Knowledge Management in Supply Chains

K. Hafeez*, E.M. Rodriguez-Falcon, H. Abdelmeguid and N. Malak *

Sheffield Business School, City Campus, Pond Street,
Sheffield Hallam University, UK.
* P.E.C. Training, Sheffield, UK.
K.Hafeez@shu.ac.uk

ABSTRACT

This paper provides an analysis of the essential building blocks of a knowledge management (KM) program. Contribution of knowledge system components in learning process is evaluated. Various forms of organisational learning are appraised in a supply chain scenario. An organisation knowledge management model is proposed and implementation results are presented. Survey results from a sample of twenty-five IT companies show that many of them don't see a direct relationship between knowledge management and organizational learning. Also many knowledge management companies do not use any specialist IT tools or systems. Although the potential benefit of knowledge sharing in a supply chain scenario is recognised, many feel that there are implications in terms of losing sensitive information and business. On average the respondent felt that their company is getting only about 34% value for money from their KM initiative.

Key words: learning organisation, supply chain, knowledge management, virtual organisation, and knowledge networks

INTRODUCTION

The knowledge movement has gain momentum during last decade as many academic and practitioners have recognised that acquiring and applying knowledge will become the key competitive factor and the most valuable and strategic resource in a company's portfolio of assets [Nonaka (1995); Ducker (1994); Zack (1999)]. There have been some doubts in many quarters if KM is another label for Information Management (IM). Davenport and Marchand (1999) have underlined "coincidences" between the two concepts as many tools used in KM had been used in IM. Quintas, Lefrere and Jones (1997) define Knowledge Management as "the process of continually managing knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities". A good KM definition is due to Swan and Preston (1999), who define it as "any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations".

Johannessen et al. (1999) have given a fuller account of various types of knowledge namely, systemic, explicit, tacit, hidden, and relationship knowledge. Systemic knowledge is learned by studying patterns such as from scenario planning exercise or computer simulations. Explicit knowledge is relatively easy to attain and communicate through listening and reading. Relationship knowledge is learned via interaction and is relatively difficult to communicate. Whereas most difficult form are the tacit knowledge and hidden knowledge as these are difficult to comprehend and communicate. Hidden knowledge is the way of organising ideas and mental models and usually learned by socialising. However, the most valuable form of knowledge is the one that resides inside one's head, and therefore, not easy to quantify and made visible, an absolute factor for the initiative success (Prusak, 1999). For this reason organisations are struggling how to motivate their people to share tacit knowledge, which is recognised as a strategic asset (Boisot, 1998).

TACIT KNOWLEDGE WITHIN AN ORGANISATION

We would suggest that there is a progressive link between data, information and knowledge. Knowledge is the result of a process where an individual makes contact with data found in various

kinds of "receptacles" such as reports, newspapers, letters, books, software, etc. Then s/he adds value to it (in the form of understanding) to convert data into information. Exposing this information into new domain, for example problem solving, would bring about a pattern of learning. Therefore, information translates into knowledge when it is used in a creative manner for improving existing situations, and the process generates an outcome in the form of learning. Many companies attempt to achieve this via employee training and competence development programmes.

Figure 1 illustrates "knowledge flywheel" effect. While an individual is eliciting knowledge, s/he is usually simultaneously receiving a different kind of data or information through one of the many types of knowledge embodiment receptacles. However, human being have the capacity to enrich the existing knowledge each time it goes through this iteration. Demarest (1997) has explained that when knowledge is (explicitly) embodied, it may reflect in the form of raw materials, products, services, machinery, mechanisms, business practices and processes, environment and culture. Note that due to the fuzzy boundaries associated with environment and culture, these are codified under tacit as well as explicit knowledge. The challenge for the companies is to link this knowledge enrichment process as part of the "organisation memory". Nowadays, companies' strategy is to store all the explicit knowledge in the form of a Knowledge Processing System.
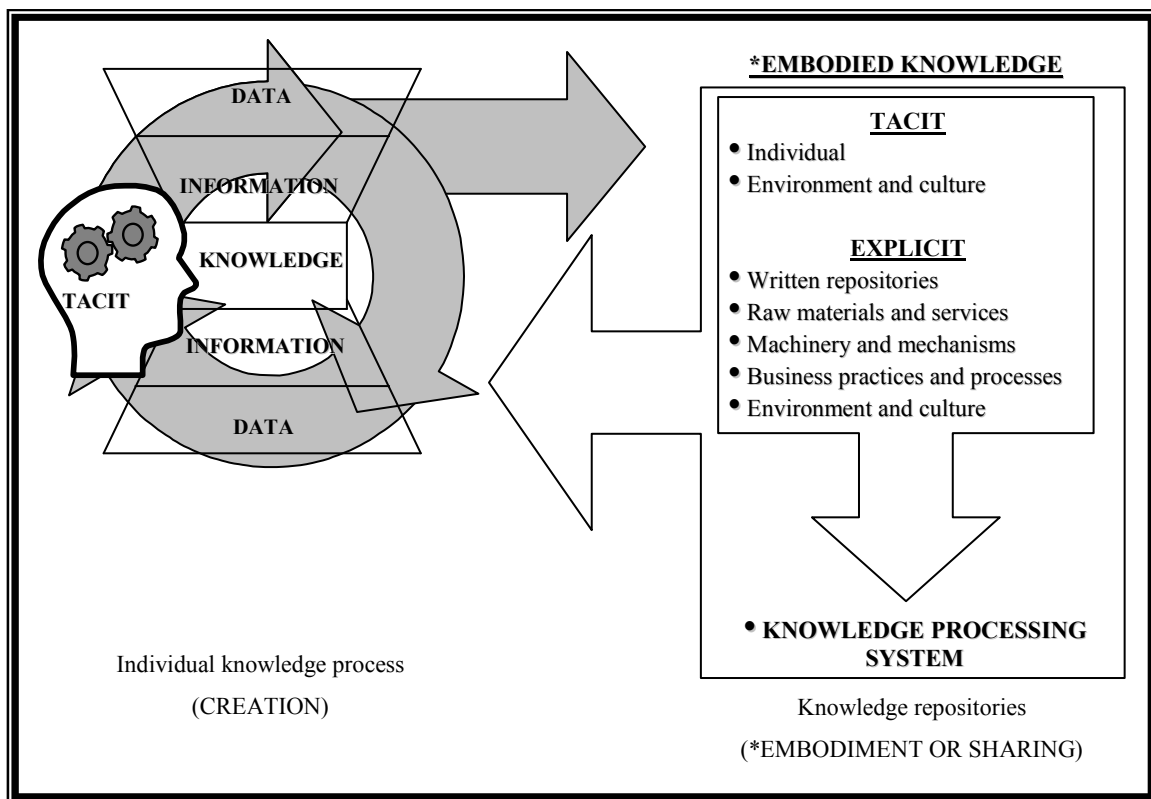

Figure 1. Knowledge creation and embodiment "flywheel" within an organisation

WHAT IS A SUPPLY CHAIN?

A good working definition of a supply chain is to found in Stevens (1989), who defines it as "a system whose constituent part include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of material and feedback flow of information". Traditionally "real world" supply chains have formed over time as the result of natural but loose connection between individual business units or "players" (Hafeez, et al, 1996). Consequently each business has tended to maximise performance as seen from a purely internal perspective. Present trading pattern demand that the complete supply chain collaborate in order to ensure that needs of the end customer is completely satisfied. Only if this objective is achieved can the individual business within the chain hope to firstly retain, and then secondly increase their market share.

Supply chains are a complex combination of technology, people and organisations. The exact participation of each of these actors may be quantified by analysing the market sector where supply chain is operating.

ORGANISATIONAL LEARNING IN SUPPLY CHAIN

Arguably, the future of the Knowledge Management is the exploitation of computational systems that are able to store, process and transmit knowledge from one individual to another, in order to facilitate daily operations within an organisation. Greco (1999) suggests that "today new technologies such as Intranets have addressed the first obstacle: rise the impetuses to capture knowledge". However, the Knowledge Management process itself is much more complicated that storing information into a computer form. Murray (1999) has rightly emphasised that, "above all KM is a people and processes issue". For this reason it is essential that organisations should design systems that fit people's needs, and supply continuous education and training in order to benefit knowledge sharing process. MacDonald (1999) have pointed out that organisation should have the right employee system in place to motivate, reward and recognise people who are willing to commit and participate in the continuous learning process.

Our conceptual model as shown in Figure 1 indicates that there are two essential steps in KM system: knowledge creation and knowledge embodiment. By making use of the concepts presented by Dixon (1993), we would argue that KM and more specifically learning could be addressed at three levels in a supply chain as explained in the following (Hafeez et al. 2000):

(i) At the Individual Level

Learning takes place each time an individual (worker) make a contact with a repository (for example reads a book which could be a technical manual or underlying policies and procedures of the company), performs an experiment i.e. some improvisation to the current practices, and gets feedback from customer or colleagues. Most of this learning would still be in the tacit form; however, the degree of "interaction" would give rise to relationship knowledge. Main emphasis here is about knowledge creation rather knowledge embodiment.

(ii) At the business unit level

At the business unit level, learning would take place when two or more workers learn from the same experience or activity. Team learning may involve new ways to address the team's responsibilities, or it may involve some aspect of the interaction between the members of the team themselves. A feedback of any nature from stakeholders, for example, the line manager, supplier or customer would considered to be a part of the learning process.

Obviously, the major emphasis at this level is knowledge embodiment and sharing process. Person to person is the most common and informal knowledge sharing practice, however it is the most inappropriate one according to the demands of a good KM practice. The knowledge shared between two or more people without evidence is too easy to be lost. Therefore, companies should codify this knowledge in a repository such as written or electronic archaic where tacit knowledge is transformed to explicit type. Some aspects of the relationship knowledge and hidden knowledge, respectively, due to interaction and socialising among the team members is also to be captured and codified.

(iii) At the supply chain level

Learning would take place when the organisation develops systemic processes to acquire, use, and communicate organisational knowledge. It embodies the individual as well as team level of learning and feedback. The learning has to be addressed at a much higher level such that each participating company within the supply chain understand and practice those systematic processes, for example, quality standards and procedures, database requirements of supplier or customers, stock control procedures etc.

At this level scenario planning and computer simulations (systemic knowledge) can provide a focal point for setting about the KM task. Like at the business unit level, socialising and interaction among

the participating individuals and inter-company teams would generate a great deal of hidden and relationship knowledge. The emphasis should be to decode knowledge in an explicit form of reports, so that it may be used to enhance the supply chain operation in the form of improved raw material, product and services, equipment etc. However, the task is much more demanding as learning is to be addressed through a favourable attitude and atmosphere such that knowledge sharing becomes the cultural value of the partnering organisations (Hafeez et al, 1998).

THE MAIN OBSTACLE TO LEARNING IN SUPPLY CHAIN

Traditional organisations are very much influenced by the Henry Ford's model and functional and cultural boundaries are to be blamed for inhibiting a co-operative intra-company and inter-company working relationships. Although functional organisations are not regarded as failure, however they have worked inefficiently and need a good shake up to adapt to the present consumer needs. The main problems of the functional organisations have been summarised as goal setting, hierarchies, job definition, responsibility, communications, corporate Bermuda Triangles and self perceptions (Handy, 1989).

This is also true for most of the supply chains those normally operate in a sequential mode, and the "soft" barriers between the key players restrict to prevail a transparent culture therein. In order to increase the capacity and capability of a supply chain the participating companies should eliminate multiple boundaries and reduce unnecessary bureaucracy (Hafeez, 1996). Barrier free or virtual organisation may be considered a way of challenging the functional boundaries, however, would require serious efforts to cultivate a culture of trust and learning therein (Hafeez et al., 1997).

The major obstacle to learning is moving knowledge across supply chain boundaries. It is not easy to cultivate a learning culture and even more difficult is to stick to change. The ability to implement a strategic change, to respond to a competitive challenge, to move information across divisional boundaries - all are closely tied to the organisation's ability to learn. To attack these problems, organisations need to recognise learning as the key issue. In other words, they need to become more intentional about their learning (Dixon, 1993). The rate at which individuals and organisations learn may become the only sustainable source of competitive advantage, especially in knowledge-intensive businesses (Stata, 1989) and in knowledge networks (Morton, 1991).

KM CURRENT PRACTICE SURVEY

A survey was conducted to capture a snapshot of the KM current practice in the North American geographical region. The sample was concentrated to the IT industry, as these companies were perceived to have relatively better understanding of the KM issues. A Questionnaire was designed to capture the subjective assessment of respondent on a linear scale. A total of twenty-five companies responded to the questionnaire. Results were analysed for the individual companies, and then collated in order to present an overall picture of KM current practice. The survey had three main sections.

Section 1 was to elicit information about some KM issues outlined in our conceptual model (Figure 1). Figure 2 gives a summary of the average results for this section. All of the respondent acknowledged that their company is promoting knowledge sharing process among its employees (average score ≅ 56%). The respondent also realised that their company has attached some form of recognition and reward for the employee who are proactive in creating and sharing knowledge within the company (average score ≅ 39%). One interesting result was that the companies thought it is important (average
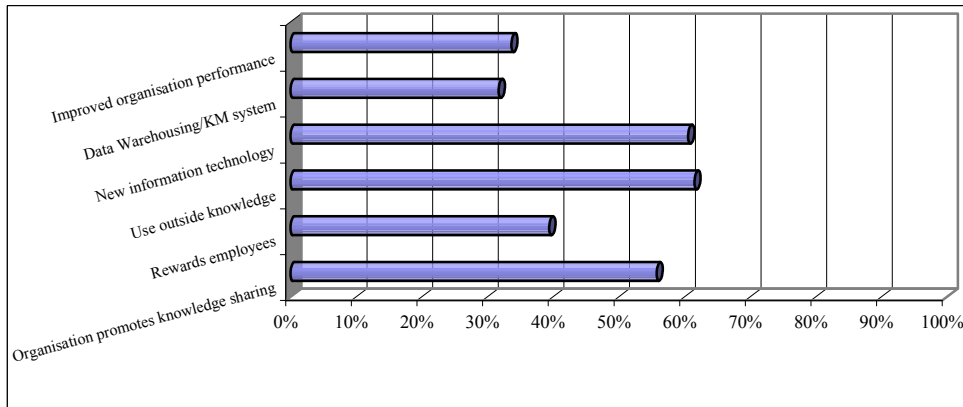
Figure 2: Survey results: General tendencies in Knowledge Management

score $\cong$ 62%) to make use of some external sources of knowledge (for example, using consultants or conducting benchmarking) to improve their activities or to re-align their strategic focus. Only 32% of the responses acknowledged that their company had introduced a dedicated data warehousing or knowledge management system (apart from using the general IT tools) for this purpose. On average the respondent felt that their company is getting only about 34% value for money from their KM initiative.

Section 2 was to get a feel how companies are responding to KM initiative in comparison to other programmes such as, TQM, organisational learning, business process re-engineering, IT and supply chain management. Figure 3 gives a summary of the results. Interestingly 73 % of the organisations are going through an IT implementation programme. Knowledge management programme secured 53.84%. Perhaps it is representative of the sample, as our target was KM organisations or IT industry in general. However, comparing this response to section 1, it can be established that all the companies who have initiated a KM programme are not necessarily using any specialist KM tools for this purpose (response rate = 32%).
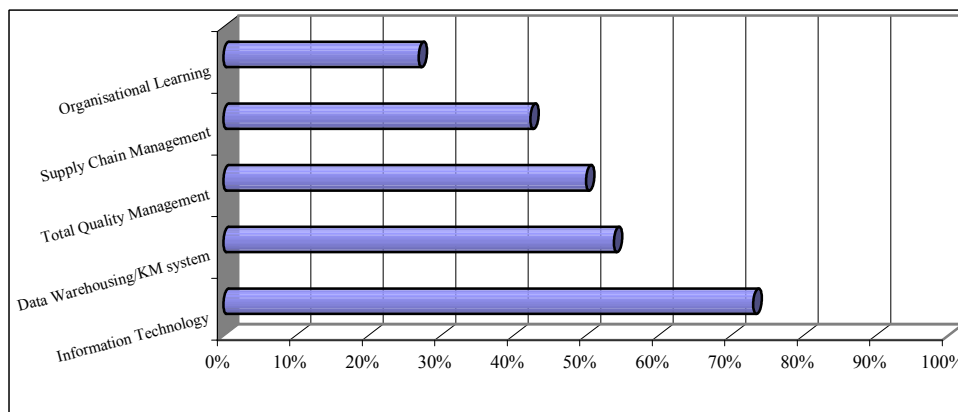

Figure 3: Organisation performance improvement initiatives

Nearly half of the sample companies have implemented a TQM initiative. Supply chain management programs were implemented by 42% of the sample companies. However organisation learning has secured only the 5th position with an average score of 27%. This shows that IT is still considered as a baseline for almost all other initiatives. KM secured a high position perhaps due to the nature of the sample companies selected. However, the survey results show a contrasting view that not necessary KM is a parallel to organisation learning program or vice versa. We understand that many of these companies have implemented some of the issues related to the KM under some other programmes. Also many a times, due to lack of understanding or unawareness many of the KM issues are not coined as a KM programme in the organisation setting.

Section 3 was to find out how companies see KM initiatives in a supply chain context. The first part of section 3 was to gauge if the participating companies perceive any advantage of sharing knowledge. A total of six questions were asked and a summary of the average response is illustrated in Figure 4.

The majority of the respondent acknowledged that information sharing would reap operational as well as financial benefits. For example, the question that information sharing would bring better demand visibility secured 68%. Many saw it a way to get more accurate orders (score 62%). The questions whether knowledge sharing would reap direct financial benefits secured relatively low (around 44%). However, most of the respondent see a clear benefit of knowledge sharing to improve operational performance by facilitating better scheduling and resource management (scored 73%), and better inventory management (scored 59.6%). It is clear that the operational benefits seem to outweigh the financial rewards according to these results. Perhaps many companies are still operating with traditional performance measures where these operational performances are not directly linked to the improved cash flows.
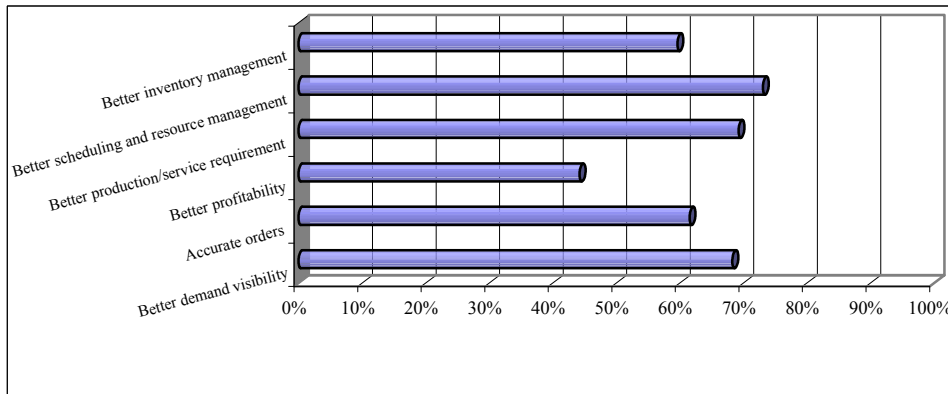

Figure 4: Advantages of knowledge sharing in a supply chain

The second part of Section 3 was to measure the darkside of knowledge sharing in the supply chain perspective. A total of five questions were asked and a summary of the average scores is charted in Figure 5. The main disadvantage of knowledge sharing was perceived to be loosing sensitive information (scored 44.23%), followed by loosing control of operation (scored 32.75%), loosing your own position (scored 24%), loosing trust (scored 22.11%) and loosing business (scored 19.23%). Interestingly knowledge sharing is about building trust, whereas many respondents felt that it would lead to mistrust. Perhaps this is inline with the results that many see it as a loss of business. Also the question about loosing your own position scored an average response of 24%, which is perceived lower if the same question is asked within a company settings, as managers are sometimes more threatened by sharing information with their colleagues. However, the overall advantages of knowledge sharing clearly outweighs the disadvantages
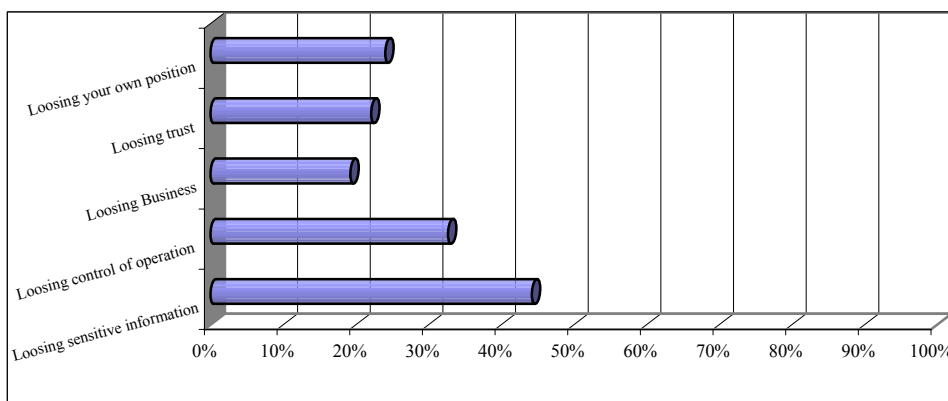

Figure 5: Disadvantages of knowledge sharing in a supply chain

CONCLUSIONS

Our survey analysis shows that companies are increasingly becoming aware of the need to have a clear knowledge management strategy. However many of the existing performance improvement initiatives are still technology oriented as the survey results show that IT is still the baseline for many change

management programs. KM is beginning to convince companies (at least in the IT industry) that technology is just a tool and not the solution. The down point of the survey analysis was that many respondent (around 72%) couldn't see a direct benefit of the KM initiative. Given the current interest in supply chain management area, KM companies clearly realise the benefits of information sharing and the perceived advantage outweighs the disadvantages. Our study has revealed that many respondent feel that knowledge sharing would lead to mistrust and loosing sensitive information and even loosing business. Clearly these critical issues are beyond the existing domain of a pure KM initiatives. However, a true supply chain management program with long term partnership initiatives in mind should address these reservations amicably. There is a clear synergy if supply chain management and KM are viewed as complementary initiatives to maximise the overall benefits.

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