

STRATEGIC EFFECTIVENESS OF THE INFORMATION TECHNOLOGIES USAGE IN SUPPLY CHAIN MANAGEMENT

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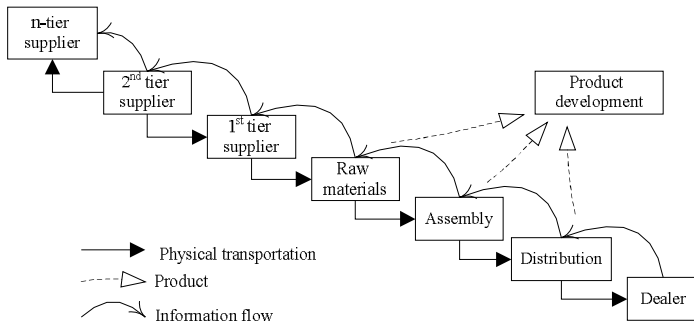
Abstract. *The high level of competition, the development of technologies, and the growth of customer requirements have led to the fact that customer requests only increase, and demand grows. The main factor in the success of supply chains is information, and the main tools are information technologies.*

Today's market is characterized by shorter product life cycles, more competitive products, and demand volatility, which makes demand during the life cycle more uncertain and difficult to predict. The development of production and technology in the 21st century has allowed global corporations to expand their business and divide production into many stages on different continents of the world. At the same time, it placed a lot of responsibility on the manufacturer due to the expectation of an increase in the level of quality of manufactured products, environmental friendliness of production and the introduction of modern technologies both in the production process and in the products themselves. This obliges manufacturers to be flexible and respond quickly to changing trends and customer needs.

Let's consider supply chain management processes in such a large industry as the automotive industry. The scope of the supply chain operates from the supply of raw materials to assemble of the finished good. The distribution process of car dealership consists of 3 focuses: the product, the supply chain and the flow of value creation. This is called a "value stream" - a new and more useful unit of analysis than a supply chain or a single firm. Supply chain for car distribution consists of functional levels, which are interrelated and form a unified chain which is incorporated in material flow, product flow and information flow. A feature of the supply chain in automobile manufacturing is its layering (Fig. 1).

Product development includes market analysis, concept development, design, engineering and production planning. Manufacturing processes and each link of the supply chain are accompanied by a flow of information that ensures the viability of the entire production. Physical transportation ensures the movement of material flow starting from the delivery of raw

materials for production and ending with the delivery of finished products to the consumer.



*Fig. 1 - Logistics chain of the car dealership center
[developed by authors]*

The organization of work with suppliers includes the formation of a reliable network of suppliers of various levels. In the production of cars, first-level suppliers are companies that supply key components, elements and assemblies for production, such as braking systems, air conditioning systems, etc. Second-level suppliers produce spare parts or other components for the product manufacturer by the first-level suppliers.

One of the most powerful leaders of automobile industry is Toyota Motor Company. In 2022, the company was the world leader in terms of the sales volume. The number of cars that were sold was 10.48 million units. Other leaders of the market were Volkswagen Group, Hyundai Motor Group and Renault-Nissan-Mitsubishi. [1]

Toyota Company has developed its Toyota production system (TPS) in the late 1940s in its engine shop. [2] It was fully developed and applied across Toyota's manufacturing operations by the late 1960s. Then, for the first time, it was written down and group was formed to teach it to Toyota's first-tier suppliers, who were all members of the Toyota Group. By the mid-1970s the TPS perspective had spread to its other first- and second-tier suppliers in Japan primarily through their supplier associations. After the merger of Toyota's manufacturing and sales companies in 1982 they began to apply the same logic to the aftermarket parts operation in Japan. This took from 1984 to 1990, after which the logic began to be spread to overseas parts suppliers (of original and replacement parts), and to the aftermarket distribution systems abroad. Womack and Jones [3] studied the transformation of Toyota's parts distribution system (Fig.2).

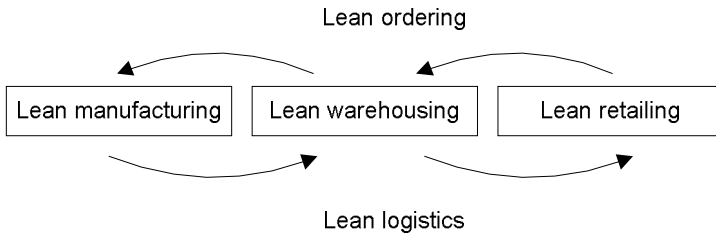


Fig. 2 - Downstream lean value stream [3]

The basis of the modern development of supply chain management is increasing the value of information. The use of information in supply chains is aimed at ensuring a quick and correct exchange of information between partners about real and forecasted demand from customers, about changes in stocks, about transport and storage capacities. The purpose of such an exchange is to replace physical stocks with information about them. With the help of information technology tools of supply chain management, today it is possible to perform most of the functions related to the solution of tasks related to the management of the entire supply chain.

A management system of any level of complexity can function only if information circulates in it, and therefore the management process, in particular the organization of logistics chains, is primarily an information process that ensures the performance of the functions of collecting, transmitting, processing, analyzing data and making informed decisions on based on the received information.

The information needs of the supply chain arise in accordance with the sequential implementation of the stages of order implementation: demand, order, stock status, production, delivery, qualified personnel, purchasing department, control of order fulfillment, planning, solving operational problems, the guarantee of the fulfillment of which in the parameters "quantity-quality- price-place-time" completely depend on the presence of an integrated information system of all links of the logistics chain (suppliers, manufacturers, distributors, carriers, logistics operators), and on all resources (material, financial, human, information).

Current applications demonstrate that companies that produce goods can expect to reduce total supply chain costs by 5% or more by applying plans created using a modeling system [4]. Modern information systems used in enterprises include such as ERP (Enterprise Resource Planning), MRP (Material Resource Planning), DRP (Distribution Resource Planning), etc. Hierarchy of supply chain information systems is presented on the Fig. 3.

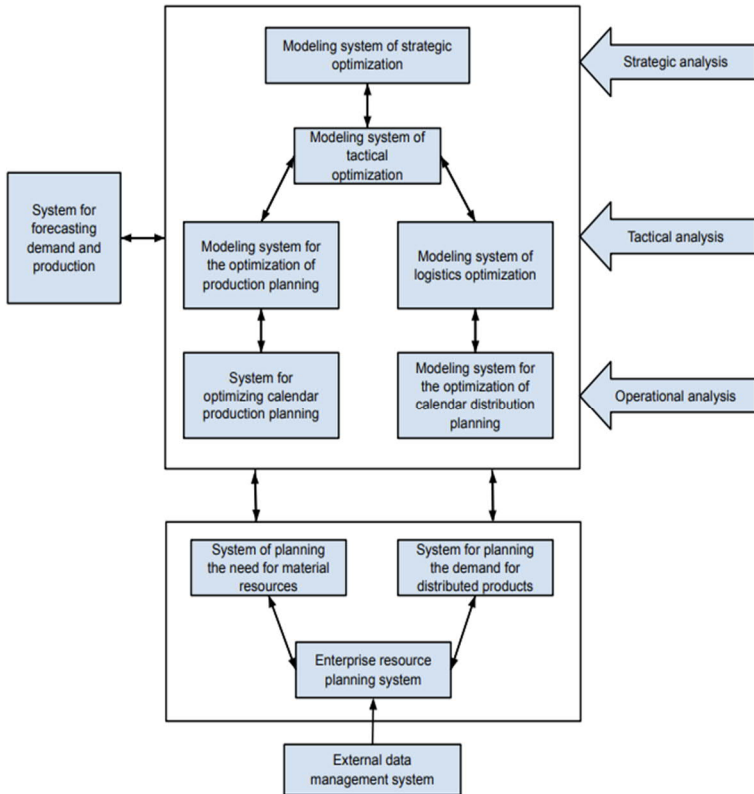


Fig. 3 - Hierarchy of supply chain information systems

To simplify the exchange of information within the company, information systems are implemented. Control of logistics business processes is a technological means of implementing the business process management policy. The control procedure includes accounting of cash stocks in a specific warehouse and regular tracking of their receipt and expenditure. There are two levels of controlling: strategic and operational. Strategic controlling is aimed at ensuring the long-term functioning of the enterprise. The purpose of strategic controlling is to evaluate and adjust decisions depending on the factors of the external environment. Operational controlling is aimed at achieving the planned level of income. This type

involves creating and maintaining the planned level of efficiency of business processes, monitoring the achievement of the organization's current goals, and adopting operational regulatory influences. The main difference between strategic and operational controlling is that the strategic one focuses on the trends of the future period, and the operational one - on the current period.

Conclusion

In today's world, it is impossible to ensure the quality of goods and services required by consumers without the use of information systems and software complexes for analysis, planning and support of commercial decision-making in logistics chains, which allows automating typical technological operations. Thus, logistics has become the dominant form of organization of goods movement in the highly competitive markets of economically developed countries. Based on the analysis of supply chains, the key element is the development and implementation of a strategically beneficial management system for both finished products and initial materials in the supply chain based on the principles of logistics, which, in turn, will allow the consumer to improve quality, reduce costs, and shorten time supplies, increase product competitiveness, and on the part of the supplier - improve sales, form long-term agreements, implement reliable forecasting, ensure profit growth.

References

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