

## **THE APPLICATION OF RFID SYSTEM AS THE TOOL OF E- LOGISTICS**

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**Abstract:** Nowadays the Internet and network operating systems are very important. Thanks to them firms have easier access to different types of data, they can easily communicate not only with suppliers and clients, know actual market situation, but also their contracting party. Thanks to the Internet and network operating systems many logistic systems were born which facilitate running a business. It's because they helped to reduce costs of transportation, stocking, production and also in better and reliable way match clients requirements.

**Keywords:** E-logistics, Logistics Information System

### **1. The essence and specification of E-Logistics**

Along with development of the Internet, logistic systems and network operating systems a new dimension of logistics appeared, it's known as E-logistics. It's a term which appears more often in contemporary literature, however coherent and unambiguous definition hasn't been refined yet. E-logistics can be defined as:

- “application of solutions of e-business to aid supply network ... Realization of logistic processes on network platforms” [1],
- “the use of three basic instruments of the Internet such as: e-mail, web page, exchange data protocol in order to speed up the exchange of information in logistic supply network” [2].

It can be stated that specification of E-logistics relies on concentration on material products, great part of ERP systems, which serves to contribute business management or cooperation of co-working firms. The specification of E-logistics is also effective, automated communication and cordless telecommunication with multi criterion contribution of logistic actions.

### **2. Types of Logistic Systems and their characteristics**

Correct functioning of E-logistics bonds with Logistics Information System – LIS, which task is gathering and processing data, serving to take a logistics decision and to make obtained information available after processing. The kind of LIS are presented in Figure 1.

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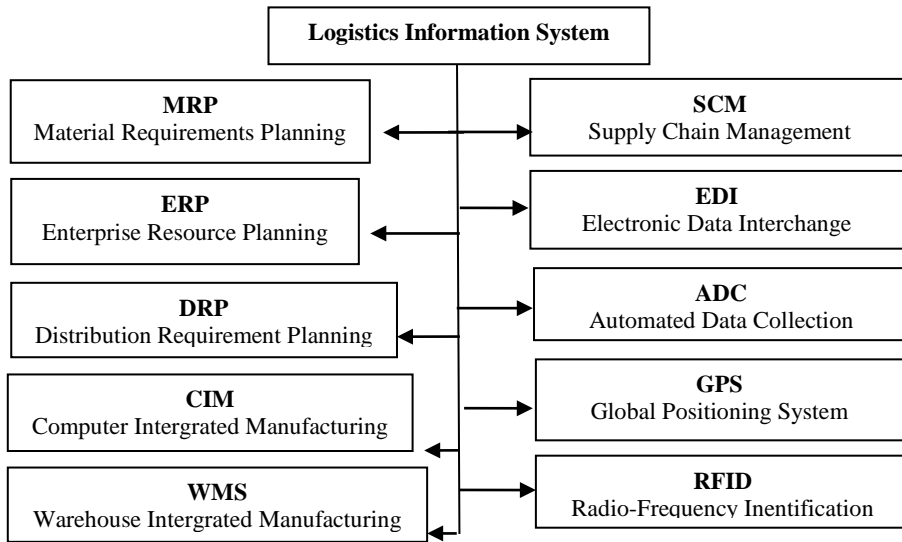


Figure 1. Logistics Information System [1]

**MRP Systems:** First MRP systems appeared on the market in early 60's last century. Thanks to this system companies have possibility to exactly calculate the sum of materials and semi-finished products. Realization of system happens thanks to structural choice connection remembered by the system, standards of material depletion and product demand. Upgraded version of scheme contains additional functions such as orders coming directly from final customers and agents, and also forecasts of sales and production, conditions of storehouses and invoice recordings [3].

**ERP Systems:** In 90's of XX century a new IT system known as ERP was born. These systems allowed the entire process support in the company. The manager can check contact history at any moment thanks to clients database found in ERP system, it also allows electronic flow of documents in the company. This way the company can operate and exercise control on processes connected with finances of the company, e.g. accounting or financial settlements.

**DRP Systems:** Another IT system which aids logistic operations is DRP. It allows the company to react rapidly upon changes of demand. It's task is to calculate needs and to plan transportation between all links of network supply. It happens because of forecasts of sales in specific differential distribution units. DRP has to plan transportation of product to its destination. Above all, this system rises the client service quality, lowers the threat of reserves depletion, costs of transportation and improves functionality of logistics centres [4].

**CRM Systems:** Another IT system which aids functionality of the company is CRM (Customer Relations Management). It was brought to life because knowledge about the client, mainly his needs and tendencies is essential for company development and minimizing costs. CRM is the alignment of business strategies, business culture and organizational structure, based on customer information and information technology, in order that all contacts with clients meet their needs and achieve business benefit or profit [5].

CRM conception relies on selectively choosing decisive clients, “crucial” or “key” client. As to suppliers the following fact should be considered: supplier should be located at his intense growth of qualification phase and development of potential. The CRM goal is to make customer satisfied for purchased material or product or execution of the service [6].

**WMS Systems:** Another IT system that widens ERP actions is WMS, which supports warehouse activity. ERP helps the company to clearly and legibly enclose storage structure. It supports the resource management of logistic units in the company. WMS essence is to prompt and remind warehouse staff of proper behaviour procedures during execution of warehouse processes. It controls and corrects the work of warehousemen. This system exactly manages logistic processes in the company by itself. The most important are location regulation in the warehouse, automatic product recognition by barcodes, improvement of logistic processes in the warehouse and package transportation enhancement [7].

**SCM Systems:** SCM systems (Supply Chain Management) allow supervision upon product flow, data and services between different involved companies. Supply Chain has got five different levels, which are very important:

- analytical framework/ value creating logic,
- supply structure,
- interdependencies,
- coordination,
- positioning.

The idea of supply chain concept is coordination between supply chain elements [8].

Economic operators are able to form better and wider production and selling cooperation. The advantage of this kind of cooperation is increased probability of disposal of needless losses and disruptions appearing in supply network. The use of SCM systems brings many benefits, most important include uniting internal and external business processes of the company by using the Internet and connection with E-markets, also choice of the most profitable supplier and facilitation in forecasting the worldwide demand size and making market simulations allowing immediate reaction for client demand.

**EDI Systems:** EDI stands for Electronic Data Interchange. It is based on the work of e-mail and is independent of specific of used equipment and software. It relies on the transmission of default formatted data and documents between IT systems of one company to another. EDI combines possibilities of computer science and telecommunication. The goal of EDI system is to minimize the number of paper documents transmitted and reduce workload of data transmission. Primary advantages resulting from use of EDI system is avoidance of time-consuming preparation and sending traditional documents as well as time of order realization reduction which bonds with reducing the amount of resources, reducing transaction costs, more effective business partners contracts and eliminating errors rising from multiple data handwriting [9].

**GPS Systems:** Global Positioning System works worldwide. It is one of basic IT solutions providing package tracking. It allows to determine where the certain object is located due to satellite navigation. The use of GPS system allows to predict transportation with great probability, considerate changing fuel costs, toll charges and additional costs and also arousing client confidence, who can track where their package is. The system enables effective control of means of transportation with cargo, it calls more discipline from

drivers, who are aware of supervision, for it creates register of travelled routes and visited places, and also increases the safety of vehicles and deliveries [10].

**ADC Systems:** Automatic Data Capture is made up of systems which identify among other things people, products automatically. It is designed for gathering and entering data into computer, programmable logic controller, and also other devices that lack keyboard. ADC tools are: printers and barcode scanners, portable Palm-type computers, portable terminals, cash registers, applicators, shop scales, and also IT systems and programs.

**RFID Systems:** Radio-frequency Identification is one of the best developing automatic object identification technologies. It depends on sending data and powering electronic system which is label of scanned object, which enables object identification by using radio waves. It allows to identify people and objects which are located in significant distance as well as sending data from many places away from the computer. This technology permits to track different objects or products thanks to 'tags'. These are miniature chips, which are placed as labels on certain objects. RFID tags have got two basic types: active and passive. Active RFID tags contain battery and they can be read from longer distances. Passive RFID tags are supplied by energy transmitted by RFID reader [11].

The biggest benefits resulting from implementation RFID technology first of all is possibility of recording greater amount of information about products than by barcodes, increased product security protecting against forgery, because access to information might be limited for selected group of receivers in IT system. It gives possibility to be used no matter what, also in extreme conditions in which traditional labels fail, increases work automation and accelerates the course of logistic processes [12].

### **3. Examples of RFID implementation**

Contemporary an example of RFID implementation is Polish company Intersport Polska S. A. This company is a retailer of branded sport equipment in many shops. It was honoured for its dynamic development on the market, improvement of the market value and for reliability in running business. It owns 32 saloons located in 21 biggest towns in Poland. The basic assumption of implementing RFID system in the company was connection of this system with already running processes, especially in the context of turnover of responsive resources between central warehouse and shops. As part of using RFID system in Intersport Polska S. A. monitoring and control of responsive resources became possible to achieve. The company has possibility of continuous inspection in actual warehouse conditions also on side of distribution center and selling points, plus it has information about all atypical situations, eg. delays in delivery, wrong identification of commodity receiver. The company has flexible access to data through web network practically from everywhere. Due to this kind of functionality central warehouse workers, and also shop managers have possibility of using the system and receiving data essential to run the company: the date of expected delivery and average realization time of transportation service. The analysis of processes that occur in the central warehouse and between warehouse and showrooms was the starting point of the project, which determined main directions of functioning the RFID system. During putting system into practice three of the most important processes were analysed, they concerned about moving responsive containers. See explanatory figure below. This process are presented in Figure 2.

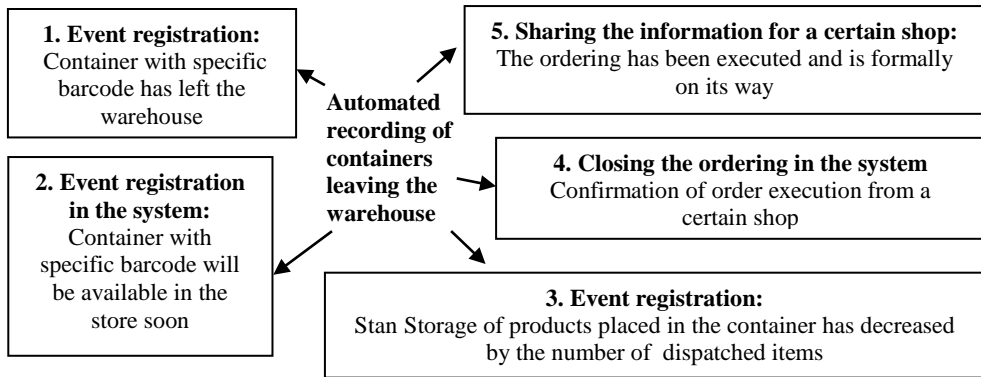


Figure 2. Process of registering containers in Intersport S. A. [13]

Benefits of using RFID system in Intersport Polska S. A. are presented in Table I.

Benefits of RFID in Intersport Polska S. A. [6]

Table I.

Benefits	Percentage
Reduction of shelves losses	from 60% to 80%
Storage compatibility	from 98 % to 99,9%
Reduction time of running continuous stocktaking	from 75 % to 92%
Reduction costs of stocktaking	from 30 % to 58%
Reduction time of incoming goods	from 91%
Increase indicator of conversion (% of visitors who bought sth)	do 92 %
Increase number of sold units during one transaction indicator	from 19 %
Increase indicator value of sales during one transaction	from 6 %
Increase in sales	from 4 % to 21 %

Due to this system the company has first of all upgraded its efficiency in resource rotation. Information gathered from the system affects its staffing policy and determines the number of workers needed to accept goods without any disturbances. This technology provides annual access to off-season sport assortment through website, which allows the company to continuously track storage and reduce eventual deficiencies.

#### 4. Summary

Reassuring E-logistics had allowed through its development to regulate, and also gain stable market situation. Many companies have opened to new markets, received access to foreign clients, and also gained the name of “innovative company” which raised up their reputation among potential and future clients. Due to E-logistics many companies have found a solution for their problems which came from constantly changing market environment. Above all E-logistics has lowered the costs connected with distribution, transportation and also costs coming from: invalid delivery of goods and services, which were the main reason why many companies have gone out of business.

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