

The Building of a Knowledge Portal for Supply Chain Co-Evolving

Chian-Hsueng Chao

Department of Information Management, National University of Kaohsiung,
Kaohsiung, Taiwan, ROC
cchao@nuk.edu.tw

Abstract: Today, companies are demanding more than just access to data. They want processed and refined information that will help them to reach more effective tactical decisions. With the global deployment of computers, inter-connecting network, mobile devices, and information architecture, participants can work collaboratively by sharing networked resources, and exchanging knowledge in order to improve corporate performance. The collaboration/cooperation feature is especially important in today's supply chain practices. Under this paradigm shift, information-oriented productivity depends on the sharing of knowledge and skills among workers. Therefore, supply chain strategies can be driven by the collective intelligence and competence to meet today's business challenges that enable organizational learning. Management of organizational knowledge for creating business values and generating competitive advantages is critical for organizational development. In other words, it is related to the efficient integration of enterprise system, e-business application framework, and knowledge portal in order to achieve the goal of a learning organization and a supply chain. co-evolving This paper focuses on the design of an enterprise knowledge portal in a supply chain scheme for today's business. The ultimate goal is to develop a technological framework for a knowledge network that brings people, information, technologies, business processes, and organizational strategies together to better utilize knowledge in e-business. The benefits of knowledge portal in today's e-supply chain collaboration will not only expand the learning capabilities of workers. It will also help supply chain trading partners to develop a more concrete vision and strategy for enhancing their market values.

I. E-Business Supply Chain Knowledge Management

Traditional business partnerships are changing in response to technology advancements and business innovations. Companies can achieve a business advantage by leveraging networking technology and the principle of supply chain integration. With network connectivity, supply chain integration is now the core strategic competence that enables many companies to act as one. Supply Chain Management (SCM) evolved several decades ago from a simple set of logistics performance tools to an inter-enterprise, and even channel-wide, operating philosophy. SCM is now a bounda-

ry-spanning, channel-unifying, dynamic, and coevolving philosophy of inter-enterprise management. The major contribution of today's supply chain model is to improve the bottom line by enhancing collaboration between businesses and their trading partners [1]. This feature is very important for the every industry, because many participants need to cooperate/collaborate intensively throughout a project life cycle, which will change from one job to another.

Issues related to e-supply chain integration include the internal and external core business processes, the development of close linkages between channel partners, and the management of production and information as they move across organizational boundaries. The selection of processes and cooperations with supply chain partners is critical to the success of business. The selection of e-supply chain partners extends beyond choosing a trading partner or contractor and must include configuring the business-to-business collaboration among the partners. An increase in horizontal integration synchronizes the output of the entire supply chain. In today's e-business, competing for supply chain requires either aligning one's strategy to what the organization knows or developing knowledge management (KM) capabilities to support a desired supply chain strategy (Figure 1). Management of organizational knowledge for creating business values and generating competitive advantages is critical for organizational development. Knowledge management systems should support people to access and learn from past and present organizational business practices/strategies and to apply the lessons learned

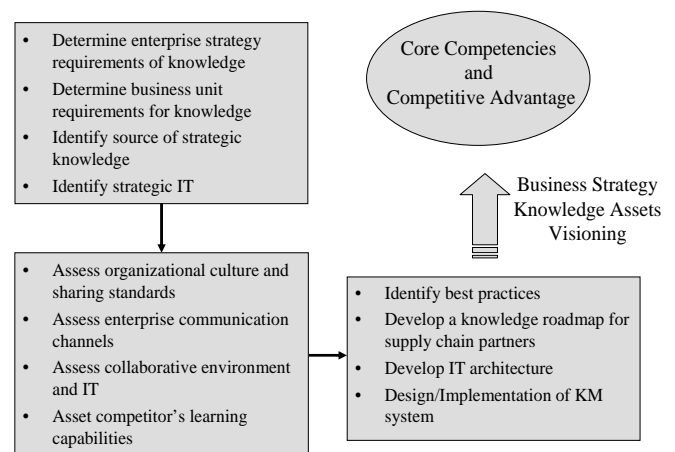


Figure 1 Aligning KM with Business Strategy

when making future decisions. Because supply chain strategies can be driven by the collective intelligence and

competence to meet today's business challenges that enable organizational learning. Based on the above discussion, a successful knowledge-oriented business for organizations should link supply chain management, relationship management, and knowledge management to function in an adaptive way and continue to thrive in the e-business era.

II. Portal of Storm: Knowledge Diffusion and Assimilation

Over the past few decades, organizations have constantly "reinvented" themselves through a series of business and technological innovations to fit into the global spectrum of business. An e-business supply chain knowledge management is a new business philosophy that drives enterprises to transform their business intelligence. Organizations are becoming knowledge intensive instead of capital intensive. This new business philosophy is an integral part of the knowledge economy for today's organizations to remain profitable, competitive, efficient, adaptive, and more intelligent.

The design of a KM portal needs to focus on the issues of data acquisition, information access/retrieval for knowledge utilization, communication, knowledge sharing, business process/information integration, document management, and most of all—collaboration. The focus on collaboration and collaborative support is perhaps one of the major distinguishing factors that differentiates knowledge support systems from other information systems. In business practices, collaborative problem solving, conversations, and teamwork generate a significant proportion of the knowledge assets that exist within a firm or entire supply chain. With network connectivity, the virtual teams can work collaboratively to share knowledge and best practices that enable supply chain "co-evolving." The enterprises will be able to better work together on a project across departmental and organizational barriers. Under this paradigm shift, intelligence and control are no longer concentrated in division offices. Empowered workers are actively engaged in their jobs, and they have the authority to form autonomous teams with self-defined roles and structures. The project members to form a "virtual team" can be from different divisions, departments, or even organizations. Those empowering workers will lead to radically different organizations that can cope with the ever-changing business environment. Interdependency between core knowledge workers will increase as the success of the enterprise becomes more dependent on how well they integrate their knowledge to produce innovative products and services [2]. This is the key issue of today's knowledge-enabled organization, and many of the concepts are brought into discussions of this paper. The objective is to develop a knowledge management framework that brings people, information technologies, business process, and organizational strategy together to better utilize knowledge in business practices in a supply chain scheme. KM portal systems should support people to access and learn from past

and present organizational business practices/strategies and to apply the lessons learned when making future decisions. The portal is also platform-independent that makes it possible to deliver business data and streamline business processes across heterogeneous business partners in the flash of a second. As mentioned before, the portal for knowledge management systems must to address the strategic visions of organization. There are several factors needed to consider in order to develop a successful KM system. The first is to recognize the organization's competence.

III. The Value Chain and Information Processing Network

Traditional managerial hierarchy is not addressed in the horizontal nature of collaborative or team-based communications, because of its vertical emphasis on communications and information systems. The shift from a division/functional organization to a matrix, and then to a network form arose from a desire to create organizations that utilize knowledge across processes and functions. Especially the rapid growth of the Internet brought about a reevaluation of the old supply chain philosophy and fostered the growth of new strategic alliance and business process integration across the border of organizations, thereby enabling organizations to more fully utilize the skills, knowledge, competences, and resources found in their supply chain network.

To design a supply chain solution, one must start by examining the basic framework of an enterprise's major business activities, which are considered competitive factors that are derived from Porter's value chain [3]. The value chain divides the organization into a set of generic functional areas, which can be further divided into a series of value activities. In the value chain, there are two distinct types of functional area: primary and support. Primary activities are concerned with the direct flow of production (such as inbound logistics, operations, outbound logistics, marketing, sales, and service), whereas support activities (firm infrastructure, human resource management, technology, and procurement) support the primary activities and each other. Starting with its generic value chain categories, a firm can subdivide into discrete activities, categorizing those activities that contribute best to its competitive advantage. The value is measured by the amount customers are willing to pay for an organization's product or service. Primary and support activities are called value activities, and an enterprise will be profitable as long as it creates more value than the cost of performing its value activities [4]. In this way, a value chain is defined and a better organizational structure and business process can be created around those value activities that can most improve an organization's competitive advantage [5].

The information processing view of an organization has been considered one of the most influential contributions to the contingency literature [6]. In this philosophy, information processing network provides the channels for exchange

and processing of information in a global system. The primary system objective of the information processing network is to provide a communication backbone for information exchange among its subsystem, the information processing nodes. The information-processing nodes within the network are responsible for receiving, using, selecting, producing, sending, and communicating (i.e. exchange information) with other information processing nodes (Figure 2). As a result, the lattice of channels between the various information-processing nodes forms a physical communication infrastructure called an information-processing network.

In value chain, Porter also recognized linkages outside the enterprise, as they relate to the customer's perception of value. This provides the possibility that one value chain could be linked to another value chain, because one business partner could be the other's customer. This interconnected value chain system can act as a supply chain or information processing network that encompasses the modern business world, and participating organizations can readily extend their technologies and knowledge to their partners. The "extended enterprise" aspect enables supply chain integration, more effective outsourcing, and self-service solutions for both internal and external stakeholders [5].

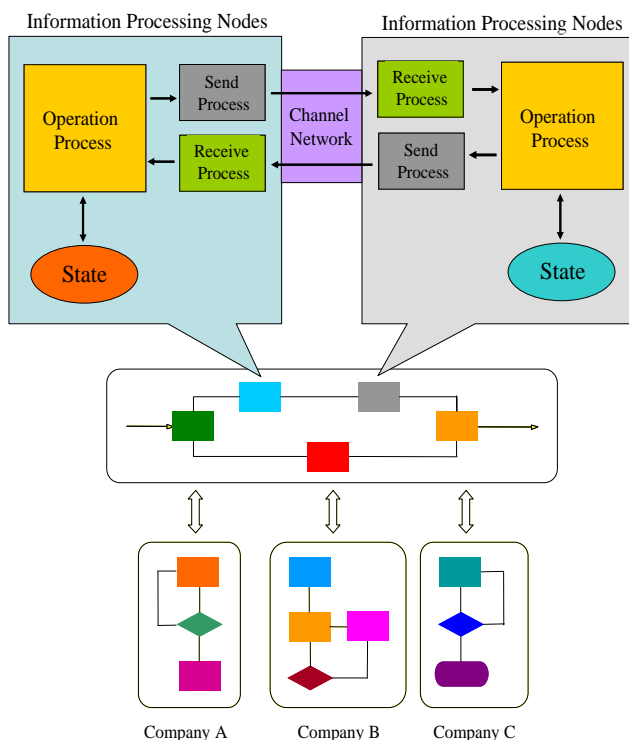


Figure 2 Information Processing View of Business Process Integration

This extended enterprise allows for the sophisticated interweaving of online business processes across trading partners and with other internal and external information sources. The usefulness of the integrated channels will be largely driven by new enterprise applications and KM portal that enhance the overall values. The following section will illustrate a typical integrated KM portal system for inter-

enterprise e-supply chain practices.

IV. The KM Portal System Architecture

The characteristics of information-processing nodes are much like the business components, but they conduct the actual exchange of information. The business components of the organization include people, processes, events, machines, and information that interact and combine to produce the products or output of the organization. People and information-processing machines, such as computers, are in this category. An enterprise operates as an information-processing system in a global information-processing network. Because it is an open structure, the network can be developed in a fractal pattern. The information-processing network can be expanded and connected to other organizations' information-processing networks. The information-processing nodes within each network in either organization can work collaboratively to achieve strategic goals in the newly joined network.

A typical enterprise KM portal is shown in Figure 3. In this figure, the KM portal act can like a groupware that supports not only several people working together on a task, but also their different and potentially changing roles. It has email and messaging functions, document management and information sharing, collaborative authoring, conferencing, time management, and some level of structured workflow support. Information can be managed only when it is embodied as content, which represents a specific combination of information and a manageable document [7]. Document management is a part of supporting IT, and it includes the ability to automatically develop and classify document databases.

Enterprise KM Portal		
Web Pages	To Do List /Calendar	Enterprise Applications
Conferencing/Chat /Discussion/E-mail	Search Tools and Directories	Document Management and Workflow
Project Management	Best Practices	Research
Database	Data Warehouse	News/Feedback

Figure 3 Typical KM Portal Components

In business practice, the project teams work collaboratively on the creation of documents and insuring that everyone has access to the latest updated version of the documents, which avoids working on the inconsistent versions of these documents. The KM portal is an integrated collaborative tool its database management ability organizes, stores, replicates, and provides shared access to documents by using a hypertext scheme. It has all the functionalities to

support basic business practices and knowledge management. The KM Portal system allows groups of users to interact and share information in an organized fashion and the documents can be posted on the Intranet or the Internet.

With the growing maturity of Internet technology, the KM portal can become more active. Applications can run on clients' browsers. The technological breakthrough makes the development of enterprise portal systems (utilizing corporate Intranet) easier in terms of communications and collab-

orations. The KM portal and Internet's hypertext scheme can easily profile different categories of business information for people working on the job site, or provide them with a "hyper-trail" for step-by-step operations. Behind the scene is a complex web that links different databases residing in the project team's organizations. With the aid of hypertext, an organization's information system becomes more accessible and adaptive, and the project data can be easily stored in archives for historical reference.

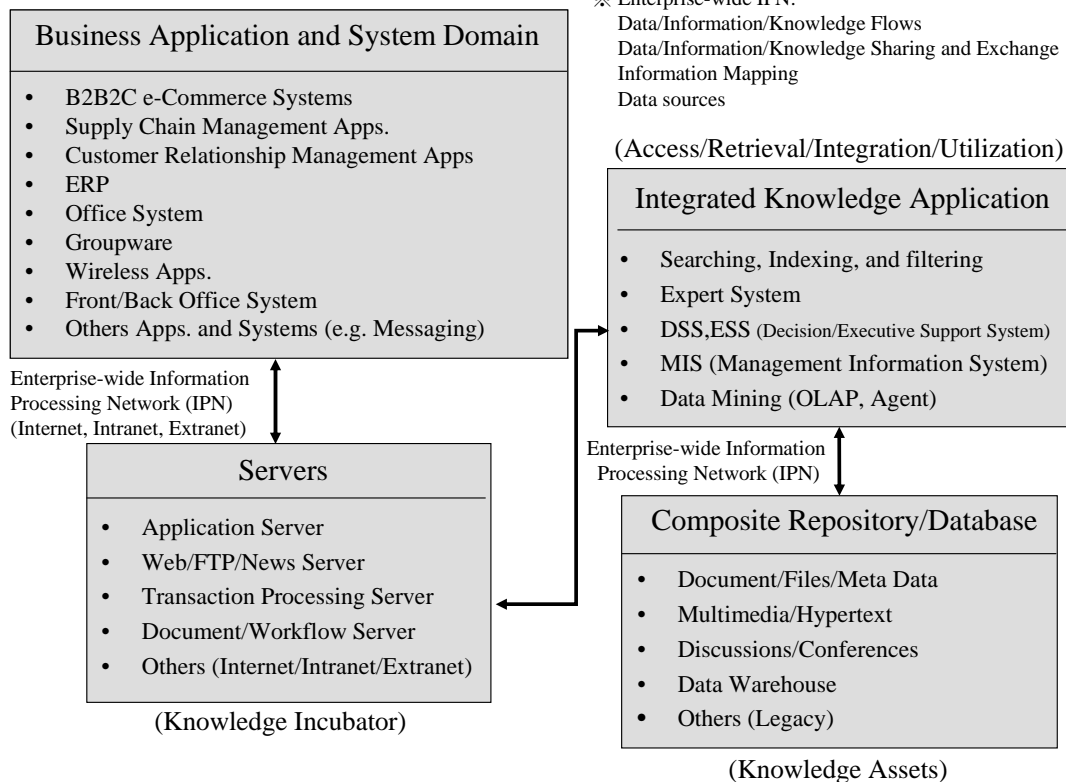


Figure 4 The KM Portal System Architecture

In this "knowledge portal" a dedicated knowledge server and database are required, because knowledge management must capture and retain in a central/distributed data repository the data and information that employees need. The technologies to facilitate these highly interactive communications are summarized in Figure 4. In this figure, for example, Internet/Intranet and groupware system are the most important ones for group communications and knowledge-sharing. For knowledge sharing, the architecture of IT in the knowledge management system is concerned with organizing and analyzing information in an organization's database so this knowledge can be readily available throughout a company. To help companies organize information residing in multiple locations and deliver it to prospective users, combinations of directory service, indexing, and searching are required in the KM system. Available groupware and document management systems do an excellent job in satisfying this requirement.

As mentioned, a central/distributed data repository that provides/captures the data and information for employees and executive decision-making is very important in a knowledge management system. The database is the core of a KM system, the decision-making support system is the driver that consolidates and directs the overall resources of the supply chain to the most mission-critical business activities to generate profits. It is believed that the next generation of knowledge management systems will be built on the Internet backbone with "agents" that flow through the net to gather business information and display it for decision-making purposes. On the other hand, the basic business applications are necessary to conduct daily business, such as word-processing, spreadsheets, accounting, and so forth. With the growth of the Internet, e-business is rapidly expanding into a complex web of commercial activities. Many organizations have recognized this competitive advantage and have shifted their focuses from process

improvement within an organization to process integration across their trading partners. This business-to-business practice transforms the traditional supply chain into a network that allows companies to work together and share knowledge. The key issue is the inter-enterprise processing. Therefore, this is the reason why knowledge management should include business processes integration.

V. The Learning Organization and Supply Chain Co-Evolving

In business practices, information is the glue that unifies businesses partnerships. Many organizations use their information processing networks and strive to become knowledge-enabled organizations to ensure that all employees are able to locate, access, and utilize the knowledge and skills they need to meet their individual and corporate goals. Senge in his thoughtful and provocative book [8] on system thinking described a "Learning Organization" as "an organization that is continually expanding its capacity to create its future." A knowledge-enabled organization is a learning organization, one where all employees are using their knowledge, skills, and learning to meet today's business challenges and to create new opportunities for the future. One thing important is that the organization also learns from customers, suppliers, and even competitors: from any and every relevant source within or outside the organization. An organization's value chain consists of all activities performed to design, produce, market, deliver, and support its product and service. Knowledge Management is introduced to enhance collaboration encourage innovation, boost productivity, achieve adaptivity, and increase the information system efficiency. The next generation of e-business will be built on an interconnected network which will help companies connect disparate systems, provide greater access to information, and more closely link employees and customers.

A successful knowledge portal and knowledge management system for today's new business must provide support for the capture and communication of users' demands, as well as enable these demands to automatically trigger business events and initiate process workflows. Indeed, a knowledge portal is integrated in terms of people focused on processes that ultimately respond to customer demand, but its success requires technology that can integrate and support every exchange of information across the entire supply chain. Data is the basic building block of information and ultimately of a knowledge-based business. A common data model is needed for the entire supply chain knowledge network, because the effectiveness of an e-business supply chain solution will depend largely on its ability to deliver an accurate and common view of customer demand data, as well as any subsequent events, plans, or other business data. Therefore, the enterprises are capable of quickly consolidating critical competencies and physical processes to gain competitive advantages easily.

VI. Conclusion

The explosion of strategic alliances and partnerships on a global scale has brought about the formation of inter-enterprise virtual organizations capable of leveraging the skills, physical resources, and innovative knowledge that reside at different locations in a supply chain network. The beauty of a supply chain knowledge network is that the true value of the information surpasses the conventional boundaries that often restrict employees' thinking [9]. The collaboration of people, processes, and technology is important, because companies can enhance customer satisfaction, improve operational efficiencies, and cut costs by leveraging a comprehensive, integrated, e-business suite of applications based on Internet technology. Information can be managed only when it is embodied as content, which represents a specific combination of information and a manageable document. A KM infrastructure combines automation, business rules, artificial intelligence, workflow, analytical tools and advanced messaging-analysis technologies to allow e-businesses to deliver information and to respond to customer requests rapidly and accurately [10]. In a successful "k-business" model, the sharing of information moves the supply chain closer to the desired goal of a demand chain. In this way, a true knowledge management system can be built and utilized by the entire supply chain community to generate profits. This adaptivity requires enhancing communication among all team members and aligning their actions toward a common project goal, and IT will be a key "enabler" for this transformation effort. Enterprises will need to learn that content communication is as important as technological infrastructure to the enterprise software application architecture. This new "e-supply chain" offers unlimited business opportunities when enterprises fully integrated their knowledge, processes, and technology. A well-designed and well-integrated knowledge portal will improve existing supply chain performance and provide organizational agility in the event of change.

References

- [1] Computer Science Corporation "@ insights, A Look at Business Transformation in Today's e-World" Computer Science Corporation (CSC), pp. 4-7, 2000.
- [2] Alan, Burton-Jones "Knowledge Capitalism, Business, Work, and Learning in the New Economy" pp. 56 Oxford University Press, Oxford 1999.
- [3] Porter, M. "Competitive Advantage: Creating and Sustaining Superior Performance." The Free Press, 1985.
- [4] Kuglin, F. A.. Customer-Centered Supply Chain Management, A Link-by-Link Guide, AMACOM, a Division of American Management Association. 1998.
- [5] Curran, T. A. Ladd, A., and Keller, G. "SAP R/3 Business Blueprint, Understanding Enterprise Supply Chain Management," Prentice Hall, Inc. 2000.
- [6] Wang, T.G. Eric "Effect of the fit between information processing requirements and capacity on organizational performance." International Journal of Information Management, 2003.
- [7] Laugero G. and Globe A. "Enterprise Content Services, Connecting Information and Profitability." Addison Wesley, 2002.

-
- [8] Senge, Peter M. "The Fifth Discipline: The Art and Practice of the Learning Organization," Doubleday, Currency NY 1990.
- [9] Tapscott, Don "Creating Value in the New Economy" President and Fellows of Harvard College, 1999.
- [10] Tiwana, Amrit "The Knowledge Management Toolkit, Practical Technique for Building a Knowledge Management System" Prentice Hall PTR N.J. 2000.