

# Information Infrastructure for Supply Chain Management – An Overview

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## ABSTRACT

*Supply chain management provides supervision and direction for the various parts of the distribution system including production scheduling and inventory control, transportation, warehousing, wholesaling, retailing and brokerage. It encompasses all industry sectors. Global competition is putting business pressures on all supply chains to reduce their costs while being more proactive. At the same time, the firms with their suppliers and clients are facing enormous pressure to co-ordinate and increase collaboration in their business activities and processes. As all firms with their clients try to simplify their supply chain operations, they are gradually adopting web-based supply chain management technology.*

**Keywords:** *Product Description Catalogue, Order Status Information, Inventory Data as well as Demand projections over the Internet.*

## 1.0 INTRODUCTION

Supply chain management is the combination of art and science that improving the status of the company by finding the raw components it needs to make a product or service, manufacturers use that product or service and delivers it to customers. Supply chain management is a cycle of the five basic components i.e. Plan, Source, Make, Deliver, and Return.

**Plan-** This is the strategic portion of supply chain management. Any company needs a strategy for managing all the resources that go toward meeting customer demand for the product or service. A big piece of planning is developing a set of metrics to monitor the supply chain so that it is efficient, costs less and delivers high quality and value to customers.

**Source-** Choose the suppliers that will deliver the goods and services to the appropriate destination places. Creating the set of pricing, delivery and payment processes with suppliers and develop metrics for monitoring and improving the relationships. These processes put together for managing the inventory of goods and services that receive from suppliers, including receiving shipments, verifying and transferring them to manufacturing facilities and authorizing supplier payments.

**Make-** This is the manufacturing step. Schedule the activities necessary for production, testing, packaging, and preparation for delivery. As the most metric-intensive portion of the supply chain, measure quality levels, production output and worker productivity.

**Deliver-** This is the part that refers to “logistics”. Coordinate the receipt of orders from customers, developing a network of warehouses, pick carriers to get products to customers and set up an invoicing system to receive payments.

**Return-** The problem part of the supply chain. Creating a network for receiving defective and excess products back from customers and supporting customers who have problems with delivered product.

## 2.0 CURRENT RESEARCH

### 2.1 Sharing Product Description Catalogue over the Internet

An electronic catalogue is a centralized online repository for item data. It includes all attributes that can be used to support business processes across multiple departments and supply chain partners such as merchandising, logistics and marketing.

One of the benefits of having product information in a standardized digital format is the capability to exchange data with trading partners. The frequent communication of product information is possible as access to electronic catalogues may be via the Internet or through Electronic Data Interchange (EDI).

### 2.2 Sharing Order Status Information and Inventory data over the Internet

Monitoring and managing the flow of inventory through a multi-party supply chain is now possible with Web-Visibility capabilities. Web-Visibility offers accurate and timely monitoring and managing of flow by all parties. It is also a new way of cutting operational costs and improving customer service. Supply chain visibility applications enable the enterprise to extract data from multiple platforms and applications and share that up and down the supply chain. Visibility tools do not necessarily create information; they consolidate it into a central point and pass it on.

According to The Gartner Group, supply chain internet visibility is one of the top priorities for Supply Management Enterprises. These systems let businesses monitor and manage events across the supply chain to pre-empt problems (for example, by sourcing material from another supplier to meet commitments, or by rerouting and rescheduling deliveries dynamically based on customer requirements) and plan activities more effectively.

Many enterprises track and trace inventory globally by line item, but they also submit plans and receive alerts when events deviate from expectations, thereby giving reliable advance knowledge of when goods will arrive. Having this strengthened insight into the status of orders, inventory and shipments across the supply chain have become especially helpful to senior management in refining strategic plans. Discrete manufacturers have recently been outsourcing more of the manufacturing, distribution and service processes of their business, illuminating the need for improved visibility and collaboration. Because of these drivers, visibility solutions (that is, Available To Promise (ATP), Capable To Promise (CTP) and online inventory status) will continue to drive among Supply Management Enterprise through 2005 according to the Gartner Group.

According to Forrester research, more than 71% of all logistics transactions will be online by 2005 in the United States and the main value-added solutions will consist of visualization tools for logistics tracking coupled with basic and standardized technology, such as the Internet to connect to users. More advanced applications enable firms to deploy Available To Promise (ATP) solutions to their supply chain partners. ATP is a feature of high interest across smaller manufacturers and of moderate interest among distributors who are probably looking more toward Capable To Promise (CTP) capabilities.

ATP simply means that product is in stock and can be promised to a buyer, as opposed to CTP, which looks at the master schedule to determine the capability to produce a product in a customer's time frame. At the minimum, ATP enables customers or sales reps to book new-finished goods or excess capacity, eliminating unnecessary key-in operations and the potential for human error. Supply Chain Event Management (SCEM) capability enables firms to optimize internet visibility solutions. SCEM provides alerts to individuals in the supply chain based on predefined alert resolution logic. When events fall outside of a set of parameters determined in Supply Chain Planning (SCP), SCEM provides notifications that enable companies to take action with the appropriate SCE application.

Notification may be a negative event such as a late shipment or out-of-stock item or an opportunity such as a profitable rush order. Supply Management Enterprise must look at comprehensive and integrated monitoring, notification and response capabilities. The ability to simulate a response to a problem and its impact is also becoming a demanded feature/function but remains visionary for most firms.

### 2.3 Sharing Demand Projections over the Internet

Internet based demand planning enhances Supply Management Enterprises and larger firms ability to accurately forecast future demand for finished

products, key components and sub assemblies, as well as spare or service parts. If Supply Management Enterprises accurately plans for the specific materials, parts and products that will be needed at a given location and given time, they can manage inventory levels in tighter fashion. Hence, demand planning is an area where many Supply Management Enterprises begin collaborating, and is often the first Supply Chain Planning (SCP) application implemented in full SCP suite.

Most Supply Management Enterprises still use manual tools such as Microsoft Excel to do demand planning- but these tools lack the forecasting algorithms and analysis capabilities of true demand-planning solutions. Specifically, they should reconcile both recent and historic demand activity, as well as established orders, point-of-sale data and industry forecasts to generate clear graphical overviews of demand by item, location and customer. Another important feature is the ability to publish reports that provide feedback for managers so that they can increase the accuracy of forecasts.

### 3.0 CONCLUSIONS

- Internet-based technologies are changing logistics from being a packaging and moving function into an information business. Electronic business integrates carriers with shippers via electronic ordering, inventory decisions and product flow. Retailers and third-party logistics firms are able to access their respective information systems through the internet
- The General merchandising and the pharmaceutical retailing industries are heavy users of electronic commerce. Paper systems have largely been replaced by electronic systems including Electronic data Interchange (EDI) and Internet- based systems.
- Electronic systems have been instrumental in streamlining the supply chain and logistics operations of the retail sector. As soon as orders are received from customers, instructions are sent electronically to suppliers and distribution centers to ship the order either from the warehouse or the plant.
- Inventory costs are being passed down the supply chain, as manufacturers are able to make better decisions on product flow based on collaborative Internet-based networks between suppliers and retailers. Suppliers are better informed whether or not to stock key items in their warehouses. The end result is reduced inventory costs and better product flow.
- Logistics managers are placing greater emphasis on external functions and demand-pull systems that are customer oriented. In the past, they

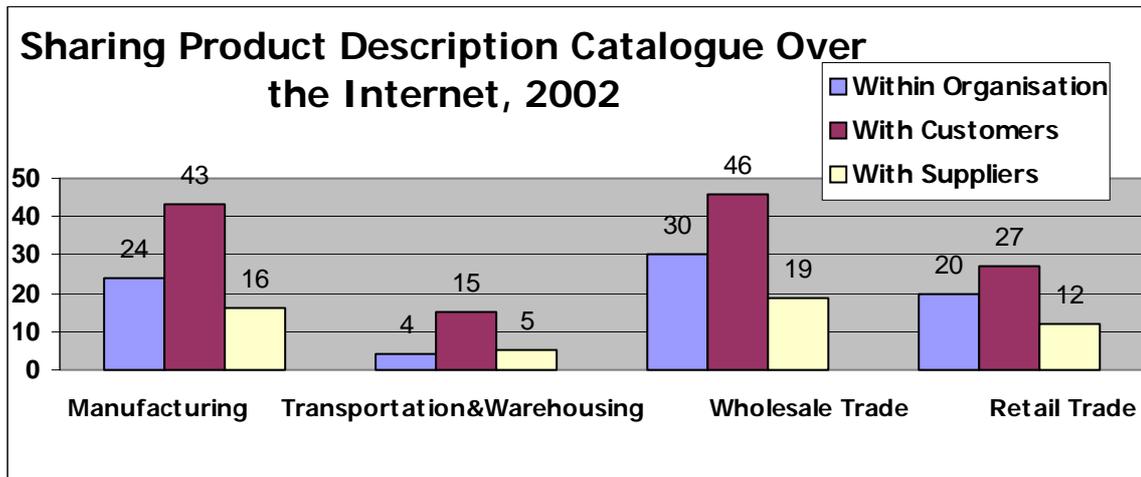
concentrated exclusively on internal logistics functions including warehousing, transportation, etc.

- Logistics and supply chain management are heavy users of electronic business due to pressures to cut costs and move goods and services both smarter and faster in a real time environment. The quality of logistics services is as important as the timing of deliveries to meet just-in-time inventory practices. Specialized equipment is often used in order to ensure no breakages occur.
- Retailers are benefiting from improved logistics systems, which utilize central distribution centers in key locations and electronic systems to keep track of the movement of goods and the repair needs of the equipment (tractors, trailers, etc.).
- While EDI systems are still important, retailers are generally moving to Internet-based systems or plan to do so in the near future. Internet-based systems are more cost effective and efficient. Suppliers do not have high up front costs for equipment and software. Internet-based systems are better able to work with a myriad of suppliers, retailers, distributors, agents, intermediaries and customers.
- Internet-based systems support mass customization of products and a management structure that operates collaboratively with all players in the value chain.
- Internet based supply chain applications adoption across all industry sectors is at its infancy stage. Only very few firms are fully embracing this technology.
- In order to achieve a global synchronized electronic supply chain; firms, associations, government and information systems solution providers will have to deploy a global strategy that enable all players to benefit from the system.

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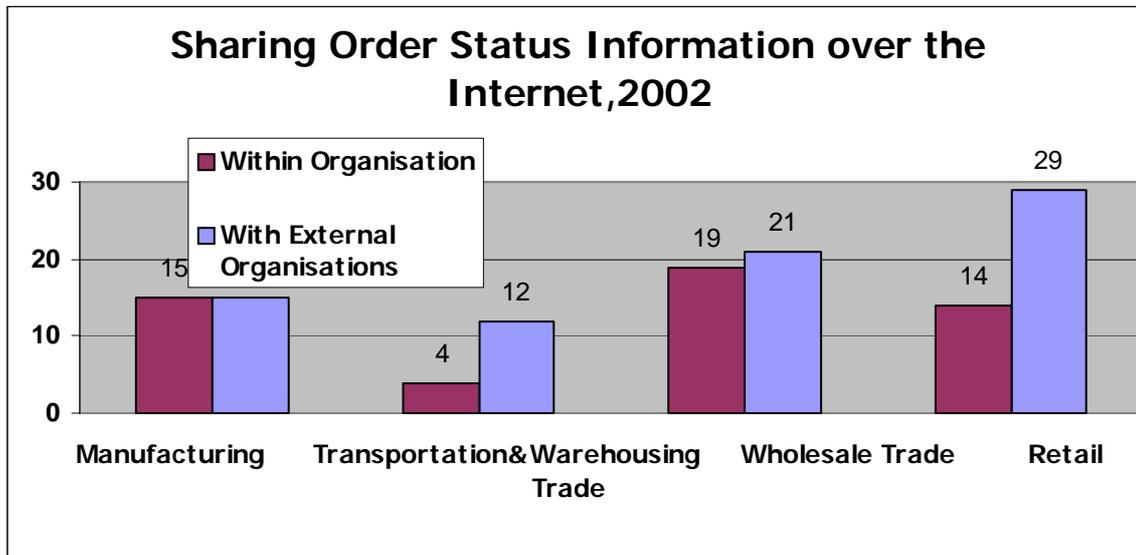
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## APPENDIX – 1



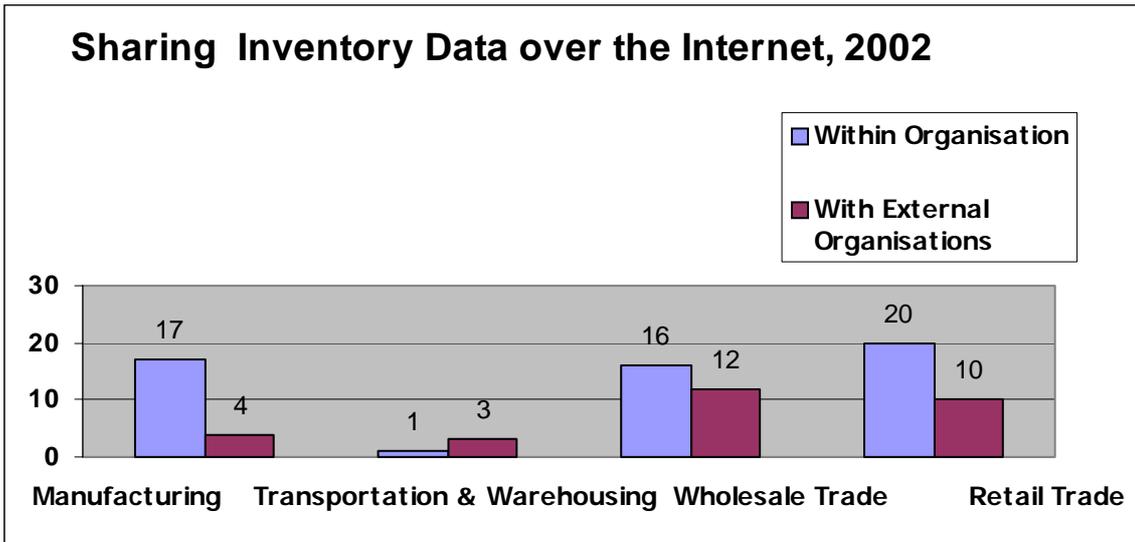
- The internet-enabled electronic catalogue will become a basic requirement for doing business and will have as great impact on firms as the introduction of UPCs, bar code and Enterprise Resource Planning Systems (ERP).
- More than 43% of manufacturers and 46% of wholesalers are using the electronic catalogue technology to share information with their customers.
- Only 15% of the firms involve transportation and warehousing are involve in that particular practice. That can be explained by the fact that they do not possess any good and their partners; manufacturers, wholesalers and retailers, are taking responsibility for electronic catalogue capability.
- For retailers, only 12% are using electronic catalogue with their suppliers and 27% with their customers.
- Electronic catalogues are the wave of the future and ensure data integrity and cost reductions in communications between partners. More importantly for SMEs, low-cost entry options exist today to start enjoying the benefits of electronic catalogues.

## APPENDIX - 2



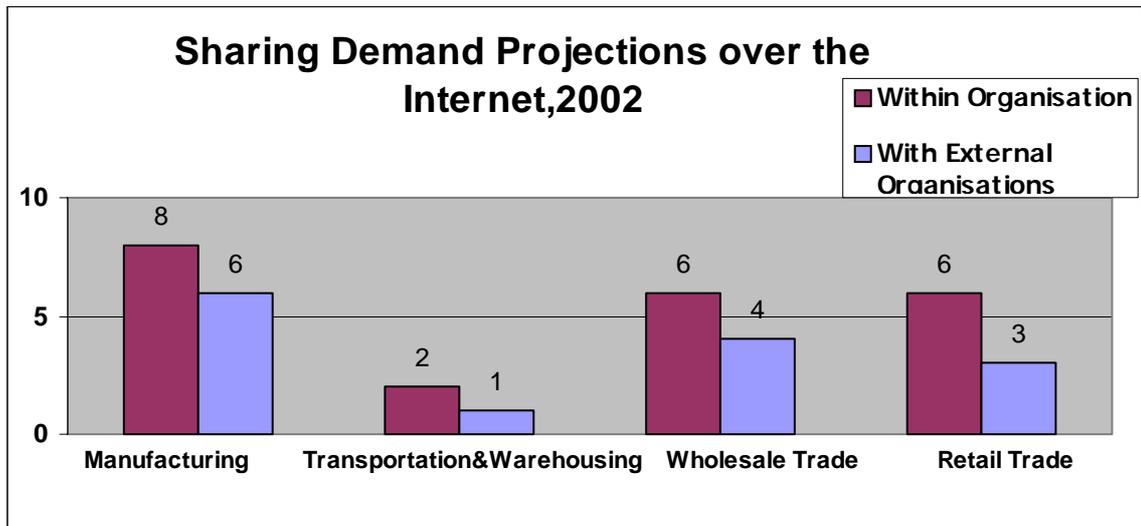
- The leading organizations are now demanding the capability to look into supply chain real time to assess what is in production queue, what is in warehouse, what is on trucks for logistics and procurement decision making
- Real trade is leading the way with more than 29% of its sector embracing the order status sharing technology with its partners.
- Transportation and warehousing firms are having the lowest score with only 12% of firms that are providing Internet order status to its partners. Such a low penetration rate indicates that many supply chains are far from being synchronized and connected together via the Internet.
- Wholesale trade, with 21% of firms providing online order status capability to its partners, are paving the way to new grounds while manufacturing is lagging far behind its supply chain partners with only 16%.

APPENDIX – 3



- Sharing inventory data does not only imply technology compliance, but also trust between partners and the willingness to synchronize and flows on a supply chain basis.
- Not many firms are embracing the activity of sharing inventory data over the Internet. Only 10% of retailers, 4% of manufacturers, 12% of wholesalers and 3% of transportation and warehousing firms are embracing this technology.
- Transportation and warehousing firms usually do not carry inventory on a long-term basis that could explain the low penetration rate. Providing real time exception based order status and tracking is the key technology for transportation and warehousing firms.
- For manufacturers, retailers and wholesalers, it appears that inventory information is still an internal strategic information that cannot be shared at the moment.
- Data quality/ integrity, global standards, and dealing with multiple information systems at the same time are all key factors that are showing down the adoption of sharing inventory data over the Internet.
- With the larger buyers pushing their supply chain into collaborative processes, we shall see a major shift in the near future.

## APPENDIX – 4



- Very few firms are using Internet based demand projections technology in Canada.
- The leading sector is Manufacturer where only 6% share demand projections over the Internet with their trading partners.
- Only 3% of retailers are currently using these types of applications.
- On the other hand, large retailers are currently implementing advance planning technology, Collaborative Planning and Forecasting Replenishment (CPFR) trademark registered by the Voluntary Interindustry Commerce Standards (VICS), that will have a major impact on all SMEs that are supplying them.
- Transportation & Warehousing service firms are involved in the process of delivering and managing the goods according to demand projections. Very few, 1 – 2% are currently using that type of technology.
- Wholesalers are expected to play a key role with new processes such as Vendor Managed Inventory, Just in time and Lean concepts.
- Only 6 – 4% of wholesalers are sharing demand projections information via the Internet.