Knowledge Management and Organisational Performance in the context of E-Knowledge

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Abstract

Competitive organisations must be able to locate, capture, store, share and leverage not only data and information but also the knowledge of the firm. However, if the majority of information needed for decision-making exists in the minds of employees, a system is needed to capture and codify this knowledge. The paper addresses this within the context of how decision support systems, Artificial Intelligence and Information Technology can aid the transformation process of knowledge.

The emergence of new technologies has increased the ability of organisations to share knowledge, not just internally, but with external stakeholders. E-knowledge networks allow their participants to create, share and utilise strategic knowledge to improve operational and strategic efficiency and effectiveness. The proposed e-knowledge network will evaluate and deploy these technologies to enable inter-organisational knowledge sharing. In addition, the implications of inter-organisational knowledge sharing on the supply chain are considered for business process improvement.

Keywords: Knowledge Management, Business Performance, Data warehousing, e-Knowledge

1. Introduction :

Organisations have always realised that access to quality information and knowledge will help them remain competitive. However, with the advent of rapidly changing business environments, managers are now realising they need to develop an effective knowledge strategy and provide employees with best available knowledge to support the decision making process.

Data warehousing initiatives, utilising various data mining techniques, have found common place in many business infrastructures for supporting the decision making process. However, as the vast majority of knowledge exists in the minds of employees, the quality of support these provide, especially for intensive queries, is somewhat uncertain (Nemati, Steiger et al. 2012). Therefore, new systems are required that not only locate, capture, store, share and leverage data and information, but also knowledge.

Knowledge management has recently become a fashionable concept, although many organisations are still unable to explain what knowledge is. More importantly, they are unable to develop and leverage knowledge to improve organisational performance. This is due to organisations becoming increasingly more complex in structure, resulting in knowledge that is fragmented, hard to locate, leverage, share and difficult to reuse (Zack 2010).

The paper focuses on the explication of knowledge and technology that can contribute to provide in capturing, coding, retrieval, sharing and leveraging of different forms of knowledge, as well as different types of knowledge, across an organisation. It raises a number of questions. What is explicitly codified knowledge and how should it be managed? What role can technology play? How should an organisation's resources and capabilities be configured? The goal of these questions is to provide the decision-maker with a suitable analysis platform for decision-making that enhances all phases of the intra-organisational knowledge management process.

2. Knowledge Management :

Knowledge that supports the decision making process is an obvious vital resource, however, knowledge has often suffered from under management in the past. It is only in recent years that knowledge has been taken more seriously. This no doubt resulted from a poor understanding of what knowledge is and from a lack of provision, in terms of guidelines and frameworks, for managing it.

Knowledge: Most definitions and explanations of knowledge seem to cover the same vocabulary, concepts and words. Rather than provide a standard definition, the paper addresses the general themes and fundamentals that have become evident in recent years.

(1) Knowledge goes through a process of sharing tacit with tacit knowledge, tacit to explicit, explicit leverage, and explicit back to tacit. (2) Knowledge can be created and tested. (3) Knowledge can be distinguished from data and information. (4) Explicit knowledge is usually filtered, stored, retrieved and dispersed across the organisation. (5) A culture that does not foster and reward the sharing of knowledge cannot expect technology to solve its problems (Srinivas 2012).

Tacit knowledge is subconsciously understood and applied, difficult to articulate and usually developed from immersing oneself in an activity for an extended period. Explicit knowledge can be easily communicated to others through a system of language, symbols, rules, equations and objects. It consists of quantifiable data, written procedures, mathematical models etc. Explicit knowledge is the most important for organisations; imagine an organisation with no computer software or procedural documentation.

The Knowledge Transformation Process: As stated earlier, knowledge goes through a transformation process, which can be facilitated through the utilisation of Decision Support Systems (DSS), Artificial Intelligence (AI). The paper covers the main area of focus, the explication of knowledge, with further detail of this transformation process to be found in the following reference (Nemati, Steiger et al. 2012). DSS are IT and software specifically designed to help people at all levels of the company, below the executive level, make decisions. DSS can play an important role in the transformation process of explicating knowledge, for example, through the specification of mathematical modelling. Specifically, the goal of these models, and of the decision variables, must be explicitly articulated by the decision-maker. Furthermore, the decision-maker must also explicitly articulate the model constraints. This specification of explicit knowledge "represents the tacit knowledge the worker has developed over time, within the decision-making environment" (Nemati, Steiger et al. 2012).

DSS can further enhance the explication of knowledge by "eliciting one or more what-if cases, representing areas the knowledge worker would like to investigate" (Nemati, Steiger et al. 2012). In effect, the tacit knowledge of historical decisions is transformed into explicit form, to be shared and leveraged for improved decision making.

Once this knowledge has been transformed and stored, it can be leveraged by making it available to others when and where they need it. (Nemati, Steiger et al. 2012) suggests that "explicit knowledge stored in the form of instances of a mathematical model (what-if cases) can be leveraged via deductive and/or inductive model analysis systems". Model-specific knowledge is applied to a single instance of a model, addressing such questions as "why is this the solution?" "why do the solutions to two model instances differ so much?".

DSS can also help workers to learn, i.e. the process of converting explicit knowledge to implicit knowledge. Known as internalisation, this process involves the "identifying bodies of knowledge relevant to the particular user's needs" (Warkentin, Sugumaran et al. 2013). It involves extracting knowledge and filtering it to match a particular problem against the body of knowledge. Internalising explicit and/or new knowledge may arise through a decision-maker modifying his/her internal mental model that is used as his/her performance guide for a specified situation (Nemati, Steiger et al. 2012).

If tacit knowledge has the potential to be explicated but cannot be articulated, it represents an opportunity lost to utilise that knowledge for enhancement of the decision making process. Competitors who are able to achieve this task may gain a competitive advantage (Zack 2010). This knowledge may remain tacit due to the organisation possessing no formal model or language for its articulation. In contrast, inherently inarticulable knowledge that organisations attempt to articulate may have a detrimental effect on organisational performance, as this knowledge may ultimately be lost. Tacit knowledge is an extremely important resource as it underpins the decisions workers make for a given situation. Failure to manage it properly will lead to a loss of knowledge and failure to benefit from the experience of others.

Although explicit knowledge represents a fraction of an organisation's intellectual assets, it is apparent it plays a crucial role in the knowledge strategy of an organisation. Zack (Zack 2010) suggests that "appropriately explicating tacit knowledge for sharing and reapplication is the least understood aspect of knowledge management". However, organisations must not shy from this process as the balance between tacit and explicit knowledge can impact the competitive performance of an organisation. Organisations should therefore focus on determining which knowledge to make explicit and which to remain tacit. Providing a suitable set of guidelines for managing this knowledge is the key to success for any knowledge management initiative.

3. Inter-Organisational Knowledge Sharing :

The paper has so far discussed how knowledge can be managed to support decision-making within an organisation. We will now discuss how the emergence of new technologies can enhance an organisation's relationship with its stakeholders. The final part of the paper will address how new technology, specifically web-enabled, can enhance the utilisation and leveraging of knowledge, for inter-organisational knowledge sharing. We examine the way organisations are restructuring internal and external relationships, and creating "e-knowledge networks", existing in a virtual environment, to facilitate the communication of data, information and knowledge.

Much like an intra-organisational knowledge warehouse, the combination of knowledge networks and the Internet effectively create one, whole virtual repository, allowing all participants to create, share and use strategic knowledge to collaboratively improve operational and

strategic efficiency and effectiveness. The primary focus of this integrated, virtual community is centred on the explicit knowledge contained in the repository, rather than the providers, decision-makers or the tacit knowledge they may hold (Zack 2010).

In addition to capturing, storing and retrieving information, an organisation must be able to lever this information to specific processes and unknown situations. Specific contextual knowledge must be fully exploited to reflect the full range of organisational knowledge, as it can provide significant opportunities for competitive advantage.

A community of practice is defined as "an informal group where much knowledge sharing and learning takes place" (Merali, Davies 2012). The vice president of Xerox describes such communities as "peers in the execution of real work. What holds them together is a common sense of purpose and a real need to know what each other knows"(Verna 2014a). In essence, the group acts like an informal network, with each participant sharing a common agenda and interest. The importance of these networks becomes apparent when individuals attempt to elicit information from others who do not share common interests and agendas. "Communities of practice and social networks highlight the importance of the link between social capital and knowledge resources" (Merali, Davies 2012).

Most knowledge management initiatives attempt to capture information relating to specific user profiles and queries. However, "the bigger challenge is to capture and reuse knowledge that is generated during knowledge work" (Merali, Davies 2012). Although DSS can effectively manage this created knowledge in a number of ways (refer back to 2.1) Merali (Merali, Davies 2012) suggests that the majority of knowledge created through this process generally tends to remain private. This is due to the   following: (1) "A lack of context within which to articulate individual learning" (Merali, Davies 2012). (2) "The amount of time and effort required to analyse and record what has been learnt" (Merali, Davies 2012). (3) "Articulating particular types of knowledge may not be culturally legitimate, challenging what the organisation knows may not be socially or politically correct" (Zack 2010). (4) "Making private knowledge public may result in a redistribution of power that may be resisted in organisational cultures" (Zack 2010).

Communities of practice are seen as a means to overcome these barriers to knowledge sharing. We now discuss how e-knowledge networks, supported by the Internet, can enable the creation of a "virtual community of practice" (Merali, Davies 2012).

Inter-organisational systems are "networks of company systems that allow organisations to share information and interact electronically across organisational boundaries" (Warkentin, Sugumaran et al. 2013), the common medium being the Internet. Organisations are now adopting a fresh approach to knowledge, that is, "knowledge equals power, so share it and it multiplies" (Verna 2014b). Their aim is to increase efficiency and speed of response in rapidly changing markets and improve an organisation's relationship with its stakeholders (Walsham 2011).

E-knowledge networks are formed through the combination of knowledge management and inter-organisational systems. The adoption of the Internet has provided a platform for the continuous and unattended exchange of information and knowledge about markets, customers, demand, inventories and so forth. These platforms enable the sharing of valuable knowledge, often created through technologies such as decision support systems, intelligent agents and data warehouse technologies, with their strategic partners, thereby enabling improved organisational effectiveness. One such example of intelligent agents is the Jasper II system, comprising intelligent software agents that "retrieve, summarise and inform other agents about information considered to be of value to a Jasper II user" (Merali, Davies 2012).

It is quite apparent organisations need to be flexible and be able to identify exploitable situations. These goals can be achieved by implementing electronic systems that generate immediate knowledge (real time) about internal functions and processes, customers, markets, supply chain partners, vendors and dealers (Warkentin, Sugumaran et al. 2013). Furthermore, a strategic relationship should provide access to different sources of knowledge, not duplicates of this knowledge (Day, Schoemaker, P. J. H. et al. 2014). Such systems allow organisations to be dynamic and flexible, allowing rapid changes in their strategies and activities. Organisations can use this knowledge to create new internal and external structures and relationships, leading to further improvements in knowledge, leading to further strategic improvements.

4. E-Knowledge Networks for Business Improvement :

We will discuss one long-term alliance, suggested by Warkentin (Warkentin, Sugumaran et al. 2013), as a trend likely to develop from implementing strategic e-knowledge networks in the context of supply chain. The supply chain process involves organisations acquiring resources and providing goods or services, (Johnson, Scholes 2014). Progressive supply chain management aims to improve the co-ordination "across the supply chain to create value for customers, while increasing the profitability of every link in the chain" (Warkentin, Sugumaran et al. 2013). It is this co-ordination aspect that addresses the role of shared knowledge, enabling the analysis and management of all supply change activities. In other words, according to Choi et al. (Choi, Budny et al. 2015) the supply chain involving knowledge is referred to as knowledge supply chain and in this context they define knowledge as technologies, inventions and know-how that helps businesses bring products to markets. The material flow is the physical flow of material and the knowledge flow is like the flow of technique that connects the parts together. Figure 1 illustrates a material flow in a typical supply chain. It shows how material moves from supplier to customers' and at every stage a value is added to the material, whilst,

a network generates value not just through goods, services and revenue, but also through knowledge. Knowledge becomes a medium of exchange in its own right, with success dependent on building a rich web of trusted relationships. The supply chain network proposed by Warkentin (Warkentin, Sugumaran et al. 2013) is extended to emphasise the creation of a value network for a complex e-business environment. In support of this trend towards e-networks, additional focus has been given to the implications on the value chain. Verna (Verna 2014b) states "the traditional view of value chain is outdated by the new enterprise model of the value network".

Figure 1: A Typical Supply Chain
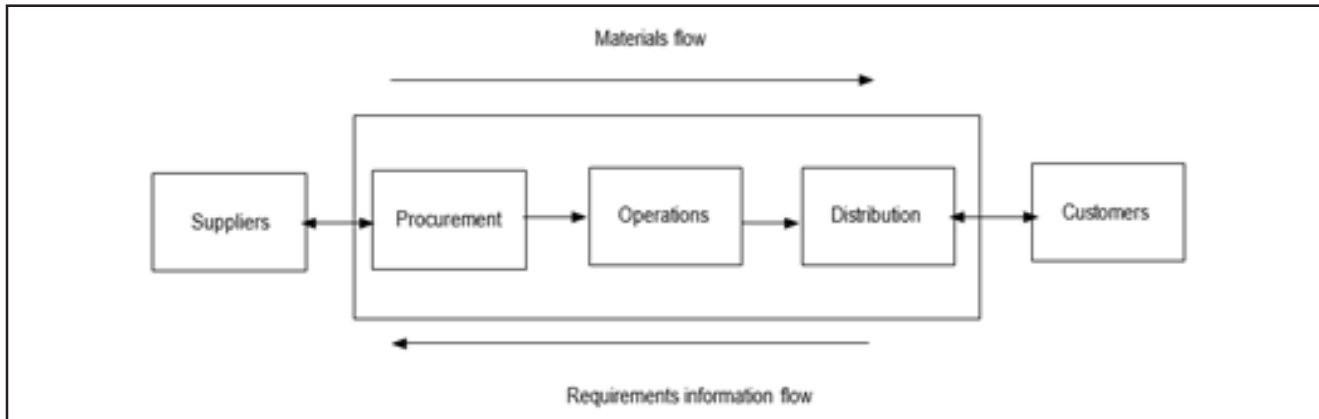
Before the introduction of the Internet, the traditional view of the supply chain was that of inefficient communication and allocation. Information flowed in a linear fashion, either upstream or downstream. In addition, a further drawback was the lack of connection to one's customers, as organisations were forced to communicate through wholesalers, distributors and retailers. Dispersion of information beyond one link in the supply chain was inhibited through a lack of formal relationships. Furthermore, the "information flow through linkages was constrained due to a lack of standard data representation schemes, therefore, the sharing of information beyond immediate supply chain partners was impossible" (Warkentin, Sugumaran et al. 2013).

The traditional view of knowledge was to hoard it and If organisations were to share this valuable information, a competitive edge would be lost (Verna 2014b). However, the consensus among new economy organisations is to provide an open environment for the sharing of information. Organisations are encouraged to work "in close co-ordination to optimise the flow in the entire supply chain" (Warkentin, Sugumaran et al. 2013)

The concept of the e-supply chain proposes a new relationship between suppliers, partners and customers as well as integration of processes, information systems and inter-organisational problem solving (Manthou, Vlachopoulou et al. 2015). The e-supply chain is the backbone of a virtual network, linking each participant as one cohesive unit. The chain comprises a series of value-added stages, starting with the supplier and ending with the consumer. The focus of the e-supply chain is on the bi-directional flow of information, each stage is a supplier to its adjacent downstream stage and a customer to its upstream stage. Each participant is therefore able to assume many roles within the supply chain, but the ultimate relationship comes down to a supplier and a customer role.

Traditionally, demand information passed through many layers, with each layer degrading the quality of information. The variances in this information caused poor production scheduling and inefficient resource allocation, resulting in excessive inventory throughout the chain (Warkentin, Sugumaran et al. 2013). In contrast, the e-supply chain proposed by Manthou (Manthou, Vlachopoulou et al. 2015) utilises information and knowledge as a substitute for inventory, competing on agility and speed and viewing customer collaboration as a competitive, strategic asset. Figure 2 illustrates the creation of knowledge in an organisation. Here, it is argued that a typical organisation is closed loop i.e., it can acquire knowledge through external factors only. But it must be emphasized that effectively managing and retrieving the existing knowledge - which could be in the form of data and expert's knowledge - should be the main focus.

Figure 2: Knowledge Creation
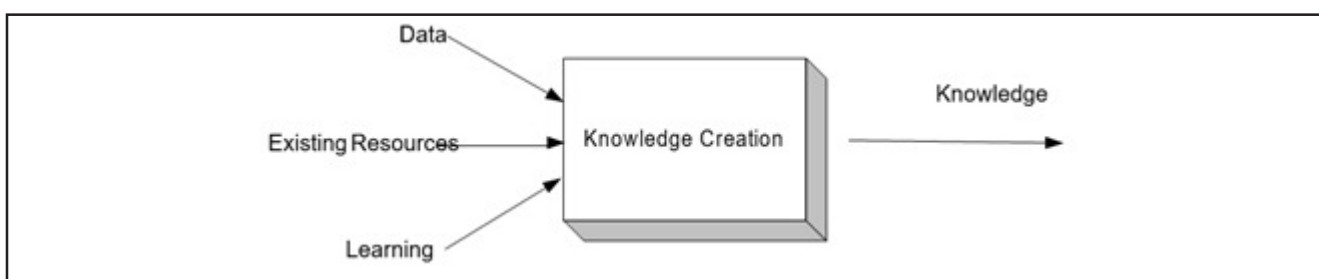
Knowledge creation would ensure by helping the organisation in identifying skill gaps or knowledge gaps between what an organisation has as a whole and what it may need to face new challenges. It would also make it easy to identify what areas an organisation should either focus on or outsource its activities to. It must be emphasized that just leveraging knowledge in an organisation may not be enough because of the dynamic and ever changing world we are in. And so, this should be complemented by inculcating a learning environment by fostering and rewarding individuals. The key to a successful organisation is how effectively it brings together the skills it possesses.

The resulting fresh flows of strategic supply chain knowledge lead to new strategic relationships in the e-marketplace. These flows may represent "knowledge created by analytical processes conducted by automated data mining algorithms" (Warkentin, Sugumaran et al. 2013). What is most significant about e-knowledge networks is that they permit fresh inter-organisational information and knowledge flow, effectively facilitating management of the supply chain. However, if an organisation is to gain maximum benefit from these newly created flows of information and knowledge, they must use it strategically.

5. Conclusion :

The motivation of this paper is to draw attention to important issues of technology in capturing, codifying and disseminating knowledge throughout the organisation. It reflects the need to store not just different forms of knowledge, but different types of knowledge. However, it should be remembered that an overemphasis on technology might force an organisation to concentrate on knowledge storage, rather than knowledge flow. New insights and opportunities are available to organisations if they are able to integrate knowledge across shared and different contexts.

The Internet has enabled the creation of virtual communities, networked through technologies only available just a few years ago. As the Internet is becoming the standard form of collaboration between organisations, the trend of the e-knowledge network looks set to continue. While technology can greatly enhance an organisation's knowledge management strategy, it does not necessarily ensure an organisation is managing its resources and capabilities in the right way. However, technology is vital to enable the capturing, indexing, storing and distribution of knowledge across and with other organisations. Knowledge can be viewed in a number of other contexts; it is vital each are addressed if an organisation is to improve performance.

Successful knowledge strategies depend on whether organisations can link their business strategy to their knowledge requirements. This articulation is vital to allocating resources and capabilities for explicating and leveraging knowledge.

The competitive value of knowledge must be addressed to assess areas of weakness. Strategic efforts should be made to close these knowledge gaps to ensure the organisation remains competitive. The strategic value of knowledge should be addressed, focusing on the uniqueness of knowledge.

Finally, an organisation should address the social aspects affecting knowledge initiatives, namely cultural, political and reward systems. Beyond the management roles proposed in the paper, the environment should promote co-operation, innovation and learning for those partaking in knowledge based roles.

Knowledge is more than a fad; it is now at the centre of an organisation's strategic thinking. The essence of any knowledge management strategy can be summed up by quoting, (Drucker 2001) who said "A company's key to success resides not so much in its work and capital as in the capacity to treat knowledge, corporate knowledge, be it explicit or tacit."

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