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Business-to-business data sharing: A source for integration of supply chains

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Abstract

The flow of information between parties in a supply chain is crucial for carrying out an effective and efficient transition of consignments. To support the flow of information, diverse communication systems exist. Although the electronic data interchange technology has been around for more than 30 years now, it has not reached small- and medium-sized enterprises to any significant extent. The results of more than 20 case studies imply that smaller companies run the risk of being permanently excluded from integrating their logistics operations in the supply chain. However, the advent of the Internet and concepts of electronic business open up new perspectives for small- and medium-sized enterprises. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

To provide effective support for the functioning of the logistics channel, the overall information systems architecture must be capable of linking or coordinating the information systems of the individual parties into a cohesive whole. In practice, each company's information system should support both *proprietary* and *shared* data. Since it is needed to manage the company, the proprietary data would be accessible only to those employees who have legitimate internal business needs. The shared data should be available through appropriate information interfaces to customers, logistics suppliers, or any other party having a need to know, through a contract or standard to which all parties agree [1]. This has become more important in later years as many companies are increasingly outsourcing their logistical activities to third parties, which in turn heightens the demand for effective data sharing [2].

This article lies within the scope of the shared data segment and, by carrying out several case studies, it tests whether the above statement "The shared data should be available through appropriate information interfaces…through a contract or standard to which all parties agree" is a vision or a reality. Additionally, the goal is to analyze to which extent small, medium, large and huge companies, taking part in the supply chain, utilize advanced information technology.

To be able to position the information system, often called the logistics information system (LIS), within the concepts of logistics, LIS may be defined as follows (adapted from [3]):

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Logistics Information System is an interacting structure of people, equipment, and procedures which together make relevant information available to the logistics manager for the purposes of planning, implementation, and control.

This definition implies that the data sharing between parties in the supply chain is of fundamental interest, and that the flow of information is essential for carrying out an effective and efficient movement of consignments. By using more advanced technology and data sharing, one can increase the resource utilization and thus reduce costs [4]. Development in information and communication technology has made it possible to integrate the supply chains so that the links between suppliers, producers, customers and third parties have been easier to establish. The elementary factor in making these links feasible is that the companies must develop the information systems in accordance with standards and communication technology that the other parties can agree to [5]. There exists a general consensus about this, but the means of communicating the relevant data or information are a different story.

Establishing electronic links with their suppliers and customers enables companies to transmit and receive purchase orders, invoices and shipping notifications with much shorter lead times than previously, which gives potential to speed up the entire shipping transaction [6]. The most common technology for moving such messages between larger companies is electronic data interchange (EDI) meaning that "structured data, by agreed message standards, is transferred from one computer to another, by electronic means" [7]. However, there exists a barrier through which smaller companies are not able to break: the cost of implementing EDI communication technology, and the cost of installation and maintenance of value-added networks (VANs), place electronic communications out of reach for many small- and medium-sized enterprises (SMEs). For the most part, these businesses rely on telephone and fax for their business communications. Even the larger companies that use EDI do not often realize the full potential benefits because many of their business partners do not use EDI. Therefore, although the technology has been around for more than three decades now, it has not reached SME's to any significant extent. Whereas 96% of 1998's Fortune 1000 companies in the USA are using EDI, 98% of the other companies are not [8]. The EDI is a solution made by the large companies for the large companies, while the small- and medium-sized ones do not have the opportunity to join the society.

The results of the case studies, carried out in 20 companies, show that the larger companies are using EDI technology to communicate business data but experience problems in communications with the smaller companies. The smaller ones do not often have resources or basic information technology to implement EDI modules, and the consequence is that those companies risk being permanently excluded from integrating their logistics operations into the supply chain.

The advent of the Internet opens up new perspectives for the SMEs. The Internet makes electronic business affordable even to the smallest companies. Companies of all sizes can communicate with each other electronically through the public Internet, networks for company use only (Intranets) or for use by a company and its business partners (Extranets), and private VANs. The Internet provides a new technology for doing EDI. Ultimately, many companies plan to adjust their EDI programs to Internet solutions, but in the meantime Internet technology increases the number of protocols that a business must support. As a result, companies are moving from traditional EDI translators to EDI gateways which then serve as a single management interface for the EDI system [9]. This serves the smaller companies as well, since they do have an interest in signing up for such gateways to enable communication with their often much bigger customers.

2. Framework

The framework chosen for this work is a simple short supply chain, including different parties commonly belonging to a logistics network: a