

THE DEVELOPE OF SOFTWARE SOLUTION FOR SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Information Technology (IT) systems play a significant role in the success of a supply chain because they enable management to make decisions over a broad scope. The IT systems monitor materials, orders, schedules, finished goods inventory, and other information throughout the entire organization. SCM systems are a combination of many of the preceding applications and are used to span the stages in the supply chain and to allow for a more global scope because they can span many supply chain stages with their different modules. SCM systems have the analytical capabilities to produce planning solutions and strategic level decisions. As supply chains become more global and complex and as customers and competition become more demanding, companies will need the supply chain capabilities that only sophisticated IT systems can provide.

KEYWORDS: *supply chain management, business software, software development*

Based on the data and information collected in this research, a comparative empirical study was conducted in this research in terms of: model of delivery, solution suite, distinguished product features, business size and pricing, operating system and database support, network support, program language and Internet protocol, implementation and training, technical support, source code, and product variety and industry segment. The experimental results from the analysis are described below along with managerial implication discussions.

Effective Supply Chain Management approach demands comprehensive information systems that allow companies to synchronize plans with their customers and suppliers, collaborate in real time both inside and outside their enterprises, execute plans, adapt to a dynamic environment, and measure performance relative to objectives. There are six solution suites:

(1) Supply Plan Management, in which planning is integrated with execution, making it possible to adjust to unforeseen events in real-time.

(2) Logistics Management, which shifts the balance of power in business relationships to customers, whether they are manufacturers or end users.

(3) Order Management, to manage high volumes of personalized, complex customer order requirements while maintaining profitability. This solution enables

customer to streamline order processing and maintain visibility and control of order tracking throughout the order life cycle.

(4) Manufacturing Management, provides a fully integrated solution allowing companies to use efficient processes that optimize resources while satisfying customer expectations about quality, price, and delivery performance.

(5) Inventory Management: This solution offers immediate access to current item information at the inventory locations worldwide - whether in-house or at customer and supplier sites.

(6) Procurement & Subcontract Management: This solution can help firms control the tasks associated with the selection of a subcontractor to obtain reliable, quality goods and services, while minimizing costs and risks.

The development of SCM software solutions is summarized below:

(1) Product Development: This solution brings together engineers, manufacturers, customer and suppliers, allowing them to leverage their collective expertise and knowledge to minimize costs, maximize product quality, and streamline the entire concept to release process.

(2) Advanced Planning: This suite can improve predictability of demand by involving customers, manufacturing, and marketing to reduce user's inventory costs and increases delivery performance.

(3) Procurement: This solution can identify savings with spending and source analysis and lower the cost of each transaction with online payment to suppliers.

(4) Manufacturing: With this suite, users can improve tracking of materials on their shop floor and optimize finite scheduling to get the most from their production lines.

(5) Order Fulfillment: This suite has been credited by Aberdeen Group as the most complete Order Management e-business solution that effectively integrates front-end and back-end applications across virtual and traditional channels.

Its SCM products encompass the full range of end-to-end supply chain activities, including:

a. Supply Chain Planning: This suite allows user to create an overall supply plan that takes into account materials management, production, distribution, and transportation requirements.

b. Supply Chain Execution can perform plan-driven procurement, inventory management, and invoicing, and can create a complete feedback loop between demand and supply to increase responsiveness across all areas of supply chain planning.

c. Supply Chain Coordination: This suite can handle problems automatically using standard operating procedures.

d. Supply Chain Networking uses role-based technology to deliver information to users based on their individual responsibilities and allow users to plan, execute, and monitor activity using mobile and remote devices.

Source Code: The trade-offs for an open source code is one of important developments in the software industry, and an important choice for an SCM solution. The basic idea behind open source is simple: when programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, and people fix bugs.

And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing. In particular, the service and help that are needed by customers can be done most effectively with an entirely open-source system. From top to bottom, companies that sell open source software programs can deliver a system that works, and that can continue to change and adapt to customer's business needs. For example, IBM, HP, Sun, Apple and Linux are some of the open source companies. The information collected in this study, however, revealed surprisingly slow movement to open source systems for SCM software vendors in this important area.

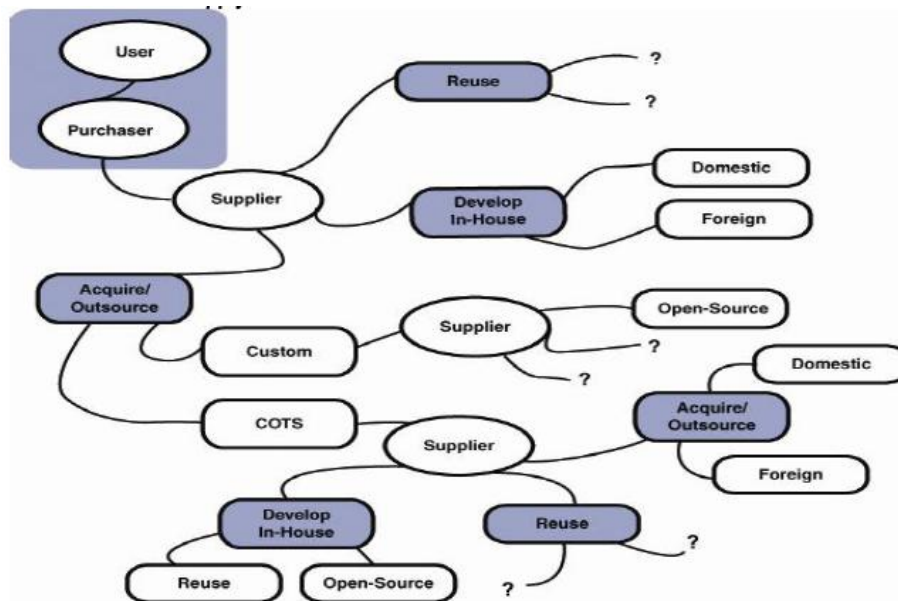


Figure 1 Potential Software Supply Chain Paths

Information assurance relates to measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include providing for restorations of information systems by incorporating protection, detection, and reaction capabilities. Information systems include the software that controls the system and processes data and information. Therefore, measures must be used to protect the systems from software vulnerabilities and unintended software processing that expose a system to compromises in availability, integrity, and other security properties. Figure 1 shows some of the potential paths software

can take before it is acquired and put into use. Each organization in the supply chain path has an influence on the security or exploitability of the software. Knowing who produced the software and being able to determine if they use security-aware practices in producing software, can provide the requisite transparency for informed risk-based decision-making in purchasing software or contracting for software services.

Operating System/Database/Network/Programming Language Support: Reducing inventories, sharing information with partners, and meeting customer demands require a complete supply chain solution and an open, scalable technology foundation including supporting operating system, database, network, and programming language. The survey revealed a significant gap between these six SCM vendors in terms of those technical elements.

For instance, the operating systems supported by Baan's SCM products are limited to Windows 95/98/ME and Windows XP/2000/NT. While the solutions from other SCM vendors can support Windows 95/98/XP/2000/NT, HP-UX, IBM AIX, Sun Solaris, Compaq Tru64 and Unix. For this technical element, Baan is a step behind the other competitors. In terms of database support, the survey result showed that all of the six SCM vendors' products support most industry-leading database management systems. Additionally, Baan SCM products also support Microsoft Access, J.D. Edwards' SCM solutions support Sybase database, while PeopleSoft SCM products support Sybase and Informix, and SAP developed its own SAP DB server to host its solutions.

Network support is another important technical requirement for SCM solutions from users' perspective. Many users believe that it will be much more convenient for them to access their applications anytime and anywhere, download refreshed data, and upload new or updated data.

Users can continue to work with their applications on a laptop or personal digital assistant (PDA) while disconnected from the Internet or local network. At the current stage, J.D. Edwards' SCM products support Token Ring, TCP/IP, NT Server and Ethernet. SAP solutions support TCP/IP, NT Server and Ethernet, but not Token Ring. In contrast, other SCM vendors' products only support TCP/IP. In terms of program languages and Internet protocol supported by a SCM solution, no significant difference was discovered from this research among these six SCM vendors. SAP products are built on an open technology framework that takes advantage of industry standards to ensure flexibility and interoperability. From the discussions above, it can be seen that those technical elements of SCM solutions might become the core area for SCM software vendors to a gain competitive edge in future marketplace.

Implementation/Training/Support Description: A successful implementation of an SCM solution depends on the available IT support and time constraints of potential users. Generally, there are three options for the users to choose from:

- (1) Software provider installation and configuration,
- (2) Software provider assistance in configuration,
- (3) Customer installation and configuration.

The SCM vendors selected in this study provide different options to their customers. Adequate training for users is another critical step for a successful SCM solution. In this regard, all the vendors surveyed have some training available to their customers to improve the capabilities of users before, during and after the implementation stage. As an appropriate understanding about the SCM solution will impact business performance, all of the vendors provide educational services to their users about how their SCM solutions can make their work easier, their roles more productive, and their contribution more valuable. Specifically, Baan offers diverse courses, innovative educational products, and comprehensive training materials to their users, with a broad range of technology-based training services. Currently, several primary learning platforms are offered by Baan to accelerate the learning curve for its customers. These include: (a) traditional Instructor-Led Classroom Training, (2) Internet-Based Baan Virtual Campus, and (3) Online BaanLIVE. All have been well received by customers in the ongoing market competition. With a different approach, i2 Technologies built a global learning resource providing education and training services to its customers on business concepts. i2 solutions learning options range from instructor-led training at users' locations, to web-based training through the Internet with two key offerings: Project Readiness Education, which is designed for key members of user's project team, addressed through various workshops, and Business Readiness Training, designed for end users and suppliers.

It is noteworthy that almost every SCM vendor in this study takes its training resources to the Internet and offers some web-based training. Oracle calls it iLearning, PeopleSoft names it eLearning, and in SAP it is called E-learning. Designed by experts, these courses bridge the gap between the classroom and the fast-paced workplace. With e-learning courses, user's employees can make the most of their time and work at their own pace, while avoiding travel costs, lost work time, and scheduling conflicts.

In the software industry, after-sales support is a key to the success of a company. That is, customer service and support are required to provide customers with access to the appropriate level of expertise - when they need it and wherever in the world the need may arise. SCM vendors must work closely with customers throughout the lifecycle of their SCM solutions to help resolve technical support questions quickly and thoroughly and to optimize the performance of their products. From the survey feedback and information on the Internet, it can be seen that all six SCM vendors provide their customers with similar following types of supports: (a) Website support - product support questions and knowledgebase are available at the website; (b) Email support - questions can be sent directly to a support staff for review; (c) Telephone support - calls can be placed directly to a support staff, and (d) On-site support - a representative from SCM vendor can come to the site of customers. In summary, there appeared to be no significant differences among the six SCM vendors in terms of customer service and support. Or, put another way, customer support has not been a differentiation factor in the current market competition.

In summary, companies of all sizes need to extract improvements in supply chain performance. Although most organizations realize that SCM initiatives can directly improve their bottom line, there is uncertainty about what kinds of investments in technology and resources are most likely to result in benefits. Given the recent development of the SCM software industry and the competition of SCM software market, as described in this research, there are a wealth of opportunities for firms to make low-cost and low-risk investments to improve their supply chain performance. Businesses can gain significant benefits with appropriate SCM initiatives. But in order for those productivity gains to materialize, requires the willingness to take incremental steps towards a global vision, the use of flexible architectures, and the ability to target specific performance improvements.

Based on the primary analysis of this research, the following items are recommended to potential SCM solution buyers to look for when searching for a successful SCM solution: (1) a description of the computing environment, tools, and applications (current and planned); (2) a list of current project phases (i.e., middle of release cycle, between release); (3) a description of the current structure of the team, and its culture; (4) a description of how the software development and change process is performed (tools and process); (5) a description of what policies and procedures which are needed to put in place that will ensure to meet the objectives of the organization, and (6) a prioritized list of required features and capabilities. This would include a handful of must-haves (the things users can't live without), and a smaller list of highly desirable items.

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