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Knowledge Management for Business Performance Enhancement

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Abstract

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

Keywords: Knowledge Management, business performance, technology

Introduction

Organizations have always realized that access to quality information and knowledge willhelp them remain competitive. However, with the advent of rapidly changing businessenvironments, managers are now realizing they need to develop an effective knowledgestrategy and provide employees with best available knowledge to support the decisionmaking process.

Data warehousing initiatives, utilizing various data mining techniques, have found commonplace 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 supportthese provide, especially for intensive queries, is somewhat uncertain (Nemati, Steiger et al.2002). Therefore, new systems are required that not only locate, capture, store, share andleverage data and information, but also knowledge.

Knowledge management has recently become a fashionable concept, although manyOrganizations are still unable to explain what knowledge is. More importantly, they areunable to develop and leverage knowledge to improve organizational performance. This isdue to organizations becoming increasingly more complex in structure, resulting inknowledge that is fragmented, hard to locate, leverage, share and difficult to reuse (Zack1999).

The paper focuses on the explication of knowledge and technology that can contribute toprovide in capturing, coding, retrieval, sharing and leveraging of different forms ofknowledge, as well as different types of knowledge, across an organization. It raises anumber of questions. What is explicitly codified knowledge and how should it be managed?What role can technology play? How should an organization's resources and capabilities beconfigured? The goal of these

questions is to provide the decision-maker with a suitableanalysis platform for decision-making that enhances all phases of the intra-organizationalknowledge management process.

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 yearsthat knowledge has been taken more seriously. This no doubt resulted from a poorunderstanding of what knowledge is and from a lack of provision, in terms of guidelines andframeworks, for managing it.

What Is 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 thegeneral 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 created and tested.
- Knowledge can be distinguished from data and information.
- Explicit knowledge is usually filtered, stored, retrieved and dispersed across the organization.
- A culture that does not foster and reward the sharing of knowledge cannot expect technology to solve its problems (Srinivas 2000).

Tacit knowledge is subconsciously understood and applied, difficult to articulate and usuallydeveloped from immersing oneself in an activity for an extended period. Explicit knowledgecan be easily communicated to others through a system of language, symbols, rules,equations and objects. It consists of quantifiable data, written procedures, mathematicalmodels etc. (Nemati, Steiger et al. 2002). Explicit knowledge is the most important fororganizations; imagine an organization with no computer software or proceduraldocumentation.

The Knowledge Transformation Process

As stated earlier, knowledge goes through a transformation process, which can be facilitatedthrough the utilization of Decision Support Systems (DSS), Artificial Intelligence (AI). Thepaper covers the main area of focus, the explication of knowledge, with further detail of thistransformation process to be found in the following reference (Nemati, Steiger et al. 2002).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 thetransformation process of explicating knowledge, for example, through the specification ofmathematical modelling. Specifically, the goal of these models, and of the decisionvariables, must be explicitly articulated by the decision-maker. Furthermore, the decisionmakermust also explicitly articulate the model constraints. This specification of explicitknowledge "represents the tacit knowledge the worker has developed over time, within thedecision-making environment" (Nemati, Steiger et al. 2002).

DSS can further enhance the explication of knowledge by "eliciting one or more what-ifcases, representing areas the knowledge worker would like to investigate" (Nemati, Steigeret al. 2002). In effect, the tacit knowledge of historical decisions is transformed into explicitform, to be shared and leveraged for improved decision making.

Once this knowledge has been transformed and stored, it can be leveraged by making itavailable to others when and where they need it. (Nemati, Steiger et al. 2002) 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-specificknowledge is applied to a single instance of a model, addressing such questions as "why isthis 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 toimplicit knowledge. Known as internalization, this process involves the "identifying bodiesof knowledge relevant to the particular user's needs" (Warkentin, Sugumaran et al. 2001). Itinvolves extracting

knowledge and filtering it to match a particular problem against the bodyof knowledge. Internalizing explicit and/or new knowledge may arise through a decision makermodifying his/her internal mental model that is used as his/her performance guide fora specified situation (Nemati, Steiger et al. 2002).

If tacit knowledge has the potential to be explicated but cannot be articulated, it represents an opportunity lost to utilize that knowledge for enhancement of the decision making process. Competitors who are able to achieve this task may gain a competitive advantage (Zack 1999). This knowledge may remain tacit due to the organization possessing no formal model or language for its articulation. In contrast, inherently in articulable knowledge that organizations attempt to articulate may have a detrimental effect on organizational 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 organization's intellectual assets, itis apparent it plays a crucial role in the knowledge strategy of an organization. Zack (Zack1999) suggests that "appropriately explicating tacit knowledge for sharing and reapplicationis the least understood aspect of knowledge management". However, organizations must notshy from this process as the balance between tacit and explicit knowledge can impact thecompetitive performance of an organization. Organizations should therefore focus ondetermining which knowledge to make explicit and which to remain tacit. Providing asuitable set of guidelines for managing this knowledge is the key to success for anyknowledge management initiative.

Inter-Organizational Knowledge Sharing

The paper has so far discussed how knowledge can be managed to support decision-makingwithin an organization. We will now discuss how the emergence of new technologies canenhance an organization's relationship with its stakeholders. The final part of the paper willaddress how new technology, specifically web-enabled, can enhance the utilization andleveraging of knowledge, for inter-organizational knowledge sharing. We examine the wayorganizations are restructuring internal and external relationships, and creating "e-knowledgenetworks", existing in a virtual environment, to facilitate the communication ofdata, information and knowledge.

Much like an intra-organizational 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 1999). 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 organizational knowledge, as it can provide significant opportunities for competitive advantage.

A community of practice is defined as "an informal group where much knowledge sharingand learning takes place" (Merali, Davies 2001). The vice president of Xerox describes suchcommunities as "peers in the execution of real work. What holds them together is acommon 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 participant sharing a commonagenda and interest. The importance of these networks becomes apparent when individualsattempt 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 betweensocial capital and knowledge resources" (Merali, Davies 2001).

Most knowledge management initiatives attempt to capture information relating to specificuser profiles and queries. However, "the bigger challenge is to capture and reuse knowledgethat is generated during knowledge work" (Merali, Davies 2001). Although DSS caneffectively manage this created knowledge in a number of ways (refer back to 2.1)

Merali(Merali, Davies 2001) suggests that the majority of knowledge created through this processgenerally tends to remain private. This is due to the following:

- "A lack of context within which to articulate individual learning" (Merali, Davies 2001).
- "The amount of time and effort required to analyse and record what has been learnt" (Merali, Davies 2001).
- "Articulating particular types of knowledge may not be culturally legitimate, challenging what the organisation knows may not be socially or politically correct" (Zack 1999).
- "Making private knowledge public may result in a redistribution of power that may be resisted in organisational cultures" (Zack 1999).

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 2001).

Inter-organizational systems are "networks of company systems that allow organizations to share information and interact electronically across organizational boundaries" (Warkentin, Sugumaran et al. 2001), the common medium being the Internet. Organizations 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 rapidly changing markets and improve an organization's relationship with its stakeholders (Walsham 2001).

E-knowledge networks are formed through the combination of knowledge management andinter-organizational systems. The adoption of the Internet has provided a platform for thecontinuous and unattended exchange of information and knowledge about markets,customers, demand, inventories and so forth. These platforms enable the sharing of valuableknowledge, often created through technologies such as decision support systems, intelligentagents and data warehouse technologies, with their strategic partners,

thereby enablingimproved organizational effectiveness. One such example of intelligent agents is the JasperII system, comprising intelligent software agents that "retrieve, summarize and inform otheragents about information considered to be of value to a Jasper II user" (Merali, Davies2001).

It is quite apparent organizations need to be flexible and be able to identify exploitablesituations. These goals can be achieved by implementing electronic systems that generateimmediate knowledge (real time) about internal functions and processes, customers,markets, supply chain partners, vendors and dealers (Warkentin, Sugumaran et al. 2001).

e-Knowledge Networks for Business Improvement

We will discuss one long-term alliance, suggested by Warkentin (Warkentin, Sugumaran etal. 2001), as a trend likely to develop from implementing strategic e-knowledge networks inthe context of supply chain. The supply chain process involves organizations acquiringresources and providing goods or services, (Johnson, Scholes 1999). Progressive supplychain management aims to improve the co-ordination "across the supply chain to createvalue for customers, while increasing the profitability of every link in the chain"(Warkentin, Sugumaran et al. 2001). It is this co-ordination aspect that addresses the role ofshared knowledge, enabling the analysis and management of all supply change activities. Inother words according to Choi et al. (Choi, Budny et al. 2004) the supply chain involvingknowledge is referred to as knowledge supply chain and in this context they defineknowledge as technologies, inventions and know-how that helps businesses bring productsto markets. The material flow is the physical flow of material and the knowledge flow is likethe flow of technique that connects the parts together. Figure 1 illustrates a material flow ina typical supply chain. It shows how material moves from supplier to customers' and atevery stage a value is added to the material, whilst, a network generates value not justthrough goods, services and revenue, but also through knowledge. Knowledge becomes amedium of exchange in its own right, with success dependent on building a rich web oftrusted relationships. The supply chain network proposed by Warkentin

(Warkentin,Sugumaran et al. 2001) is extended to emphasize the creation of a value network for acomplex e-business environment. In support of this trend towards e-networks, additionalfocus has been given to the implications on the value chain. Verna (Verna 2000b) states "thetraditional view of value chain is outdated by the new enterprise model of the valuenetwork".
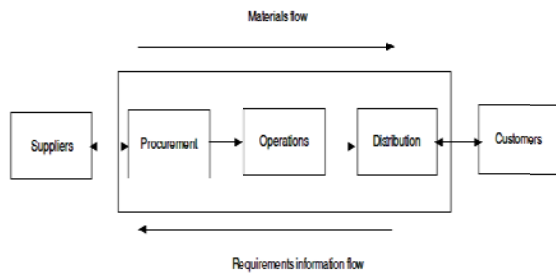

Figure 1: A Typical Supply chain

Before the introduction of the Internet, the traditional view of the supply chain was that ofinefficient communication and allocation. Information flowed in a linear fashion, eitherupstream or downstream. In addition, a further drawback was the lack of connection to one'scustomers, as organizations were forced to communicate through wholesalers, distributorsand retailers. Dispersion of information beyond one link in the supply chain was inhibitedthrough a lack of formal relationships. Furthermore, the "information flow through linkageswas constrained due to a lack of standard data representation schemes, therefore, the sharingof information beyond immediate supply chain partners was impossible" (Warkentin,Sugumaran et al. 2001).

The traditional view of knowledge was to hoard it and if organizations were to share thisvaluable information, a competitive edge would be lost (Verna 2000b). However, theconsensus among new economy organizations is to provide an open environment for thesharing of information. Organizations are encouraged to work "in close co-ordination tooptimize the flow in the entire supply chain" (Warkentin, Sugumaran et al. 2001).

The concept of the e-supply chain proposes a new relationship between suppliers, partnersand customers as well as integration of processes, information systems and inter-organizationalproblem solving (Manthou, Vlachopoulou et al. 2004). The e-supply chain isthe backbone of a virtual network, linking each participant as one cohesive unit. The chaincomprises a series of value-added stages, starting with the supplier and ending with theconsumer. The focus of the e-supply chain is on the bi-directional flow of information, eachstage 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 theultimate relationship comes down to a supplier and a customer role.

Traditionally, demand information passed through many layers, with each layer degradingthe quality of information. The variances in this information caused poor productionscheduling and inefficient resource allocation, resulting in excessive inventory throughoutthe chain (Warkentin, Sugumaran et al. 2001). In contrast, the e-supply chain proposed byManthou (Manthou, Vlachopoulou et al. 2004) utilizes information and knowledge as asubstitute for inventory, competing on agility and speed and viewing customer collaborationas a competitive, strategic asset. Figure 2 illustrates the creation of knowledge in anorganization. Here, it is argued that a typical organization is closed loop i.e., it can acquireknowledge through external factors only. But it must be emphasized that effectivelymanaging and retrieving the existing knowledge - which could be in the form of data andexpert's knowledge - should be the main focus.
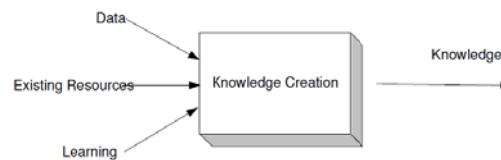

Figure 2: Knowledge Creation

Knowledge creation would ensure by helping the organization in identifying skill gaps orknowledge gaps between what an organization has as a whole and what it may need to facenew challenges. It would also make it easy to identify what areas an organization shouldeither focus on or outsource its activities to. It must be emphasized that just leveragingknowledge in an organization may not be enough because of the dynamic and ever changingworld we are in. And so, this should be complemented by inculcating a learningenvironment by fostering and rewarding individuals. The key to a successful

organization ishow effectively it brings together the skills it possesses.

The resulting fresh flows of strategic supply chain knowledge lead to new strategicrelationships in the e-marketplace. These flows may represent "knowledge created byanalytical processes conducted by automated data mining algorithms" (Warkentin,Sugumaran et al. 2001). What is most significant about e-knowledge networks is that theypermit fresh inter-organizational information and knowledge flow, effectively facilitatingmanagement of the supply chain. However, if an organization is to gain maximum benefitfrom these newly created flows of information and knowledge, they must use it strategically.

Conclusion

The motivation of this paper is to draw attention to important issues of technology incapturing, codifying and disseminating knowledge throughout the organizations. It reflectsthe 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 anorganization to concentrate on knowledge storage, rather than knowledge flow. Newinsights and opportunities are available to organizations if they are able to integrateknowledge across shared and different contexts.

The Internet has enabled the creation of virtual communities, networked throughtechnologies only available just a few years ago. As the Internet is becoming the standardform of collaboration between organizations, the trend of the e-knowledge network looks setto continue. While technology can greatly enhance an organization's knowledgemanagement strategy, it does not necessarily ensure an organization is managing itsresources and capabilities in the right way. However, technology is vital to enable thecapturing, indexing, storing and distribution of knowledge across and with otherorganizations. Knowledge can be viewed in a number of other contexts, it is vital each areaddressed if an organization is to improve performance.

- Successful knowledge strategies depend on whether organizations 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 organization remains competitive. The strategic value of knowledge should be addressed, focusing on the uniqueness of knowledge.
- Finally, an organization 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 center of an organization's strategic thinking.The essence of any knowledge management strategy can be summed up by the followingquote, from Drucker (Drucker 1993) " *Acompany's key to success resides not so much inits work and capital as in the capacity to treat knowledge, corporate knowledge, be itexplicit or tacit.*"

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