INFORMATION TECHNOLOGY IN LOGISTICS: ADVANTAGES, CHALLENGES AND OPPORTUNITY FOR EFFICIENCY FROM PROBLEM DECISION IN DIFERENT ACTIVITIES

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Abstract

Informatisation**,** internationalisation and globalisation have dramatically changed retail sector; speeding up the retail processes, creating new sale formats, fastening the increase of income etc. During the last decade, logistics influenced the development of retailing by cutting down costs and increasing the service quality level. The main purpose of this paper is to give a comprehensive review of affected logistics and directly caused changes in Western Balkan retailing and global market as well. Among the given trends there is a shorter product life cycle that induces some changes among supply chain members in order to keep profitability, innovation in technology field, RFID technology, automated commercial processes, and EDI system communications.

Based on the analysis of relevant foreign literature in the area of logistics, distribution and supply chain management, this paper gives a review of new market trends that have an important impact on logistics. Special attention is given to more significant usage of concept of managing, developing high quality products and services, minimising stock within supply chain and making sustainable, competitive and strategic advantage of a company by it.

Keywords: logistics, logistic technologies, logistic trends, retail

ИНФОРМАТИЧКАТА ТЕХНОЛОГИЈА ВО ЛОГИСТИКАТА: ПРЕДНОСТИ, ПРИДОНЕСИ И МОЖНОСТИ ЗА ЕФИКАСНО РЕШАВАЊЕ НА ПРОБЛЕМИ ВО РАЗНИ АКТИВНОСТИ

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Апстракт

Информатизацијата, интернационализацијата и глобализацијата драматично го имаат изменето малопродажниот сектор; ги забрзуваат процесите на малопродажба, креираат нови форми на продажба, забрзано зголемување на приходите и др. Во последната деценија, логистиката влијела на развојот на трговијата на мало со намалување на трошоците и зголемување на нивото на квалитетот на услугите.

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Главната цел на овој труд е да даде сеопфатен преглед на логистиката и директно предизвиканите промени во земјите од Западен Балкан во трговијата на мало, како и светскиот пазар.

Врз основа на анализата на релевантната странска литература во областа на логистиката, дистрибуцијата и менаџментот на снабдувачките синџири, овој труд дава преглед на новите трендови на пазарот кои имаат важно влијание на логистика. Посебно внимание се посветува на позначајното користење на концептот за управување, за развој на високо квалитетни производи и услуги, за намалување на акциите во рамките на синџирот на снабдување и една компанија да ја направи одржлива, конкурентна и со стратешка предност.

Клучни зборови: логистика, логистички технологии, логистички трендови, малопродажба

Introduction

Everyone agrees that effective supply-chain management can provide a major source of competitive advantage. The goal of a supply chain manager must therefore be to link the end customers, the channels of distribution, the production processes and the procurement activity in such a way that customers' service expectations are exceeded and yet at a lower total cost than the competition. One of the enabling factors for the achievement of this goal is the effective use of information technology (IT).

For example, in retailing, margin erosion and the need for ever improving levels of customer service have both been instrumental in increasing the levels of IT investment to support supply chain improvements. Retailers will continue to invest in technologies such as electronic data interchange (EDI) in order both to facilitate further reductions in supply chain stock levels and to forge stronger supply chain linkages between both their customers and suppliers.

Four key themes

There are a variety of technological trends and innovations which have an impact on the use of information technology in logistics. However, I believe that the major trends can be grouped into four key themes. These themes are important to the current and future use of information technology to support logistics operations across all industry sectors. The four key themes are concerned with:

- integration and flexibility;
- EDI;
- hardware; and
- communications technology.

Integration and flexibility

The successful integration of information within an organization is a powerful enabler for:

- reduced costs;
- increased productivity; and
- improved customer service.

Advanced transaction processing systems which address the needs of an entire organization are now commonplace. These systems enable management to monitor inventory at all locations throughout the organization, which may include multiple warehouses in multiple countries. Integrated systems are now available which provide real time visibility of demand forecast information, inventory levels and production schedules. Once these systems have been linked successfully to sophisticated decision support systems then supply chain managers will have the ability to manage the traditional supply chain tradeoffs in a dynamic way. The need for flexibility is a continuing theme whenever information systems are being considered.

Supply chain systems must be capable of being adapted to meet changing demands quickly and cost-effectively. Most supply chain systems have been based on modular solutions offering the ability to add and amend modules as required. Usually such packages are made up of a dozen or so modules at most. This means that because of the size and scope of individual modules this approach to software design may not always provide the level of flexibility required.

Individual modules need to be as small as possible if maximum flexibility is to be achieved. Increasingly, supply chain software packages are being developed, taking full advantage of object-oriented technology. Software packages are now being structured from hundreds of modules, each of which can be amended as required. This enhanced level of flexibility enables organizations to modify and enhance their supply chain systems as their business needs change. The objective is to eliminate the need for full-scale systems replacement or applications redevelopment.

Electronic data interchange

"Electronic Data Interchange (EDI) refers to the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents from one computer system to another (ie) from one trading partner to another trading partner. It is more than mere E-mail; for instance, organizations might replace bills of lading and even checks with appropriate EDI. Before discussing the potential benefits of EDI, let us first like look at some of the ways in which EDI is used currently:

- interactive, query-response transactions;
- trade data interchange;
- electronic funds transfer; and
- technical data interchange.

The second category is the one which is the most pertinent to supply-chain management as it covers transactions such as purchase orders, delivery notifications and invoices. Unfortunately within this category a number of different industries initially developed their own standards.

This is not too much of a problem unless, like Excel Logistics, you need to do business with organizations in different industry sectors. Fortunately, the trend is to standardize trade data interchange requirements. A common standard across all industry sectors is now a reality. With all of these EDI links in place between suppliers, manufacturers, retailers, customers and the banks a totally paperless supply chain is now possible. This is the key strategic benefit of EDI – as an enabler for closer supply chain relationships. EDI links organizations along the supply chain so they can work more closely together to their mutual benefit. The other benefits of EDI consists of improved internal effectiveness and efficiency and the consequential reduction in administrative costs. The savings in time and resources from the use of EDI to automate administrative processes are large and immediate.

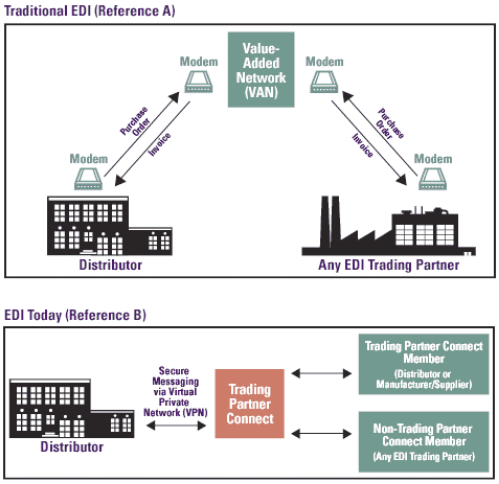

Fig. 1 EDI examples

Hardware and Communications technology

There are two main trends in computer hardware which have had, and will continue to have, a significant impact on the use of IT in logistics. One of the key underlying trends in computer hardware technology may be summed up in three words: **smaller, faster and cheaper**. The reductions in computer memory and processor size over the last 25 years have been dramatic. These dramatic improvements in hardware performance have been matched by equally dramatic reductions in hardware costs. One of the key benefits of these hardware trends is that computing power can now be implemented in parts of the supply chain that previously were never considered, either because of cost constraints, or space constraints, or both; the use of hand-held barcode scanners is a good example. These have contributed to the growth in the use of labeling and automatic identification of products and locations.

This is a fundamental enabler for the success of logistics information systems as requirements for greater traceability demand improved means of identification. The second trend is the growth in open systems. As advancing technology creates new computer network capabilities, it is vital that organizations have the flexibility to transform those capabilities into competitive advantage. The final theme concerns some recent advances in communications technology. Secure and resilient communications networks are a prerequisite for implementing EDI and achieving supply chain integration.

There is much that could be said about the growth in value added network providers and the services that they have to offer. Let us concentrate on one of the fastest growing communications technology i.e. mobile communications. One way to begin to differentiate between the services on offer is to determine whether you require both voice and data communications. Many mobile communications needs do not necessarily require voice communications. Currently in logistics the prime users of mobile communications technology are third party logistics service providers. Using voice communications networks it may take approximately 30 seconds to relay a simple message about vehicle location or delivery status. In addition, verbal information requires an operator at the other end to process the details, and verbal information is often ambiguous and open to interpretation. Using packet switched mobile data the same information can be relayed in a few tenths of a second. What is more, the information can be entered automatically and accurately into management information systems, thus obviating the need for an operator at the end of the line.

Conclusion

I would like to conclude by presenting the findings of a study done way back in 1994 that predicted the future for logistics in the new millennium. Let us see how far it was right!
The following were the findings of the survey:

- Growth in time-based performance: The prediction is that this will be achieved by speeding up movement within existing supply chain structures. This will only be achieved by taking advantage of all the information technology trends we have discussed in order to transform these existing supply chains.
- Supply chain efficiency improvements: The panel of experts predicts that EDI will be the one of the main enablers of supply chain efficiency improvements. They predict that around 50 per cent of key logistics documents will be transmitted electronically by 2001.
- Reduction in number of warehouses: The prediction is that the number of warehouse tiers will be reduced, thus leading to a reduction in the number of warehouses. One way in which this might be achieved is via investment in IT to enable greater supply chain integration and, hence, support a reduction in total supply chain inventory.

- Increase in number of transhipment warehouses: Warehouses will continue to develop away from the traditional storage function to a transhipment role. This will be facilitated by investment in advanced warehouse technologies such as fork lift truck mounted Radio Data Terminals and barcode technology, together with EDI links between the warehouse and other parts of the supply chain.
- Growing importance of retailers: The experts predict that, with growing concentration of ownership in the retailing sector across Europe, retailers are likely to become an increasingly important force in shaping the design and operation of supply chains. This will inevitably lead to increasing supply chain integration and EDI links between the retailers and their suppliers.
- Rise in prices of road transport: Road prices are forecast to rise significantly more than for other modes of transport. This means that, in order to help offset these price rises, investment in in-cab technology is likely to increase.
- Increase in cross-border transport: The study predicted a significant increase in cross-border transport for 2001 with implications for existing supply chain structures. This is likely to lead to investment in both in-cab technology and also in IT to support cross-border supply chain integration.

The conclusion from these findings is that the pressures to invest in technology are high and will increase. While there are business benefits for successful investment, the penalties of under investment or of poorly-thought-through investment decisions are also high. This is because competitors will also be investing in technology to improve the effectiveness of their supply chains and develop new ways of doing business in order to achieve competitive advantage.

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