DEMAND FORECASTING SIGNIFICANCE FOR CONTEMPORARY PROCESS MANAGEMENT OF LOGISTICS SYSTEMS

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Abstract

Today’s business market environment has got global and dynamic character. The supply chains of various industries are featured by huge streaming flows in them. The one of the results of world globalization trend is that the supply chains are getting more and more complex and the flows of material, information and finance are more and more bulky. In such business environment the companies should apply logistics management techniques in conjunction with process management approaches to reach desired competitive advantage level. They should develop logistics management system across their organizational structure and across their supply chains for effective planning, management and control in a cost and eco-friendly way. Nowadays it’s turning out that the right managerial decisions should be based on accurate demand forecast. Demand pattern drives all logistics activities in a supply chain and it’s therefore crucial for effective process management of logistics system. Within the frame of particular functional parts of a company, it can be distinguished following logistics sub-systems of a company’s logistics system – purchasing, production, warehousing, packaging, distribution and reverse material flows. The paper deals with very up-to-date topic how to effectively plan, manage and control huge material flows and related logistics activities within the frame of logistics process management of a company. For right setting of logistics measures, it’s necessary to have high accurate demand forecast of a final product, semi-finished product or raw material. Thus a demand forecasting system is fundamental tool to get initial data to make logistics managerial decisions in a right way.

Keywords: Logistics, Logistics System, Demand Forecasting, Process Management, Supply Chain

1. LOGISTICS AND ITS IMPORTANCE FOR ECONOMY

The impetuses of advanced economies are particular industries which are more or less typical for individual countries. Each industry has got its own and characterized supply chain in which the huge material, financial and information flows originate. As a result of contemporary global trend of business, the material flows are getting more and more complex and bulky. Those huge material flows it’s necessary to plan, manage and control, that’s the core of supply chain management using logistics science methods and approaches. At the present time, all elements of any supply chain, see figure 1, are affected by growing importance of international business and growing volume of material flows. [1]
For illustration, the evolution of world’s economy indicators along first decade of the 21st Century had positive growing trend, see figure 2. In the figure 2, it can be seen the global economic crisis of 2008 and 2009 which caused the total merchandise trade decline thereby also the world’s GDP decline but positive growing trend of world’s economy indicators, in the first decade of the 21st Century, is evident.

In consequence of globalization trend and increasing level of competitiveness, the companies across particular supply chains apply in their management systems process approaches. Enterprise management systems are increasingly using logistics management principles and techniques. The result is that the logistics as a science is getting more and more important and it can be classified in industrial sphere as:

- purchasing logistics or purchasing management system,
- production logistics or production management system,
- packaging logistics or packaging process management system,
- warehousing logistics or warehousing management system,
• distribution logistics or distribution management system,
• reverse logistics or reverse material flow management system.

By the globalization trend is just not affected industrial sphere but also tertiary sphere, where can be recognized very important and perspective logistics science discipline, city logistics. In context of mineral resources decrease and increasing importance of environment protection is further defined logistics science discipline, green logistics.

Therefore, the logistics science approaches to plan, manage and control, are crucial as for organizations of industrial sphere so for the organizations of tertiary sphere to make effective decisions in cost and eco-friendly way under long-term sustainable growth conception.

The increasing signification of logistics science for economy is also emphasized in scenario study “Delivering Tomorrow: Logistics 2050” by Deutsche Post DHL published in February 2012. In that study are defined 5 scenarios of life in the year 2050, taking into account essential factors such as globalization trend, economic and social development, state of the art and environment conditions. In all 5 built-up scenarios:

- scenario 1 – Untamed Economy, Impending Collapse,
- scenario 2 – Mega-Efficiency in Megacities,
- scenario 3 – Customized Lifestyles,
- scenario 4 – Paralyzing Protectionism,
- scenario 5 – Global Resilience, Local Adaptation,

the logistics science plays significant role for the economy. All scenarios have got common feature, considerably transformed role of logistics. The total demand of logistics services is growing in most of 5 scenarios but special requirements asked the logistics companies to perform are largely different. [3, 4]

Logistics is about creating value – value for customers and suppliers of the firm, and value for the firm’s stakeholders. [5, p. 13]

2. DEMAND FORECASTING

Forecasting is a process by which it’s possible to get presumption of analyse magnitude values evolution in the future. The process helps a company to be better prepared for future conditions of market environment. The outputs of forecasting process are utilizing to answer the questions such are for example:

• What will be the profit in the following period?
• What will be the demand level of given product or service in a business territory?
• How high will be the costs of final product assortment production or offered service in a business territory?
• How much financial resources a company shall have to loan in the next year?
• In which time period and in which way the loan financial resources will be paid back?

To answer the mentioned questions or for decision making process it’s needed to keep at one’s disposal forecasts of future demand or forecasts of consumption evolution. As soon as they are available, it’s possible to start the planning processes, processes to make decision or it’s possible to start management and control processes in a company.

At the present time, when the market environment trends to continual changes, forecasting process is getting more and more significant. It's necessary to ensure that the forecasting process will be constantly updated and conformed to actual market conditions to give accurate forecasts of analyse magnitude values. [6, 7, 8]
2.1. Theory of Demand

Demand pattern plays significant role during selection of forecasting methods. Various demand patterns are illustrated in the figure 3.

![Diagram of Demand Patterns](image)

**Fig. 3 Essential Demand Pattern [5, 6, 7]**

Planning system or management and control system (e.g. inventory management system) are defined by demand character. According to demand origin, the demand can be classify as independent demand and dependent demand. Further important feature of demand is its time behavior. According to this feature, the demand can be distinguished as continuous demand and un-continuous demand.

2.2. Forecasting Methods

It’s not realistic to expect that each product in line of products will be forecasted by the same forecasting method as others. For each product or production line is often necessary to select different methods for forecast creation. The forecasting methods can be classified in several ways. An example of classification can be stated as follows:

- quantitative methods,
- qualitative methods,
- intrinsic methods,
- extrinsic methods,
- causal methods.

Quantitative methods of time series forecasting utilize historical data to form a forecast. As an example can be stated simple average method, exponential smoothing method, regression analysis, Box – Jenkins methodology, etc. Qualitative methods of time series forecasting utilize experience, knowledge and judgement of experts to develop a forecast of analyse magnitude. An example can be panel consensus method, Delphi method, sales force estimate, etc. Intrinsic methods are based on data and information from an organization sources. Extrinsic methods develop the forecasts from data which are from external environment of organization, e.g. business statistics. Causal methods represent forecasting methods when the final forecast is driven by independent variables group so by factors affecting dependent variable which is demand level.

Other way to classify forecasting methods is time period determination for that the forecast is to be developed. From that point of view there are recognized 4 types of forecasts which brief description is stated in the table 1.
3. CONCLUSION

As a result of still rising material, financial and information flows across supply chains of particular industries, the companies are increasingly realized to apply progressive logistics management methods to manage. The bulky material flows represent considerable financial resources which it’s necessary effectively plan, manage and control under current competitive business environment to be successful.

In consequence of contemporary strong globalization trend of industrial and ultimate markets thereby also globalization trend of their supply chains, the companies are applying systems of process management across particular functional levels and simultaneously more and more they implement logistics principles of material flow management as a result of increasing material flows volume and complexity. As a result of rising volume of international business is an increase of flows intensity across particular logistics infrastructures – cities. That in a final effect increases the significance of logistics management principles also in tertiary sphere. Thus, the principles or approaches of logistics management under current globalized market environment are crucial to enhance a competitiveness of industrial companies in context of long-term sustainable growth and living environment protection.

The foundation of any logistics management system which is composed in common industrial company of purchasing, production, packaging and identification, warehousing, distribution and reverse material flow management subsystems, it’s progressive independent demand forecasting system gives inputs data for subsequent planning, management and control processes. An essential concept of logistics management system of an industrial company, which is based on progressive demand forecasting sub-system (methodology to create independent demand forecasting system in an industrial company under current global business market conditions, see dissertation thesis by Hart), is illustrated in the figure 4.
Basic Concept of Logistics Management System in a Company Using Progressive Demand Forecasting Sub-System

Fig. 4 Basic Concept of Logistics Management Utilizing Progressive Demand Forecasting System
[own resource; 10, p. 331]

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LITERATURE


