

# **POSSIBILITIES OF USING THE ADVANCED LOGISTICS SYSTEMS IN REPUBLIC OF SERBIA**

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## ***Abstract***

Logistics includes different business activities of all enterprises, as well as other entities of the social structure, which are focused on efficiently organizing the flow of products and services from point of delivery to the place of its reception. Throughout the history, it has evolved from the traditional traffic management to the multidisciplinary scientific field. In addition to its significant penetration in the military sector, the application of logistics has expanded to all areas of civil society.

Logistics is conceived of several key activities (transportation, structures of supporting facilities, inventory management, materials handling, communication). Logistics is a system of interdependent elements. Logistics systems can be established at different levels and in different economic sectors, with the main task focused on improvement of effectiveness and efficiency in realization of product and service flows. In order to optimize these flows, companies are developing and applying modern technological solutions, based on their business concepts.

In such market conditions, companies are faced with increasingly demanding customers and it organize their logistics operations in accordance with the principles of "drawing" strategy. Despite the many benefits that this strategy offers, its application at Serbian market faces numerous difficulties, which are manifested itself through weak logistical and technical support, lack of willingness of commercial actors in establishing long term business relationships in the B2B market.

***Keywords:*** logistics systems, production flow, PULL strategy, PUSH strategy

## **1. INTRODUCTION**

The application of technological innovation in various business processes is changing basement for establishing relationships between companies in the supply chain. Implementation of modern business systems in the production process, in particular distribution, has resulted in efficient adjustment offers to customers and elimination of some functions of intermediaries. Information technology has created a revolution in the communication system between all stakeholders in the supply chain.

Through influence of the technological and information development, as well as other market factors, behavior of the final and institutional customers is modifying. Unlike traditional relations of exchange process, where buyers have passive role as payers, in modern market conditions, buyers needs and requirements are the initial point of all business processes (Center, 2010). Therefore, buyers actively participate in the process of value creation, with a totally new forms of exchange, based on establishing of long-term relationships.

Greater buyers power and lower transaction costs, in relation with reduced life-cycle of products and services, further are aggravating the position of bidders during the introduction of new products to the market. Regarding to influence of these factors, the demand becomes more uncertain, while supply is frequently changing and adapting to new requirements. In such market conditions, traditional logistics systems are not able to provide adequate support to the implementation of business processes in the supply chain, which is the reason of establishment of new logistics concepts based on the application of the "drawing" strategy ("pull" strategy) and development of long-term relationships in the B2B market. With its implementation in most developed markets, large business systems realized numerous benefits in the form of lower transaction costs, enhanced coordination, more effective information exchange, shorter delivery time and increased customer satisfaction (Prior, 2007).

## **2. SYSTEM APPROACH TO LOGISTICS CONCEPT**

Logistics as a separate activity has developed in parallel with development of human civilization. It played significant role in organization of great people migrations and numerous wars. Logistics in modern market conditions has grown into a young scientific discipline which is used in almost all areas of human endeavor. It can be defined as a set of planned, coordinated and controlled intangible activities through which are functionally combined all partial processes to overcome spatial and temporal transformation of materials, semi-finished products, knowledge, capital, people and information in a rational, unified logistics processes and flows, from the sender (point of delivery) to the receiver (point of receipt), through aim focused on how to maximize satisfaction of market demands with minimum invested potentials and resources (Zelenika & Pupavac, 2008). It consists of five primary activities (Bloomberg, 2002):

- transport - transfer of products from the point of delivery to the point of receiving through various forms of transport (road, air, water, rail and pipeline);
- structure of supporting facilities - strategic setting of warehouses and logistics centers and making decisions regarding to its number, types, and operations;
- inventory management - inventory management of raw materials, semi-finished goods and finished products and goods through marketing channels;

- handling of material - the effective and efficient transfer and packaging products;
- communication - information exchange within supply chain.

All these activities contribute to creation of additional space and time value by reducing costs and increasing product quality. Its mutual influence and connectedness, has influence on essence of logistics concept which is reflected on implementation of system-theoretical approach to study of different logistics phenomena (Roca, 2004). Thus, logistics can be represented as a system of interconnected compatible, complex, stochastic and dynamic elements (subsystems). In recognition of functional relationships between logistics elements, it should be also considered efficiency and optimization of overall logistics system.

In global, macro and micro economic systems exist numerous special logistics (sub) systems, which are operation at different levels, more or less successfully, efficiently and rationally and produce special kinds of logistic products. The most important (sub)systems are (Regodić, 2009): megalogistics system, global logistics system, macro - meta - micro logistics system, interlogistics and intralogistics systems, system of logistics services, information logistics systems, logistics management system and logistics system of sustainable development.

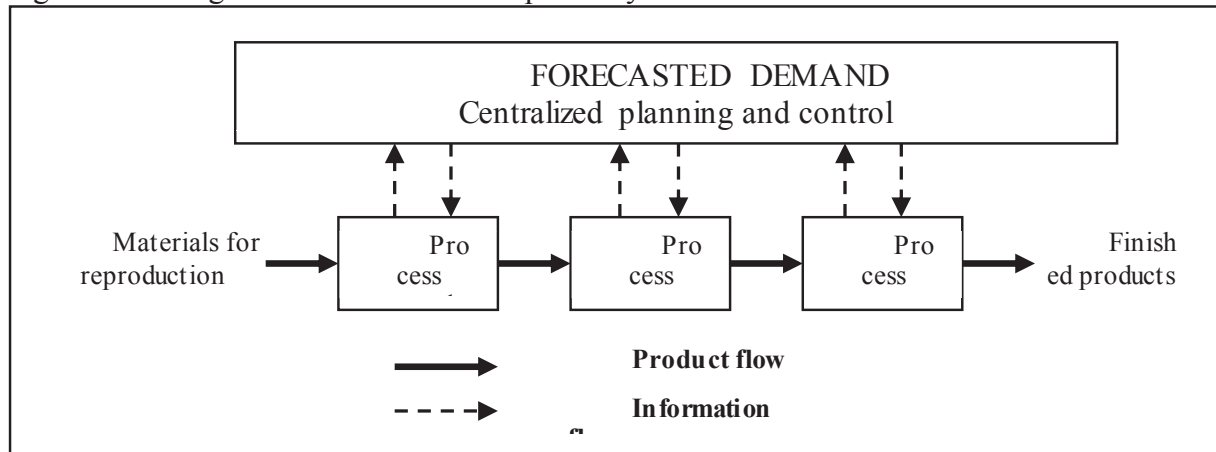
Unlike from mega, macro and global logistics which are related to planetary logistics phenomena, global and national dimensions, micrologistics system represents set of logistics activities, knowledge and resources focused on the efficient and effective achievement of company objectives. It consists of logistics of production, trade and service companies (Kalinic et al, 2009). Depending on various activity and business conditions, companies can in cooperation with its business partners, organize product and information flows through "push" or "pull" logistics systems.

### **2.1. Logical systems based on the "push" strategy**

In order to optimize production flow and efficient allocation of resources, from 1970s of the twentieth century in the United States, companies implement new logistics system, based on the use of modern technological advances. Among these systems particular place have production planning systems ("MRP I" and "MRP II" systems) and distribution needs ("DRP"). Both of these concepts are applied in accordance with principles of "push" strategy.

Basic premise for application of "push" system is reflected at possibility of more precise demand forecasting. Anticipated data on demand are representing starting point for organizing all other activities in the supply chain (it defines the necessary procedures and resources, it procured the necessary equipment and trained personnel; it implements production and distribution activities and controls all business processes and correct possible deviations) (Hagel & Brown, 2008). Figure no. 1 represents configuration of product flow in "push" system.

Figure 1. Configuration of the classic "push" system



Source: Klaas, 2009.

Set on the principals of „push“ strategy, the Material requirements planinig system (MRP I) is used for efficient production organization process and for the supply of neccesary material resources, according to forecasted buyers orders. Its implementation depends on the sofistication of software solutions, used by supply chain participants. Main steps of MRP I systemare the following (Bloomberg, 2002):

- demand forecast,
- production schedule (defining of required amount of products and time of delivery to customers),
- identification of materials and semi-finished productsl in production process and classifying it according to importance and time of use,
- monitoring of stock levels,
- issuing of orders to suppliers,
- monitoring and preparation of reports about delivery realization.

In addition to organization of internal products flow, it is important to define manufacturing and financial capacities (equipment, staff and financial), which are necessary for its implementation. For preparation of operational and financial plans, companies use special system of "planning production potential" ("MRP II" system), which is upgraded "MRP I" system.

"Push" strategy principles also have influence on organization of product flow from production to distribution centers and customers. In this case, system of "distribution requirements planning" ("DRP" system) is applied. Implementation of "DRP" system ensures greater product availability and shorter delivery time to customers.

"Push" logistics systems are primarily focused on increasing of production flow efficiency. It is based on established planed procedures, defined according to demand forecasts. However, regarding to numerous factors makes which makes forecasting and anticipation of customer response difficult, companies are increasingly implementing logistics systems which are adapted to new, changed market conditions.

## 2.2. Logical systems based on the "pull" strategy

If companies want to meet customer needs and achieve desired business results, it must consider all market changes and be adapted to new market conditions. Various factors have influence on changing of way of managing production flow. Traditional logistics

"push" systems are increasingly replaced by modern integrated concepts, which are based on implementation of "drawing" strategy ("pull" strategy). Implementation of these systems will eventually become a necessity regarding to market trends, and not only for development but also for survival of companies in some sectors. Many companies ignore the fact that future has arrived, no matter what it is unevenly distributed. Table no. 1 presents main characteristics of "pull" system.

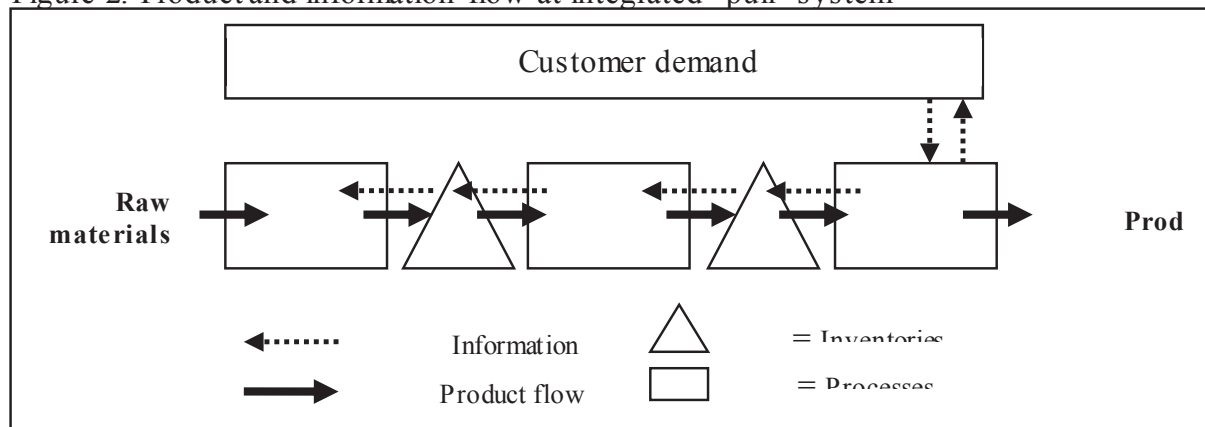
Table 1. Characteristics of „push“ and „pull“ systems

„Push“ system	„Pull“ system
Demand can be predicted	Demand is uncertain
Planning a "top-down"	The integrated approach
Centralized control	Decentralized initiatives
The procedural approach	The modular approach
The orientation on resources	The orientation on people
Inability participation	Willingness to participate
Focus on efficiency	Focus on innovation
Limited innovation	Encouraging innovation

Source: (Hagel & Brown, 2008.)

"Pull" logistics systems appear as a response to growing uncertainty in business. Its implementation does not seek to eliminate market "tension" but to find creative solutions which can meet the customer needs. Unlike the traditional approach, where success of business equals to dynamic stability, predictability and regularity, in modern logistic systems success can be reached through the process of continuous learning, changing and creating new constellations and compliance division (Roca, 2002). In such circumstances, there is a creative tension that points all employees to do the research and critical review of existing practices. Instead of centralized control system and compliance with pre-defined procedures, "pull" logistics system features modular approach of organizing activities in which are involved other members of the supply chain. Company cooperates with its partners, and it is trying to take advantage of opportunities, which can bring some uncertainty. It creates a custom value to customers through interdependent integrated process. The following figure represents the product and information flow in "pull" system.

Figure 2. Product and information flow at integrated "pull" system



Source: (Klaas, 2009.)

As the Internet represents fertile ground for implementation of various innovative solutions, integrated "pull" logistics systems are mostly implemented on Internet market. Technology development, followed by digitization process, is significantly contributing to it. Instead of waiting for producers to offer and deliver ready compilation, customers across specific web sites can also choose ("pull") songs and make the adequate solutions (Hagel & Brown, 2008). New form of distribution based on "drawing" strategy, has forced many companies (operating in the electronic market) to offer range of tools to their customers, which help them to get the desired product or service easier and faster. Customers are actively involved in value creation process and continuous exchange of information with suppliers. In addition digitized solutions, logistical "pull" systems can be used in the production and distribution of conventional, natural products, as well as in other sectors. Large numbers of companies in Europe and United States, which are engaged in production and sales of consumer goods, clothing, motor vehicles and computers have implemented integrated "pull" systems.

At the end of twentieth century, commercial actors (retailers and their suppliers), launched numerous initiatives related to potential reduce of operating costs in the supply chain through coordination of logistics activities and implementation of integrated logistics systems. Among these initiatives, the most significant is "efficient consumer response" (ECR) and system of "collaborative planning, forecasting and supply" (CPFR). Both concepts are based on "pull" logistics systems use, data sharing and establishment of partnerships in the supply chain.

### **3. APPLICATION OF «PUSH» LOGISTICS SYSTEMS IN THE REPUBLIC OF SERBIA**

For the successful implementation of modern, integrated, logistics systems, it is necessary to create an appropriate business environment that will enable companies to realize products and information flow more effectively. It is necessary to (Zelenika & Pupavac, 2008; Lovreta, 2009):

- Provide adequate logistical support,
- Achieve appropriate level of cooperation and trust between the partners,
- Provide adequate technological and informational support.

Logistics as instrument of economic development, offers specific solutions, which in a relatively short period of time can provide greater economic efficiency. Therefore, it is not a small problem that analysis of the overall economic situation in Republic of Serbia shows insufficient knowledge of real possibilities of development, which is resulting from inadequate application of basic management principles and modalities of product flows. Unlike from Germany and Hungary, where logistics is declared the third (in Germany) and sixth (in Hungary) economic branch, in Serbia it is completely neglected. This can be confirmed through World Bank report for 2010. in which Serbia took 83 place out of 155 countries in comparison of value of logistics performance index - LPI (Arvis, 2010). Lower LPI index compared to Serbia have only neighboring countries Bosnia and Herzegovina, Albania and Montenegro. Consequences of this situation are numerous and it has full negative reflection on application of modern business concepts, on which basis it could formed new integrated logistics systems. New integrated logistics systems can eliminate the unsafe, inefficient and slow managing of material goods flows.



However, unlike to most developed countries, Republic of Serbia is mostly dominated by the traditional business conditions, where buyers and sellers, driven by their own interests, seek to find way for shortest time to maximize its benefits. These companies conclude its business arrangements with focus on short-term interests, with minimal transaction costs. In such circumstances, members of supply chain are focused on bargaining over the achieved profit (Levy & Weitz, 2009). Table no. 2 represents critical factors of cooperation in "B2B" market, which are judged by companies operating at Republic of Serbia market (scores of 1-3).

Table 2. The main factors of cooperation in the Republic of Serbia business market

Item no.	Factor	Score
1.	Prices and margins	2.97
2.	Continuity of supply	2.96
3.	Quality of supply / range	2.93
4.	Professionalism	2.93
5.	Exactness	2.90
6.	Delivery Schedule	2.86
7.	Long-term partnership	2.76
8.	Exchange of information	2.75
9.	Possibility of return of goods	2.72
10.	Customization offers	2.71

Source: (Lovreta, 2009)

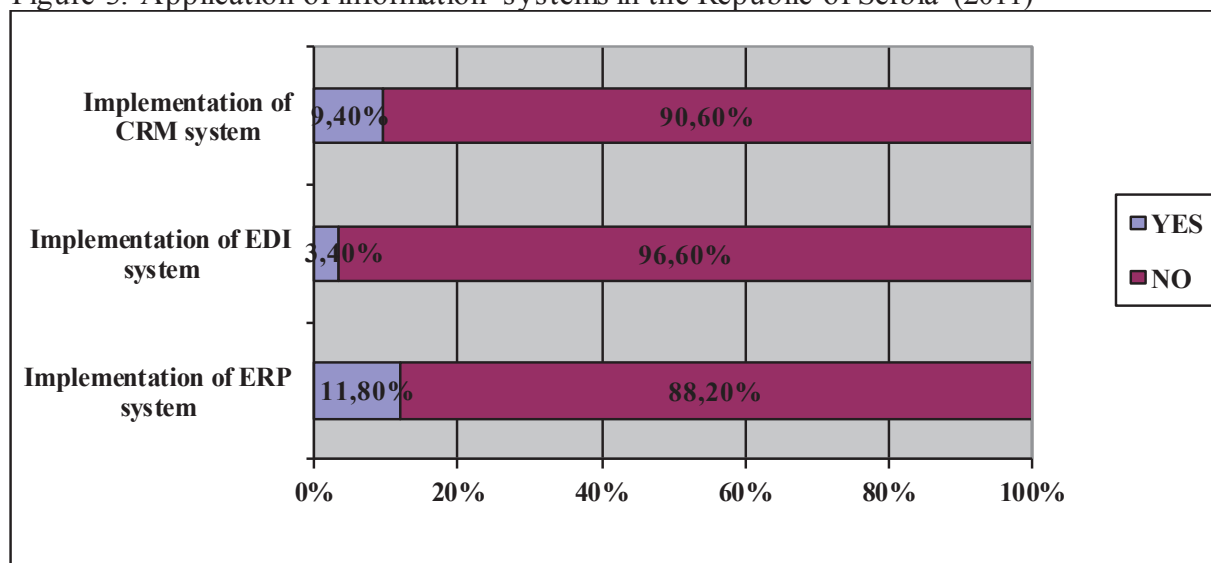
Best evaluated criteria are related to the offer price aspect, continuity of supply and quality product range. On the other hand, criteria related to the long-term partnerships, such as information exchange, return of goods and adaptation of supply, are less marked.

In integrated logistics systems, special attention is oriented to modern technology and information solutions. Its application should provide adequate information support to production flow from initial supplier to the consumer basket. Also, it provides a significant support in decision-making process and it increases efficiency and transparency of transactions, both within the company and between business partners. Through implementation of "ERP" and "EDI" system, functional (internal) and intra-organizational (external) connections can be established, and it facilitates the implementation of business processes and common goals of the company. In addition to these two systems, in order to optimize business processes and creating customer-driven values, supply chain subjects use many different software solutions, including "SCM" and "CRM" systems<sup>7</sup>. However, application of modern technological advances, including "ERP" and "EDI" information system in the Republic of Serbia is at very low level. From 98.7% of the companies in which computers are used in business purposes, just 11.8% of them use "ERP" software package to share information on sales and/or supply with other internal departments (finance, marketing, manufacturing, etc.). During 2011, only 9.4% of companies used some of the software application for managing information about clients ("CRM"), while "EDI"

<sup>7</sup> "SCM" software system can be used as an information support in the supply chain processes, while the use of "CRM" software solution allows client to create a database of customers, to realize personalization of customers, to increase monitoring and value-added goods, as well as interaction with customers after the purchase (service and customer service assisting customers, known as help Desk).

information system has been used to receive orders for products or services by 3.4% companies.

Figure 3. Application of information systems in the Republic of Serbia (2011)



Source: Statistical Office of the Republic of Serbia, 2012.

Neglect of the logistics sector, insufficient level of trust and cooperation between business partners and inadequate information support are main difficulties in implementation of integrated, logistics systems. Therefore, we can conclude that application of modern logistics systems is not simple in Serbian market.

#### 4. CONCLUSION

Logistics in the early period of 20<sup>th</sup> century has developed very quickly and it established itself in various economic fields, in broader and more subtle meaning, especially as an interdisciplinary and multidisciplinary science. Its main task lies in overcoming the spatial and temporal transformations of materials, semi-finished products, knowledge, capital, people and information in rational, unified logistics processes and flows.

In order to optimize of products and information flows at some economic areas, various logistical concepts can be applied. Globalization processes, technological development, growing competition and increasingly demanding consumers, have influence on establishment of new logistics system, based on a "drawing" strategy. In contrast to the "push" strategy, „pull“ strategy is designed as modern, business concept focused on customer whose needs are "pulling" all other activities in the supply chain.

Despite numerous benefits of pull strategy implementation such as lower transaction costs, enhanced coordination, more efficient information exchange, short delivery time and increased customer satisfaction by implementing modern logistics system, it faces with number of difficulties in the Republic of Serbia. Underdevelopment of infrastructure systems, particularly in transportation area, lack of knowledge and even more limited experience, neglecting the logistics sector, insufficient level of trust and cooperation between business partners and inadequate information support are just some of them.



One possible way to overcome the current situation and to establish of modern logistics system in Serbia is related to the improvement of the logistics sector through the announced modernization of transport infrastructure and construction of logistics centers. Development and application of modern transport technology is one of the primary conditions for the inclusion of the Serbian economy in the European exchange of goods. Also, the implementation of these technologies significantly increase the quality of service delivery and efficiency of the entire transportation system. Therefore, it can be expected future arrivals of large business system, in addition to the state sector, can also greatly contribute to the further development and improvement of the Serbian logistics sector.

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