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Supply Chain Software: an Overview

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Supply Chain Software – an Overview

THE ROLE OF INFORMATION TECHNOLOGY IN THE SUPPLY CHAIN

Ronan McDonnell and Edward Sweeney present an overview of the role of IT as an enabling technology in SCM

IT has Transformed the Way Companies do their Business

The movement of goods along the supply chain is reflected by corresponding movements of information. For example, the moment an item is sold at the supermarket check-out, this information is captured via a bar code reader and can then be read immediately anywhere in the distribution chain. Computers communicate with other computers via local area, national and, in some cases, international networks. However, without properly designed supply chains, and capable people, this will not succeed.

Categories of Logistics IT Solutions

Broadly speaking, there are two types of logistics IT solutions, point solutions and enterprise solutions. Point solutions fulfil a particular function within one of the component parts of the supply chain; buy, make, move or sell. Enterprise solutions, on the other hand integrate elements of the enterprise or the supply chain, linking the output of one action to other related elements.

Point Solutions

Buy – There are a wide range of purchasing IT solutions which support a range of both operational and strategic decision-making. In addition to what and how much to buy, other systems support vendor selection and management (see Table 1), and order processing.
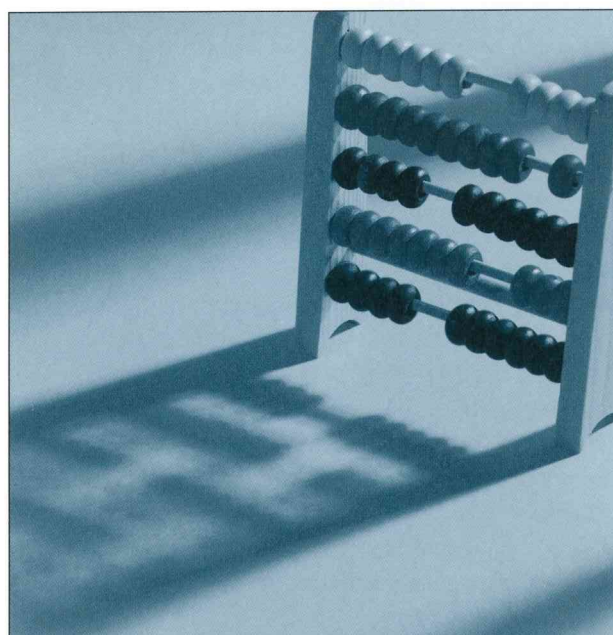
Table 1 – Example of a 'Buy' Solution

Purchasing Management eXtra (PMX) software, from the Bellwether Software Corporation automates the task of finding vendors for the items to be purchased. PMX's Master Files software module includes a Vendor File in which to store all suppliers' information and a Material File in which to store frequently purchased supplies.

Standard information for each supplier is stored in a Vendor File. Each time a purchase order is issued to that vendor, the appropriate ID code is entered, eliminating the need to re-enter standard information on every order.

PMX facilitates the classification of vendors into general types. For example, they may be classified by size, socio-economic group or the types of materials and services each provides.

http://www.pmxprosys.net/masterfiles.htm

Make – Sophisticated planning systems can be configured to model the production facility in great detail, and can be programmed to optimise the production process based on production volumes, product mix, available capacity, and any other constraints that impinge on production planning. Such systems can interface with a stock control system or a warehouse management system to ensure that sufficient materials are, or will be, available. The production planner can also run 'what-if' scenarios to make the best use of resources. SCT is of the better known developers (see Table 2) of planning applications.

Table 2 – Example of a 'Make' Solution

Iprocess, a planning system from SCT supports manufacturers by monitoring and allocating production resources. Multiple factors, such as products, recipes, routings, labour, changeovers, batch status, sizing and sequencing, can all be modelled to simulate the production environment.

http://www.sctcorp.com/industrysolutions/
manufacturing/pharmaV.htm

Manufacturing execution systems (MES) receive orders and dynamically manage resources on the shop floor from equipment and labour to inventory needed to fill those orders.

Move – The function of a warehouse in the supply chain has been described by Benchmarking Partners (1998) as a 'centre for flexible value added services and information'. Warehouse operations have been made easier through the introduction of Warehouse Management Systems (WMS). The basic functions of a WMS are receiving, put-away, work planning, picking, inventory level control, and shipping. Also important is a WMS system which is able to calculate the exact cost of the warehousing component in an order. Many software companies provide WMS systems, from tailor made packages such as EXE Technologies to off the shelf systems such as Marc WMS (see Table 3).

Table 3 – Example of a 'Move' Solution

Vertex Interactive is a global provider of business-to-business, supply chain execution technologies and enterprise applications integration. Vertex offer a portfolio of products ranging from fixed and mobile order entry and processing, through inventory and warehouse management to distribution and transportation planning. Vertex's inventory and warehousing applications include "light directed" technologies for picking and packing and technology for handheld devices including auto ID and printing solutions, and a proprietary WMS tool that enhances the functionality of SAP/R3 implementations.

http://www.vertexinteractive.ie

A wide range of Transportation Management Systems (TMS) are available, and include following functionalities:

- Complete support of transportation order management, transport planning, and fleet management;
- Communication with other supply chain participants. Most interfaces are supported by EDI, however the use of internet technology will enhance communication between supply chain participants;
- Open database for execution and administration of transport activities;
- Evaluation of transportation performances (KPIs)

A brief description of an example of a TMS is shown in Table 4.

Table 4 – Example of a 'Move' Solution

Mandata provide computerised solutions for the haulage business, from traffic management to vehicle costings to workshop management. These solutions can, for example, be used to track a vehicle's progress, calculate how much it is earning, or highlight when tachograph re-calibrations are due.

http://www.mandata.co.uk

Sell – Spreadsheets are used to monitor key customer's accounts, as well as to track trends in sales evolved into Customer Relationship Management (CRM). CRM applications are designed to collate as much relevant information as possible about each individual customer. But, the ultimate goal of CRM must be to provide the entire supply chain with as much information as possible about what has happened in order to maximise customer satisfaction. This involves understanding the customer well enough so as to able to anticipate their needs, not just forecasting the future by extrapolating the past. A brief description of an example of a 'sell' solution is shown in Table .

Table 5 – Example of a 'Sell' Solution

TRACKWeb CRM, from Soffront Software, is a set of three tightly integrated components: defect tracking, help desk management, and sales force automation. These fully web-based components can be used individually or as a completely integrated turnkey customer relationship management solution, which enhances communication and collaboration across all business units. The application provides the necessary information to assist in strategic decision making.

http://www.soffront.com

Application Integration

The shift from fragmentation, which is a characteristic of many traditional supply chains, to integration is a key objective of supply chain management. A major disadvantage of point solutions is that they can reinforce barriers between functional parts of the business. Enterprise solutions or enterprise resource planning (ERP) represent an attempt to achieve more effective integration across traditional supply chain functions.

Enterprise resource planning

Enterprise resource planning (ERP) came about in the 1990s because of an organisational shift away from the traditional task-based structures that had been based on Adam Smith's theory that industrial work should be broken down into its simplest and most basic tasks, to process based structures. The phrase ERP was first coined by the Gartner group to describe the change in computer systems from the inventory focused, transition-centric and reactive nature of ERP's predecessors – MRP (Materials Requirements Planning) and MRPII (Manufacturing Resource Planning) – to systems focused on customer service.
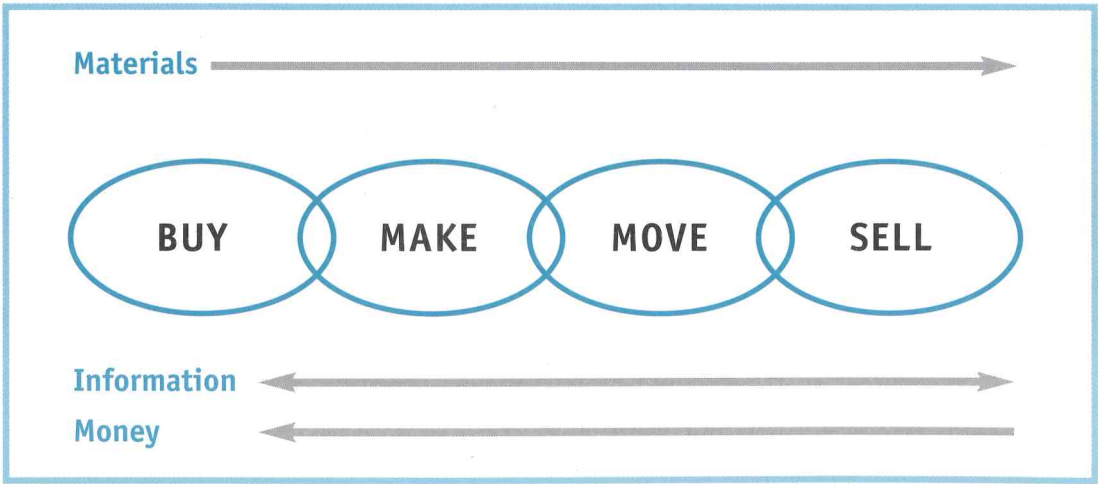
ERP attempts to integrate all departments and functions across a company into a single computer system that can serve all those different departments' particular needs. Traditionally, each department from finance to human resource management to the warehouse has had its own computer system, each optimised for the particular ways that the department does its work. But ERP combines them all together into a single, integrated software program that runs off a single database so that the various departments can more easily share information and communicate with each other.

For example, when a customer places an order, that order would typically begin 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 time 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. Well known ERP systems include SAP, J.D Edwards, Movex and Baan.

Web-based ERP.

Internet technology has made it possible for companies to operate their ERP systems in real-time, even across a number of sites. In this way, up-to-date information is always available on-screen. This information may be made available to the necessary parties through the use of intranets and extranets. Web-based ERP facilitates the sharing of information between companies and their suppliers, customers and other trading partners.
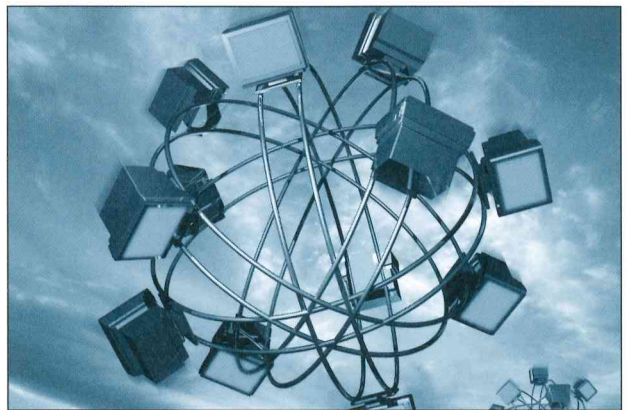
Materials →

BUY MAKE MOVE SELL

Information ←

Money ←

Best-of-Breed Solutions

A study published by the Meta Group in 1999 found that the average implementation time for an ERP solution was 21 months, and that the average total cost of ownership of such a system amounted to $15m. The study also found that it took two and a half years from project initiation to achieve 'any kind of quantifiable benefit from such a system'. Companies very often do not have time to build integrated infrastructures. In addition, in many cases departments within a company may have invested time and money in implementing and developing systems that are robust and ably fit their business processes.

'Middleware' companies have developed data translation that has enabled organisations integrate 'best-of-breed solutions'. Middleware is 'software that connects two otherwise separate applications' (Webopedia, 2001). In some cases applications are built on open standards, making the integration easy because all good middleware incorporates those standards. This technology has been facilitated in recent years by the advent of extensible markup language (XML). XML 'allows designers to create customised tags, and share documents between different platforms and computer languages' (Softworld, 2001).

The trend toward best-of-breed solutions has also decreased the anticipated role of ERP as a central repository of all business data for manufacturers (Berton Latamore, 2000).

New Logistical Challenges

All of the technological potential identified in this article presents opportunities for companies throughout the supply chain. The necessary IT is now available to enable a company to provide finished goods just-in-time for delivery, based on an individual unique order received from anywhere in the world; sourcing the optimum materials for the order, and the identification of the optimum means of shipping it to the customer.

The proliferation of sophisticated information technology solutions has led to IT investment decisions becoming a complex choice between (a) custom or standard solutions, and (b) point or enterprise solutions. Even more challenging is the realisation that most IT solutions are no longer likely to provide strategic advantage, but simply the business basics. The competitive advantage for companies will originate from developing creative information technology strategies and implementing them superbly.

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