present themselves unexpectedly. According to Cohen and Levinthal (1990), the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends is largely a function of firm’s level of prior related knowledge which they called a firm’s absorptive capacity. As companies, in the case of imposed knowledge gaps, often do not have the absorptive capacity to fill these gaps, they invest time and energies in order to build the absorptive capacity so that new knowledge can be acquired and internalised. While Cohen and Levinthal (1990) have identified factors such as R&D investments and manufacturing investments through which companies generate such capability, this study shows that companies make

numerous changes such as investments in machines and equipment, building, training, and human resources, in order to enable themselves to fill these types of knowledge gaps. It has been noted that in the case of imposed knowledge gaps, companies have to take drastic actions to make improvements in their absorptive capacity in order to fill these gaps.

The ‘imposed’ knowledge gaps often prove a threat to the existence and survival of companies, especially if they have not been able to fill these gaps within the stipulated time. The findings of the study show that often in these circumstances companies improvise in order to fill the imposed knowledge gaps (Orlikowaski, 1996). This means that these gaps diverge companies from their normal course of development i.e. companies have to interrupt their ongoing plans and have to invest in efforts to bridge these knowledge gaps.

Endogenous factors, on the other hand, facilitate companies in ‘identifying’ knowledge gaps. The ‘identified’ knowledge gaps lead to the development and growth of the companies, as identification of knowledge gaps is often a part of companies’ strategy. The process of identifying the knowledge gaps starts, in most cases, when companies evaluate their repositories of knowledge and compare them with their long-run strategic development plans. As the ‘identified’ knowledge gaps are identified after the evaluation of companies’ existing repositories of knowledge, they prove comparatively easy to fill. However, in the case of knowledge gaps, which can only be filled by improving organizational capabilities, companies have also to identify the gap between their existing absorptive capacity and the absorptive capacity required to fill these gaps.

The above discussion explains why knowledge gaps imposed by exogenous forces are difficult to fill; as seen above, companies are compelled to bring in new knowledge for which they might not have the required absorptive capacity. It has also been noted that even when the required knowledge is available from the alliance partners or from other sources, still companies might not be able to fill ‘imposed’ knowledge gaps, as they do not have the ability and the capacity to absorb new knowledge. In other word, for companies to fill their ‘imposed’ knowledge gaps they have to develop their absorptive capacity to a certain level. This finding supports Lane and Lubatkin’s

(1998) study on relative absorptive capacity in which they criticised Cohen and Levinthal's (1990) assertion that a firm has an equal capacity to learn from all other organizations. According to Lane and Lubatkin (1998), companies do not have equal absorptive capacity and it is their relative absorptive capacity which determines the speed of knowledge transfer. They also argued that in order to improve knowledge transfer, companies have to make efforts to have a relatively similar absorptive capacity as that of their partners. In other words, while companies identify the knowledge gaps to be filled they also identify the absorptive capacity required to fill these types of knowledge gaps. Following on to this discussion, next section discusses the processes adopted by them and which leads to discussions regarding which knowledge gaps should be filled in the short-run and which ones in the long-run.

Fillability of the organizational knowledge gaps

The analysis of the data shows that companies can and usually have multiple knowledge gaps at any given time, and that companies continuously identify new knowledge gaps over time. However, not all the identified knowledge gaps can be filled in the short-run, due to reasons including the urgency to fill the knowledge gaps, the potential financial and strategic gains, and most importantly, the lack of absorptive capacity. The most important factor in filling the organizational knowledge gaps was identified to be the organizations' capacity to absorb new knowledge, a further expansion of concept of the absorptive capacity (Levinthal and Lane, 1998). The analysis of the data shows that organizational knowledge gaps can be categorised on the bases of their strategic importance, urgency, and organizations' ability to fill these gaps. The first category seems to include knowledge gaps for which companies do have the abilities to fill. The second category includes those knowledge gaps, which are deemed important but that require companies to improve their absorptive capacity. The third category includes those knowledge gaps, which are urgent, but companies lack the abilities to fill those knowledge gaps. Overall, it has been found that companies in their normal course of development, most frequently, face the second category of knowledge gaps i.e. which are important and can be filled with improvements in their absorptive capacity. This is because the first category of knowledge gaps can easily be filled as capabilities to fill these gaps exist. Otherwise,

these gaps are not important, as companies do have the capabilities to fill these gaps but are not filling them. On the other hand, the third category knowledge gaps are problematic for the companies, as discussed earlier. The analysis shows that companies have to disrupt their existing plans and have to invest in efforts to fill urgent and important knowledge gaps as the capabilities to fill these gaps do not exist. It was also observed that companies try to influence exogenous factors, which, in the first place, imposed these knowledge gaps, in order to avert filling these gaps.

The analysis of the data also shows that at any given time companies need different types of knowledge to fill their knowledge gaps. Besides identifying different types of knowledge gap and corresponding knowledge types, it was also found that the type and nature of the knowledge required by the companies to fill their knowledge gaps varies over time, especially because of the complexity and the usage of that knowledge. It was noted that in the early stages of organizational development, alliances fill the simple and more concentrated types of knowledge gaps, simple in the sense of technological complexity and concentrated meaning their relation to any particular function. Another observation made was that companies at the early stages of their alliances, while bringing in the above mentioned knowledge they also learn, consciously or unconsciously, how to learn from their partners. For example, physical capital related knowledge acquired along with the expertise required to work on those machines was simple in nature and concentrated in the production/assembly department only. Through constant learning and changes, alliances were used to fill more complex and diverse types of knowledge gaps, indicating that companies over time have acquired the ability to successfully learn from alliance partners.

Conclusion

This paper introduces the concept of organizational knowledge gaps in an effort to contribute towards developing the understanding regarding the issues related to organizational knowledge gaps such as definition, nature, types, and role of knowledge in organizational development. Besides providing definition of the concept of knowledge gaps and the knowledge, paper also discussed briefly issues related to this concept such as how these gaps emerge, how companies identify these knowledge

gaps, and what factors contribute towards companies' efforts to fill these gaps. The paper also presents a new taxonomy of the knowledge in organizations by taking an operational and functional approach of organizational studies. While the findings of this study present a new concept and a new taxonomy of knowledge, it also supported many of the prior studies on organizational knowledge.

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