

E-Logistics

Managing Your Digital Supply Chains for Competitive Advantage

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Synopsis

Logistics has moved into the sphere of electronic technologies. Though most companies agree that technology must play a role in logistics, how can they be convinced that sharing a single platform within an industry will provide benefit without decreasing their competitive edge? Given the challenges *within* an industry, how can e-logistics possibly work when different industries need to communicate? *E-Logistics* tackles those questions and asks, What does the future have in store for e-logistics?

E-Logistics (Kogan Page, © 2016) examines the history of e-logistics, its role in transportation industries and automation, and the future of information and communication technologies (ICT). More specifically, you will learn:

- How technology has developed in the field ICT in general and within e-logistics in particular
- How e-logistics operates and improves processes in the various transportation industries: air freight, rail freight, road freight, and shipping (port systems)
- What sorts of challenges these industries face in terms of technology, integrating ICT systems within and among industries, and establishing global standards
- How automation is the future of ICT and e-logistics

The key concepts of *E-Logistics* can be distilled into the following concepts:

Research the Latest Logistics Technology

Become familiar with the latest technological advancements in logistics. Learn how those advancements have affected your industry in particular.

Share E-Logistics Best Practices

Optimize individual business performance by sharing e-logistics best practices within an industry. Sharing technology platforms helps an industry to function more efficiently and to get things done right the first time.

Employ Automation Technologies

Automate the service chain in order to improve the flow of goods and enhance data sharing and analysis. Automation technology such as Radio Frequency Identification (RFID) has taken warehouse operations to another level.

Comply with Global Policies

Coordinate your e-logistics with global policies and standards. The “single window” system attempts to provide a single point-of-contact for all international logistics activities.

Study Trends to Optimize Competitive Edge

Stay current on what is trending in ICT. Developments in e-logistics will help companies create and maintain a competitive advantage.

...We aim to capture the state-of-art developments in the field of e-logistics [to help] the logistics community to gain a more precise understanding of how a business can utilize recent ICT developments to manage their supply chains and logistics-related activities for competitive advantage.

Based on *E-Logistics: Managing Your Digital Supply Chains for Competitive Advantage*, edited by Yingli Wang and Stephen Pettit, we discuss the development of e-logistics, its implications in various industries, global policies and governing bodies in the realm of ICT, automation technology, and the future of logistics. We share our interpretations of these developments and strategies in the following pages.

Developments in E-Logistics

Global manufacturing and distribution has benefited from developments in ICT, particularly in the areas of supply chain and logistics-related activities. All aspects of manufacturing and distribution are now connected through information technology (IT) applications. Because of this connection, improvements have been measured in areas such as customer service, operation efficiency, information quality, and responsiveness. Proper utilization of new digital technologies will give companies a competitive advantage.

History

Electronic business (e-business) systems came into play during the 1960s in the field of logistics and supply chain management. Two examples are the materials requirement planning (MRP) inventory management system and the distribution resource planning (DRP) and billing system. They were function-based and operated independently of one another.

In the 1970s, enhancements were made to the MRP system to integrate production, purchasing, and inventory management functions to include labor and financial requirements. This led to the development of enterprise resource planning (ERP) in the 1990s. Although this was an improvement, this single system was unable to cover all logistics operations within a company.

Concurrently, inter-organizational information systems (IOSs) have developed. An early example is the electronic data interchange (EDI), which worked to unify business processes. More recently, enterprise application integration (EAI)-based systems have been introduced. These systems function as one-to-one IOSs, also known as proprietary IOSs.

Readying the Future of ICT and Logistics

Multimodality is central to the notion of contemporary e-logistics. It encompasses the efficient use of different modes, both on their own and in conjunction with others, with the goal of utilizing resources in a sustainable and optimal way. Advanced technologies such as RFID, vehicle area networks (VANETs), and cellular networks and satellite systems that link haulage vehicles are what make this possible and what will lead to innovations in ICT.

In the future, wireless technologies may be used to facilitate communication among autonomous vehicles. Intelligent transport systems (ITSs) based on VANETs offer further opportunities for efficiency, as well as the use of the smart grid to optimize supply chain function. ITSs hope to reduce the number of vehicles and accidents on the road, as well as limit their negative impact on the environment.

The smart grid has to do with the consumption and delivery of electricity in a way that is capable of being monitored in real-time. ITSs will soon include more electric, and automated electric vehicles, increasing the need for a smart grid that can integrate with transportation technologies and provide fueling stations for those vehicles. Business solutions of the future will rely upon a common platform for ITSs and the integration of wireless technologies and the smart grid.

E-Logistics in Transportation Industries

Every transportation industry has its own needs and individual technologies. Conversely, each of these industries interacts with the others and, therefore, needs an efficient and standardized way to communicate. ICT within the transportation industry is complex and there are many innate barriers to its practical usage. However, ICT will always aim to increase efficiency, and technological improvements will continue to bring these industries into synchronicity.

Airfreight

By its own admission, airfreight management has not taken full advantage of ICT progress. It is a particularly complex transportation industry in that it is dependent upon other modes, especially road transportation, for its supply and distribution operations. Therefore, effective communication among hauliers, ground handlers, and airlines is essential to airfreight activities. Standardizing ICT processes would go a long way towards boosting airfreight productivity, but complexities are still preventing optimum usage.

The industry has made some headway in the area of customer interfaces with the International Air Transport Association's (IATA) introduction of the Cargo Accounts Settlement System (CASS), which provides freight forwarders access to all shipment billing data with the ability to download them in a variety of formats. Airlines upload standardized files containing shipment information to *CASSLink*, including air waybills (AWB); CASS produces invoices for freight forwarders and can provide up-to-date sales statistics.

Despite this progress in ICT, airfreight management is still challenged to find technology that can encompass the entire supply chain.

Rail Freight

The rail freight industry has employed ICT virtually since the beginning. It was an early developer of systems that monitor and control transport activity. One of the main issues for the industry is how to keep its customers better informed. Data travels well within rail companies, but is not as accessible to outside customers.

Examples of ICT usage in rail include assessing

- The position of trains on the network
- Which assets are on the trains
- What the trains are carrying
- The condition and maintenance requirements of the locomotives and rolling stock

New ICT, such as the Anubis order management system (an online portal), allows customers to track and trace containers and view the relevant ordering and invoicing processes. It received commendation by the National Rail Awards in 2014. Anubis assists with providing data to customers in the form of

- Electronic data interchange (EDI) order placement
- Tracking and tracing
- EDI interface with shippers, hauler, ports and terminals
- Inland terminal and warehouse management
- Electronic 'paper trail'

Road Freight

Transport management systems (TMS) allow transporters to interact with customers electronically regarding logistics and distribution management. The facility with which the TMS operates greatly affects the success of the road freight company. The road freight industry is drowning in data, but lacks a proper mechanism by which it can be shared and accessed. Most companies are using computer booking systems tailored to their individual needs or propriety telematics systems that do not assimilate with others.

Contractual obligations are a major barrier to the integration of ICT among road transport companies. For example, fines are built into contracts in the case of late or early deliveries. Transport operators may design a route that saves fuel and time on the road, but if delivery times are not acceptable to procurement departments and contracts are inflexible, collaboration cannot be achieved. Integrated data systems may cost more financially, but would lead to a more productive industry.

Bills of Lading

Bills of lading are the most important documents in mercantile shipping. They serve as receipts and title documents and are the basis of sales agreements in the global shipping marketplace. Traditionally, bills of lading are paper documents regulated under common law or through such international conventions as the “Carriage of Goods by Sea Act 1924” or the recent “Rotterdam Rules.” However, the mercantile shipping industry has begun to replace those paper bills of lading with an electronic version.

Three developments have been vital to this transition:

- Comité Maritime International (CMI) rules for electronic bills of lading
- Bills of Lading Electronic Registry Organization (BOLERO)
- Electronic Shipping Solutions (essDocs)

These developments have laid the foundation for standardized EDI in bills of lading.

Electronic bills of lading find their greatest challenge when used as legal documents of title— their endorsement and transfer can be problematic in electronic form. Some progress has been made in the area of legal rules on evidence, which should make it easier to use electronic bills of lading as documents of title. The United Nations Commission on International Trade Law (UNCITRAL) Model Law on Electronic Commerce began the move in that direction and continues its efforts to create standards for international electronic commerce.

Port Technologies

Ports have become important hubs for a variety of supply chains and commerce-governing authorities. Port-centric information adds value to logistics, especially with the introduction of cloud computing and the internet of things (IOT), which makes connecting the various participants cost effective. An example of a port-centric ICT system is the Portbase port

community system (PCS), which is used by the Port of Rotterdam and the Port of Amsterdam.

Logistics for port systems have three major components:

- Physical flow
- Information flow
- Financial flow

Physical flow encompasses the movement of ships, cargo, and other vehicles. Information flow and financial exchanges are integrated by a port-centric ICT system that uses a single platform for all participants.

Portbase takes on the roles of

- Service provider
- Infrastructure provider
- Community manager
- Data manager
- Knowledge supplier and innovator

All of these advancements will make these two ports more attractive to maritime shipping companies by integrating the logistics chains of the Dutch ports with their related supply chains, improving turn-around times, and making the work of port authorities clearer and more efficient.

E-Commerce and Automation in E-Logistics

E-commerce, e-fulfillment and their complementary technologies have completely changed the retail environment. Convenience and speed of delivery have turned consumers towards online shopping. E-logistics has kept pace with this change, particularly in the area of warehousing logistics, with technologies that have automated nearly every aspect of storage and fulfillment.

E-Commerce and Warehousing

The rapid expansion of the e-tailing market has required an equally rapid expansion of e-fulfillment capabilities. Successful warehouses/fulfillment centers need to be reliable, flexible, cost-effective, responsive, and technologically advanced. Their employees should be well-trained and they should have well-managed external partnerships and human

resources departments. In addition, meticulous inventory management and forecasting is critical.

E-Logistics Technology

Radio frequency identification (RFID) is leading the way in automation technology. It can capture massive quantities of data quickly, from tags within a certain range, while they are moving, and without having to “see” them. Some benefits include

- Better inventory control
- Improved picking process
- Ability to track the location of goods

This technology applies to many of the functions along the supply chain as well as within track-and-trace functions. Data can be accessed in real-time and goods within the warehouse/fulfillment center or in transit can be located with greater accuracy.

GS1 Standards

Taking automation to a global level requires a universal language or code to identify goods. The GS1 is a global, not-for-profit organization supported by members in more than 100 countries. GS1 codes are available for documents, locations, and shipping data, and can trace an item’s (or even a person’s) path along the supply chain in real-time. Global standardization of coding makes it easier to document and share product changes, as well as any changes within supply chain participants, routing, and visibility.

E-Logistics – Regional and Global

Electronic logistics marketplaces (ELMs) at the regional level are web-based systems that facilitate productive alliances between shippers and carriers as well as among shippers. ELMs at the global level seek to improve supply chain management through a ‘single window’ system. It is an ICT platform that provides a single point-of-contact for all international trade associates.

Regional E-Logistics Marketplaces

Empty or partially-filled trucks on the road are examples of the inefficiencies that can occur in road transportation. Better coordination between shippers and carriers via an ELM would allow each party to share data and relevant supply chain information. However, because shippers and carriers often do not have compatible technology, data sharing is not always possible. Making a financial investment in technology may not be an attractive

proposition at the outset, but it would pay off in future productivity for transport companies.

Single Window Global ELMs

Trade and transport operations at the global level often face redundant processes and documentation obligations. The single window system would provide one interface for businesses and authorities with standardized documentation. Important objectives are to coordinate customs and border management; facilitate port operations for maritime authorities; and to enhance trade operations and ease compliance redundancies for businesses. The single window system will make global trade more efficient.

Use Advanced E-Logistics Technology to Strengthen Your Business

Understand e-logistics technology

Each industry has technology platforms to improve logistics. Using references like this book to discover what might work in your business.

Integrate Transportation Industries

Use e-logistics technology to optimize communication within individual businesses, among businesses within the same industry, and among transportation industries that interact.

Automate Warehousing and Fulfillment Operations

Employ radio frequency identification (RFID) technology and other innovations to control inventory and provide efficient fulfillment and returns operations for consumers.

Comply with GS1 Standards for Global Trade

Identify products for global trade by using GS1 codes. The electronic product code information system (EPCIS) provides real-time, traceable data regarding location and time-of-arrival for goods.

Improve Operations through E-Logistics Marketplaces

Facilitate your operations by using e-logistics marketplaces (ELMs), both regionally and globally (single window system). The single point-of-contact reduces redundant reporting and documentation,

For More Information

Logistics is about flow. As business and trade are firmly in the digital realm, e-logistics is about allowing technological advancements to promote better flow. From the transportation industry to automated warehousing and fulfillment operations to regional and global trade, e-logistics is the key to progressive, efficient, and prosperous commerce. Enhancing the digital supply chain gives individual companies a competitive advantage.

...The ability to orchestrate and manage a portfolio of e-logistics systems is considered as a strategic dynamic capability for the users and providers of logistics services and is the key to effective information flows within and across supply chains.

If you've enjoyed our insights on Wang and Pettit's *E-Logistics*, we encourage you to access the other *E-Logistics* assets in the Skillsoft library, or purchase the hardcopy.

About the Editors

Yingli Wang

Dr. Yingli Wang is a lecturer in logistics and operation management at Cardiff Business School. Her research on e-logistics dates back to the early 2000s and has attracted funding from bodies including the Engineering and Physical Sciences Research Council, the European Regional Development Fund, the Welsh Government, Highways England and the Department for Transport.

Over the last decade, she has worked intensively with over 60 organizations including shippers, logistics service providers and IT service providers, in the field of e-logistics, such as Tesco, ASDA, BT, Costain, Panalpina, Tata Steel, Descartes, JDA Software Group, Infor, Road Tech Computer Systems, GT Nexus, Tandem Transport, CEVA Logistics, ABP Ports, Portbase, to name only a few. Before embarking on her academic career, she worked for eight years at Nestlé China in various senior managerial roles.

Stephen Pettit

Dr. Stephen Pettit is a member of the Transport and Shipping Research Group within the Logistics and Operations Management section at Cardiff Business School. He has been involved in a wide range of transport-related research projects, notably for the Department for Transport and the European Commission. His recent research has focused on international logistics, port operations and management, and the application of information and communication technology in the fields of transport, logistics and supply chain management.

More recent work has focused on Humanitarian Aid logistics and Supply Chain Management. An initial project was funded by the Chartered Institute of Logistics and Transport through their Seedcorn Grant scheme and was co-researched with Dr. Anthony Beresford. This work has been extended through collaboration with Cranfield University in the Cardiff-Cranfield Humanitarian Logistics Initiative. Stephen has written a large number of journal papers, conference papers and reports primarily on port development, port policy and the logistics of humanitarian aid delivery.

Also by Stephen Pettit

Port Management: Cases in Port Geography, Operations and Policy, Kogan Page, © 2017, ISBN 978-0749474324.