

## Knowledge Management for Profitable Businesses

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### Abstract

*Competitive corporations must be able to locate, capture, store, share and leverage not only data and information but also the inherent knowledge of the firm. Having said this, if the majority of information needed for decision-making exists in the minds of staff, a system is needed to capture and codify this knowledge. The research addresses this within the context of how decision support systems, Artificial Intelligence and Information Technology can assist the transformation process of knowledge. The emergence of new technologies has hiked the ability of corporations to share knowledge, not just internally, but with external stakeholders. E-knowledge networks permit their participants to create, share and utilise strategic knowledge to enhance operational and strategic efficiency and effectiveness. The proposed e-knowledge network can evaluate and deploy these technologies to enable inter-corporate knowledge sharing. In addition, the implications of inter-corporation knowledge sharing on the supply chain are considered for business process improvement.*

### 1. Introduction

Corporations have always attempted to understand if access to quality information and knowledge can help them remain competitive. However, with the adoption of rapidly changing business environments, functional managers are now realising that they need to inculcate an effective knowledge strategy and provide employees with best available knowledge to assist a more comprehensive decision making process.

Data warehousing initiatives, applying various data mining methodologies, have found common place in many business infrastructures for assisting the decision making process. However, as the vast majority of knowledge resides in the minds of employees, the quality of support

these provide, especially for intensive queries, is to a large extent uncertain (Nemati, Steiger et al. 2002). Hence, a new system is required that not only locate, capture, store, share and leverage data and information, but also include the aspect of knowledge.

Knowledge management has recently become an interesting concept, although many corporations are still unable to explain what knowledge means. More importantly, they are unable to develop and leverage knowledge to enhance corporational performance. This is due to corporations becoming increasingly more complex in structure, knowledge resulting that is fragmented, hard to locate, leverage, share and difficult to reuse (Zack 1999).

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

### 2. Knowledge Management

Knowledge that assists the decision making process is an obvious vital resource, however, knowledge has often suffered from under management as per history annals. It is only in recent years that knowledge has been taken more seriously. This no doubt yielded from a poor understanding

of what knowledge is and from a lack of provision, in terms of advice and frameworks, for managing it.

## 2.1 What Is Knowledge?

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

- Knowledge goes through a process of sharing tacit with tacit knowledge, tacit to explicit, explicit leverage, and explicit back to tacit.
- Knowledge can be built and tested.
- Knowledge can be separated from data and information.
- Explicit knowledge is normally filtered, stored, retrieved and dispersed across the corporation.
- A culture that does not render and reward the sharing of knowledge cannot expect technology to solve its problems (Srinivas 2000).

Tacit knowledge is subconsciously understood and used, difficult to articulate and usually developed from immersing oneself in an activity for a prolonged period. Explicit knowledge can be easily communicated to others via a system of language, symbols, rules, equations and objects. It consists of quantifiable data, written procedures, mathematical quantification etc (Nemati, Steiger et al. 2002). Explicit knowledge is more important for corporations; imagine a corporation with no computer software or procedural documentation.

## 2.2 The Knowledge Transformation Methodology

As mentioned earlier, knowledge goes through a transformation process, which can be facilitated through the utilisation of Decision Support Systems (DSS), Artificial Intelligence (AI). The manuscript covers the main area of focus, the explication of knowledge, with additional detail of this transformation process to be registered in the following reference (Nemati, Steiger et al. 2002).

DSS are IT and software mainly designed to help people at all levels of the company, below the executive level, make

decisions. DSS can play a vital role in the transformation process of explicating knowledge, for example, through the specification of mathematical analysis. Specifically, the goal of these models, and of the decision variables, need to be explicitly articulated by the decision-maker. Furthermore, the decision maker can also explicitly articulate the model limitations. This specification of explicit knowledge "represents the tacit knowledge the employee has developed over time, within the decision-making environment" (Nemati, Steiger et al. 2002).

DSS can also enhance the explication of knowledge by "eliciting one or more what-if conditions, representing areas the knowledge worker would like to investigate" (Nemati, Steiger et al. 2002). In effect, the tacit knowledge of historical decisions is changed into explicit form, to be shared and leveraged for improved decision making.

Once this knowledge has been transformed and registered, it can be leveraged by making it available to others when and where they need it. (Nemati, Steiger et al. 2002) proposed that "explicit knowledge stored in the form of instances of a mathematical system (what-if cases) can be leveraged via deductive and/or inductive model analysis systems". Model-specific information 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 changing explicit knowledge to implicit knowledge. Known as internalisation, this process involves the "identifying bodies of knowledge applicable to the particular user's needs" (Warkentin, Sugumaran et al. 2001). It involves extracting knowledge and filtering it to match a particular issue 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. 2002).

If tacit knowledge has the potential to be explicated and difficult to be articulated, it represents an opportunity lost to utilise that knowledge for improvement of the decision making process. Competitors who are able to achieve this task may attain a competitive advantage (Zack 1999). This knowledge may remain tacit due to the corporation possessing no formal structure or language for its articulation. In contrast, inherently inarticulable knowledge that corporations attempt to articulate may have a detrimental effect on organizational performance, as this knowledge can be ultimately lost. Tacit knowledge is an extremely important resource as it underpins the decisions staff 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 a corporation's intellectual assets, it is apparent it plays a crucial role in the knowledge strategy of an corporation. Zack (Zack 1999) suggests that "appropriately explicating tacit knowledge for sharing and re-application is the least understood aspect of knowledge management". However, corporations must not shy from this process as the balance between tacit and explicit knowledge can impact the competitive performance of a corporation. Corporations 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 a solution to success for any knowledge management initiative.

### 3. Inter-Corporation Knowledge Sharing

The manuscript has so far discussed how knowledge can be managed to support decision-making within a corporation. This section will now discuss how the emergence of new technologies can enhance a corporation's relationship with its stakeholders. The final part of the manuscript will address how new technology, specifically web-enabled, can enhance the utilisation and application of knowledge, for inter-corporation knowledge sharing. This study examines the way corporations are restructuring internal and external relationships, and creating "e-knowledge networks", existing in a virtual environment, to coordinate the communication of data, information and knowledge.

Much like an intra-corporation knowledge warehouse, the amalgamation 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 rooted on the explicit knowledge contained in the repository, rather than the renderers, decision-makers or the tacit knowledge they may hold (Zack 1999).

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

A community of practice is defined as "an informal set where much knowledge sharing and learning takes place" (Merali, Davies 2001). The Vice President of Ranbaxy

Labs 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 2000a).

In essence, the group acts like an informal network, with each representative sharing a common agenda and interest. The importance of these networks becomes viable when individuals attempt to elicit information from others who do not share mutual interests and agendas. "Communities of practice and social networks underline the importance of the link between social capital and knowledge resources" (Merali, Davies 2001).

Most knowledge management initiatives attempt to register information relating to specific user profiles and queries. However, "the bigger challenge is to capture and reapply knowledge that is generated during knowledge work" (Merali, Davies 2001). Although DSS can effectively handle this created knowledge in a number of ways (refer back to 2.1) Merali (Merali, Davies 2001) proposes that the majority of knowledge created through this process normally tends to remain private. This could be due to the following:

- "A lack of context within which to articulate personalized learning" (Merali, Davies 2001).
- "The amount of time and effort mandated to analyse and record what has been learnt" (Merali, Davies 2001).
- "Articulating particular sections of knowledge may not be culturally legitimate, challenging what the corporation knows may not be socially or politically correct" (Zack 1999).
- "Making private knowledge public could result in a redistribution of power that may be resisted in corporation cultures" (Zack 1999).
- Communities of practice are viewed as a means to overcome these barriers to knowledge sharing. The research now discusses how e-knowledge networks, supported by the Internet, can enable the creation of a "virtual community of practice" (Merali, Davies 2001).

Inter-corporation systems are "networks of company systems that permit corporations to share information and interact electronically across boundaries" (Warkentin, Sugumaran et al. 2001), the common medium being the Internet. Corporations are now adopting a fresh approach to knowledge, that is, "knowledge equals power, so share it

and it multiplies" (Verna 2000b). Their aim is to increase efficiency and speed of response in dynamically changing markets and improve a corporation's relationship with its stakeholders (Walsham 2001).

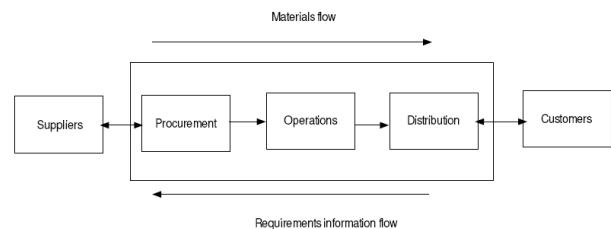
E-knowledge networks are formed through the amalgamation of knowledge management and inter-corporate systems. The adoption of the Internet has provided a platform for the continuous and unattended exchange of information and knowledge referencing markets, customers, demand, inventories and so forth. These platforms enable the sharing of valuable knowledge, often created through technologies viz., decision support systems, intelligent agents and data warehouse technologies, with their strategic partners, thereby initiating improved corporation's 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 deemed to be of value to a Jasper II user" (Merali, Davies 2001).

It is quite apparent corporations 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 unified functions and processes, customers, markets, supply chain partners, vendors and dealers (Warkentin, Sugumaran et al. 2001). Furthermore, a strategic relationship can provide access to different sources of knowledge, not duplicates of this knowledge (Day, Schoemaker, P. J. H. et al. 2000). Such systems permit corporations to be dynamic and flexible, allowing rapid changes in their strategies and performance. Corporations can use this knowledge to auger new internal and external structures and relationships, leading to further improvements in knowledge, thus realizing further strategic improvements.

#### 4. e-Knowledge Networks for Business Improvement.

This research now discusses one long-term alliance, suggested by Warkentin (Warkentin, Sugumaran et al. 2001), as a trend likely to emanate from implementing strategic e-knowledge networks in the context of supply chain. The supply chain process involves corporations acquiring resources and providing goods or services, (Johnson, Scholes 1999). Progressive supply chain management attempts 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. 2001). It is this symbiotic 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. 2004) the supply chain encompassing knowledge is referred to as knowledge supply chain and in this context they define knowledge as technologies, inventions and know-how that assist businesses bring products to markets. The material flow is the physical flow of material and the knowledge flow is similar to 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 reasonable yield is added to the material, whilst, a network generates value not just through goods and services, but also through knowledge. Knowledge becomes a medium of exchange in its own right, with success rested on building a rich web of trusted relationships. The supply chain network proposed by Warkentin (Warkentin, Sugumaran et al. 2001) is extended to emphasise the marking of a value network for a complex e-business environment. In support of this trend towards e-networks, additional focus has been rested to the implications on the value chain. Verna (Verna 2000b) states "the traditional view of value chain is outdated by the new enterprise structure of the value network".

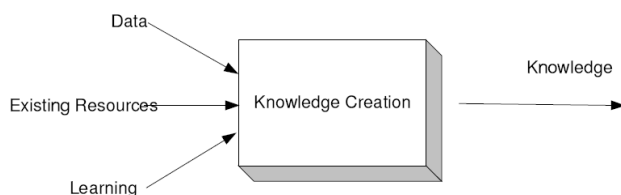


**Figure 1: A Typical Supply chain**

Before the advent of the Internet, the traditional view of the supply chain was that of inefficient communication and allocation. Information flowed in a linear fashion, possibly upstream or downstream. In addition, a further drawback was the missed connection to one's consumers, as corporations were forced to communicate through wholesalers, distributors and retailers. Dispersion of information beyond one link in the supply chain was limited through a lack of formal relationships. Furthermore, the "information flow through linkages was constrained in lieu of a lack of standard data representation schemes, hence, the sharing of information beyond immediate supply chain partners was impossible" (Warkentin, Sugumaran et al. 2001).

The traditional view of knowledge was to hoard it and if corporations were to share this valuable information, a competitive edge would be lost (Verna 2000b). Moreover, the consensus among new economy corporations is to

provide an open environment for the sharing of information. Corporations are encouraged to work "in close co-ordination to optimise the flow in the entire supply chain" (Warkentin, Sugumaran et al. 2001) The concept of the e-supply chain asserts a new relationship between suppliers, partners and customers as well as coordination of processes, information systems and inter-corporation problem solving (Manthou, Vlachopoulou et al. 2004). The e-supply chain is the backbone of a virtual network, linking each participant as one robust unit. The chain comprises a series of value-added stages, starting with the supplier and ending with the end-user. The focus of the e-supply chain is on the multi-directional flow of information; each stage is a supplier to its adjacent downstream stage and a customer to its upstream stage. Each participant is hence able to assume many roles within the supply chain, but the ultimate relationship boils down to a supplier and a consumer role. Traditionally, demand information passed through many layers, with each layer eroding the quality of information. The variances in this information resulted poor production scheduling and inefficient resource allocation, resulting in excessive inventory throughout the chain (Warkentin, Sugumaran et al. 2001). In contrast, the e-supply chain asserted by Manthou (Manthou, Vlachopoulou et al. 2004) utilises information and knowledge as a substitute for inventory, competing on agility and speed and witnessed customer collaboration as a competitive, strategic asset. Figure 2 illustrates the creation of knowledge in a corporation. Here, it is argued that a typical corporation is closed loop i.e., it can acquire knowledge through external factors only. Having said this, it must be emphasized that effectively managing and retrieving the existing knowledge - which could be in the form of data and expert's knowledge - could be the main focus.



**Figure 2: Protocol for Knowledge Creation**

Knowledge creation would ensure by assisting the corporation in identifying skill gaps or knowledge gaps between what a corporation has as a whole and what it may need to face new challenges. It would also make it easy to identify what areas a corporation should either focus on or outsource its activities to. It must be emphasized that just leveraging knowledge in a corporation 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 corporation is how effectively it brings together the skills it harbours.

The resulting fresh flows of strategic supply chain knowledge tend to crystallize new strategic relationships in the e-marketplace. These flows may represent "knowledge created by analytical processes conducted by automated information mining algorithms" (Warkentin, Sugumaran et al. 2001). What is most significant about e-knowledge portals is that they permit fresh inter-corporation information and knowledge flow, effectively facilitating management of the supply chain. However, if a corporation is to gain maximum benefit from these newly created flows of information and knowledge, they must use it strategically.

## 5. Conclusions

The motivation of this paper is to draw attention to important aspects of technology in capturing, codifying and disseminating knowledge throughout corporations. It not only reflects the need to store different forms of knowledge but also different types of knowledge.

However, it should be remembered that an overemphasis on technology might force a corporation to concentrate on knowledge storage, rather than knowledge flow. New insights and opportunities are available to corporations if they are able to integrate knowledge across shared and different contexts. The Internet has enabled the creation of virtual civilizations, networked through technologies only available just a few years ago. Now that the internet is becoming the standard form of collaboration between corporations, the trend of the e-knowledge network looks set to continue. While technology can greatly enhance a corporation's knowledge management strategy, it does not necessarily ensure that a corporation is managing its resources and capabilities in the appropriate way. However, technology is vital to enable the capturing, indexing, storing and distribution of knowledge across and with other corporations. Knowledge can be viewed in a number of other contexts, it is vital that each is addressed if a corporation is to improve performance.

- Successful knowledge strategies rest on whether corporations can link their business strategy to their knowledge requirements. This articulation is vital to the allocation of 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 that the corporation remains competitive. The strategic value of knowledge should be addressed, focusing on the uniqueness of knowledge.

- Finally, a corporation needs to address the social aspects affecting knowledge initiatives, namely cultural, political and reward systems. Beyond the management roles proposed in this research work, 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 a corporation's strategic thinking. The essence of any knowledge management strategy can be summed up by the following quote, from the Father of Management - Peter F Drucker (Drucker 1993) "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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