AN ANALYTICAL STUDY OF ERP AND SCM INTEGRATION

Zhen Xu and David C. Yen, Department of DSC &MIS, Miami University, Oxford, OH 45056, 513- 529-4826, yendc@muohio.edu
David C. Chou, Department of Computer Information Systems, Owen College of Business, Eastern Michigan University, Ypsilanti, MI 48197, 734- 487-0054, david.chou@emich.edu
H. L. Tang, Department of Computer Information Systems, Owen College of Business, Eastern Michigan University, Ypsilanti, MI 48197, 734- 487-2454, hung-lian.tang@emich.edu

ABSTRACT

This paper aims to study the integration of ERP packages and SCM software. The first part of this paper reviewed the ERP and SCM. The second part concentrated on the methods of integration. The integration methods were divided into four categories. In each of the category, the problems of integration and their solutions were illustrated. In the final part, the implications of the future development of integration of ERP and SCM were given.

ERP: AN OVERVIEW

According to Kumar and Van Hillegersberg [8], ERP systems are defined as configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization. Enterprise resource planning software, or ERP, attempts to integrate all departments and functions across a company onto a single computer system that can serve all those different departments' particular needs. ERP can also be defined as a "software solution that addresses the enterprise needs taking the process view of the organization, to meet the organizational goals tightly integrating all functions of an enterprise [22]" It is an industry term for the broad set of activities supported by multi-module application software that help a manufacturer or other business manage the all the parts of its business [23]. ERP facilitates integration of company-wide information systems with the potential to go across companies. Take a customer order, for example, typically, when a customer places an order, that order begins a mostly paper-based journey from in-basket to in-basket around the company, often being keyed and re-keyed into different departments' computer systems along the way. All that lounging around in in-baskets causes delays and lost orders, and all the keying into different computer systems invites errors. Meanwhile, no one in the company truly knows what the status of the order is at any given point because there is no way for the finance department, for example, to get into the warehouse's computer system to see whether the item has been shipped. "You'll have to call the warehouse" is the familiar refrain heard by frustrated customers.

SCM: AN OVERVIEW

The definition of supply chain management (SCM) is directly related to the definition of supply chain, which is "a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers." [21]. Supply chain management is defined as "the delivery of enhanced customer and economic value through synchronized management of the flow of physical goods and associated information from sourcing through consumption." [16]. According to Ferguson [22], the concept of SCM incorporates two important ideas: 1) SCM is a collaborative effort that combines many parties or processes in the product cycle, and 2) it shows that SCM can cover the entire product cycle, from the introduction of raw materials to the point at which the consumer purchases the

product. SCM systems are “back-end applications designed to link suppliers, manufacturers, distributors and resellers in a cohesive production and distribution network and thus allow an enterprise to track and streamline the flow of materials and data through the process of manufacturing and distribution to customers.” [6].

THE INTEGRATION OF ERP AND SCM

The Problems Of Erp And Scm Individually

There are several problems associated with ERP solutions. First, the time and cost associated with ERP implantations can be enormous. Second, ERP systems run on cycle updates, rather than on really processing. The system may become reactive instead of proactive. Successful enterprises need to be proactive and respond to change quickly and effectively with right information to guide them. A reactive system is more likely to pose a serious threat to a major corporation [2]. Third, ERP vendors normally offer their system packages as a solution to make the company more efficient without first looking at the corporate business processes. In some cases, organizations must change how they do business in order to benefit from a migration to enterprise solutions. However, organizations typically do not have the required expertise to implement the systems and implementation may take a long time to complete. They must rely on consultants or employees of the software vendor. Fourth, One-Dimensional Planning: ERP systems normally employ some flavor of MRP (Material Requirements Planning) or MRP-II (Manufacturing Resources Planning) for internal supply chain planning. The problem with these traditional planning methodologies is their sequential nature, which makes them unable to consider multiple constraints simultaneously [24]. Traditional supply chain strategies focus on managing the supply chain from an enterprise context — demand planning starts with the sales office, and supply planning starts with the purchasing department. However, we live in an increasingly interconnected world with many uncertainties. Uncertainty in demand has led to a focus on planning optimization. Uncertainty in suppliers' ability to meet shorter lead times has led to increased inventory buffers and safety stocks. As the supply chain becomes more complex — with rapid customer response requirements, shorter product life cycles, increased outsourcing of manufacturing and distribution, and expanding globalization — the challenges have increased. Planning optimization is often insufficient, inventories continue to expand, and costs are becoming more difficult to manage. This growing complexity has intensified the need for greater visibility into the operations and business information of customers, suppliers, and other supply chain partners. In addition, the lengthy time delays that plague supply and demand signals as they trickle through the tiers of supply chains run counter to the need for rapid response across the supply chain. Finally, management expectations for continuous cost reduction have increased during the recent economic slowdown, requiring more frequent and broader sourcing cycles. Despite the potential for cutting costs and driving efficiencies by boosting supply-chain visibility, the process does not come without cultural and technical challenges. Enterprises have to overcome natural resistance to revealing proprietary product design and marketing plans to suppliers. Once a company overcomes the various cultural barriers to opening up the enterprise to the supply chain, it must next tackle the technical challenges associated with linking multiple disparate systems for visibility [14].

The Synergy To Integrate Erp & Scm

First, the development of enterprises needs to establish a streamline business process, which can significantly enhance the communication and cooperation among functional departments. To achieve this goal, functional integration is required, which is the process of integrating all business function to

work together, including the functions of ERP and SCM. ERP system applications originally linking back-office applications into a single system would extend beyond their core functionality to include not only sales-force automation, data warehousing, document management, and after-sales service, but also SCM to increase efficiency and productivity for the key customers [15] Second, with the development of information technology, old legacy systems need to be converted to new, more powerful and flexible systems. Companies need to found out integrated business and technology solutions. The settlement would fall into ERP and SCM, which in essence combines business processes with state-of-the-art technology to provide solutions for the whole enterprise [18]. Third, as former Baan CEO Mary Coleman said recently, "Supply chains must ultimately serve the customer…. Because today's customers want their products and services faster, cheaper, and better than their last purchase, companies must continually re-architect their supply chain to increase customer intimacy and satisfy ever-changing demand" [5]. Fourth, although ERP vendors may have identified CRM as highly important to their customers, they still lack the "domain expertise" to succeed, primarily because industries have yet to clearly define information flows and business-process cohesiveness between CRM and ERP. Mostly, the work that has been done covers only two of the most prominent CRM applications: sales force automation (SFA) and call center management (CCM).

FUTURE IMPLICATION

There is still no one method able to solve all the integration problems of ERP and SCM. Companies need to make the decisions on their approaches based on the specific requirements and situations of the company. Until now, web services may be a best way for the future integration. Web Services offer a platform neutral approach for integrating applications, so that it can be used to integrate diverse systems, in a way supported by standards rather than proprietary systems. The ability of an enterprise to have access to real-time information spanning across multiple departments, applications, platforms and systems is one of the most important driving factors behind the adoption of Web Services. Companies should first start using Web Services for their internal integration projects for business processes that are non-transactional in nature, before they venture using Web Services in B2B integration projects. Integration of ERP and SCM is not an easy task. CIOs should assess their own existing system (ERP or SCM) first and then consider possible integration approaches whatever it should be best for their organizations. Integration of ERP and SCM is a very tough task as each member in the supply chain may have different hardware, software and it is very difficult to insist that your company's supply chain partners maintain same systems. It would however be ideal if all the parties involved could agree up front to abide by open standards. This would help easier integration. A successful and full integration between ERP and SCM between enterprises is a process that is durable, patience and resources are needed. Not that many companies have been implementing the integration between ready-made ERP and SCM packages yet. Since there is a growing demand of integration, the converges between vendors between ERP and SCM software are rapid and the development in technology is growing, more and more enterprises are starting to consider the solution. Enterprises seem to believe in this integration and claim that it will give positive results.

In conclusion, the integration of ERP and SCM will continue to enhance in the near future. The integration of ERP and SCM will create a new spectrum in the information industry. The integration of all core business processes through one comprehensive information system will create a collaborative business and operation environment.

references will be furnished upon request.