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MANAGEMENT OF THE PHYSICAL DISTRIBUTION OF FOODS ON THE MARKET

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***Abstract*—**The globalization of economic flows, in addition to circulation of goods raises important and complex task, which means that the products, whose place of production and consumption do not coincide, as quickly and safely to be delivered to the user. Terms and length of transport of most material products have a major and often decisive influence on the actual level of quality at the time of its arrival to the ultimate user. However, the storage conditions of the product and the way how they're stored and transport affect on the preservation of the product integrity, ease of manipulation, rational use of storage capacity and transportation equipment, work organization, distribution costs, etc. The data show that more than 50% of losses incurred by spoilage of the products can be avoided by selecting appropriate preservation conditions, storage, transportation and packaging. The aim of this work is to offer a model of management of material goods transportation for all participants of trade in goods that basically their work is based on transport activity. The model is particularly applicable to the business of small and medium-sized companies that are engaged in transport services.

***Keywords*—**Elements of physical distribution: Decision-making on transport, storage, stocks.

I. INTRODUCTION

PHYSICAL distribution has a large number of tasks that can be condensed into one basic that expresses its fundamental purpose: to minimize costs while maximizing customer service. This basic task expresses tendency towards a certain ideal solution. However, lower overall costs and higher service level of customers almost always are mutually excluded. For example, achieving a higher level of customer service means that the physical distribution marketers will work with the multiple warehouses and in every warehouse will always be large stores in order to meet quickly the local customers' orders. In relation to this, marketers should have ready a certain fleet of vehicles that can deliver goods to customers within a few hours after receiving their orders. Contrary to maximizing customer service, minimizing of total costs means the use of few warehouses, holding of small stores and use of cheaper means of transport.

At the same time achieving both requirements such as: to minimize total costs and maximize customer services, are mostly impossible. Certain compromises related to the realization of both requirements are indispensable. In seeking the realization of ideal solutions, managers of physical distribution must operate with real tasks and perform certain balancing of actions in the process of distribution.

Managers and marketers of physical distribution can design and develop reasonable tasks if they start with marketing concept. As it's known, the marketing concept requires the managers to focus their attention on increasing customer satisfaction when planning and carrying out any marketing activity, including the physical distribution. Thus, the physical distribution should be designed so that it meets the requirements and needs of customers. In addition, distribution costs should be, as well as other elements of the distribution system, evaluated from the standpoint of customer demands. If the market analysis shows that the customers are the most interested for faster delivery, this means that you should make another step in the marketing research and determine how customers are willing to pay a higher price for such kind of service. Therefore, the marketing managers, who deal with the physical distribution, must research and identify how customers see the problem of harmonizing the maximum services and minimum of total costs and what physical distribution policies use the competing firms. And in this field marketers need to create certain differential advantages over the competition.

Management of physical distribution implies, in a nutshell, decision-making on selection of individual elements and their combination in the overall system of physical distribution. In the physical movement of products from manufacturer to final customer, we can separate six essential elements or activities. Managers of physical distributions must consider their mutual relationships and individual contribution of each individual activity in the entire system of physical

distributions. These are the following basic elements, or activities, of the physical distribution systems [2]:
1. transportation,
2. storage,
3. control of stores,
4. handling of goods,
5. processing of orders and
6. packaging.

II. DECISION-MAKING ON THE BASIC ACTIVITIES OF PHYSICAL DISTRIBUTION

Decision-making on transport includes the selection of specific solutions to be used for the physical transfer of the product from manufacturer, wholesaler or other seller to the receiving capacity of the buyers. The main alternative transportation solutions include: truck, air, railway and water transport. One of the benchmarks of their comparative importance is the rate of their participation in the realization of the overall transportation on the national and global international level.

In addition to alternative transportation solutions, transportation managers need to think about an exchange in which they participate in the distribution process. Primarily they have to think about the needs of customers. If it is particularly difficult, or expensive, meeting their needs, managers must examine the willingness of customers to afford additional costs to meet their needs. They have to think also about the nature of the product (size, perishability, weight, fragility), the necessary speed and reliability of delivery, the costs and availability of transportation methods and storage space. Available alternative solutions must be evaluated from the perspective of these variables due to efficient choice of transport services [1].

Decision-making on storage includes three fundamental decisions. The first relates to the choice of storage types, the second to determine the optimal number of storage locations and the third to determine the level of inventory which will be kept in storages. In making the mentioned decisions it is necessary to find an adequate compromise between the requirement to minimize the costs of storage and a satisfactory range of services to customers.

Storage is a physical facility that is used primarily for storage of goods necessary for the anticipated sale or transfer of goods within the distribution channel. Storage contributes to minimizing the shortage of goods in stock caused by the difficulty in predicting demand or discrepancies between production and consumption. Decision-making on selection of storage types includes two important decisions. The first relates to the choice between private and public storages, and other to the choice between central and local storages [4].

From the standpoint of property rights we can vary two widely represented types of warehouses: private and public warehouses. Private warehouses are owned or leased by the buyer or reseller – members of the distribution channel. Public warehouses are specialized service executives of storage and handling of goods that usually their storage space lease to businesses on the basis of monthly contract payment compensation in the form of fees of storage and fees for handling of goods.

Private warehouses are particularly important when products require special handling and storage, as is the case with the perishable products. Private warehouses, also manifest a greater understanding of the company commitment to specific products or geographic regions. The manufacturer or the reseller will use private warehouses when there is little seasonal variations and when the demand of goods is relatively stable in the geographical area which will be served by the storage. Compared with the public, private warehouse secures marketers greater control of special storage conditions and special handling of goods. Private storage can be used as a regional sales office of the company. It also allows the development of better communication links between suppliers and customers. The main disadvantage of private warehouses are large capital investments in storage facilities and equipment.

One of the most common types of private warehouses are the distribution centers. Distribution centers represent the main storage capacity in private ownership which serve regional market by consolidating the delivery of a large multi-suppliers with a large number of small orders of local customers. Suppliers deliver goods to distribution centers than to factories, agents or retailers. The benefit of this kind of distributions are:

1. Less stores in the distribution centers than in warehouses of the customers,
2. Greater ability to obtain volume discounts in purchasing, and
3. Making the benefits introducing special purchasing opportunities, the greater possibility of warehouse business automation and lower costs of storage and transport .

The use of a private warehouse provides the resellers direct delivery of goods and delivery from the unloaded ramp or dock. Direct delivery reduces the need for a large storage space, reducing the costs of loading and unloading and reduce the time between ordering and delivery of goods.

Public warehouses are particularly useful for supplying customers in new geographic markets, when seasonal demand cannot be satisfied using private storage of the company, when demand for goods is instable, or when company wants to use selected

products as collateral for certain loans. The usage of public storages contribute to reduce investments of the company in the capacities of physical distribution.

Decisions on the choice of selection and size of storages, that are available to marketing managers, can be spread between two extreme strategies as their different combinations. In one extreme case, the manufacturer may perform large supply to the warehouses with enormous capacity that are located in the vicinity of the manufacturer. From these large warehouses delivery is made in small quantities to retailers and/or other customers [5]. According to the other extreme alternative strategies manufacturers can exert a relatively large supply to various remote storages with lower capacity that are located close to customers. The basic function of these warehouses are to provide services to the local customers. These two extreme strategies, among which there are other possible combinations of choices, are illustrated in figure 1.

Each of the possible alternative storage has certain advantages in costs and services to customers in addition to other alternatives. In the first case, the use of several large warehouses located near the manufacturers can bring a large scale economies and other benefits, but also contribute to the reduction of certain services to customers. In the latter case, the location of storage facilities close to customers have a great sales attraction, but includes the operation with a large number of storages and work with small shipments, because the local warehouses serve only to local markets.

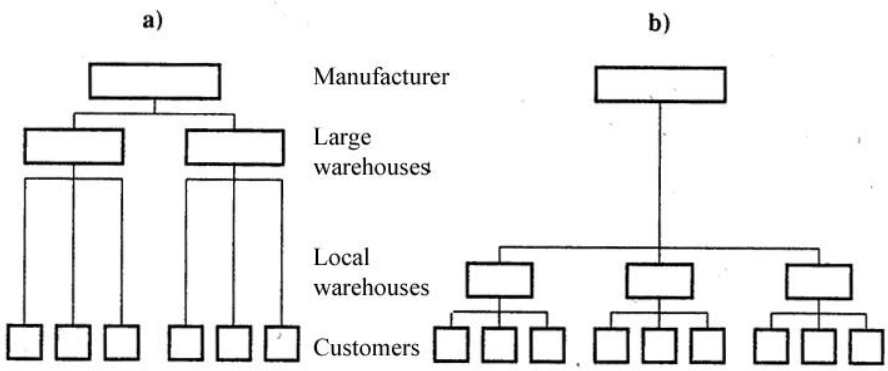

Fig. 1. The usage of storages: a) with a large capacity delivery
b) with a small capacity delivery
Source: Milenković, B.,Kasnali marketinga, UBK, Beograd, 2001.

In decision-making about the choice of storage locations is necessary to possess information related to reaction of customers to different level of speed and reliability on execution of orders. The possibility of a certain warehouse to respond to 20% of orders within 24 hours, and the remaining of 80% orders within 72 hours, is given in a specific location in the network storage. The best location warehouse is the one that maximizes customers service, provide a company differential advantage compared to rivals and minimizes costs. Finding such location is very difficult. Managers of physical distribution must use the appropriate marketing strategies as a guideline for finding the best position for storage. If the strategy provides priority to maximizing customer service, then considering of costs may be relatively less important. When the strategy insists to minimize costs and lower prices to customers, then the costs will be the most important variable in the decision-making process on storages.

One of the key decisions in the process of inventory management is to select the species of stock for a specific product, product line, geographic region or type of customer. Selection may include one or a combination of several types of stocks. Alternative type of stocks could be [4]:

1. Process inventories
2. Stocks of major goods parties or stocks of cycles
3. Safety stocks
4. Seasonal and harmonizing inventories and
5. System supplies "in time".

Process inventories in the distribution channel are the inventories in transit. These inventories are necessary to bridge the time needed to move the commodity stock from one to another member of marketing channel. The company can reduce inventory process by locating warehouses closer to customers, using regional instead of central warehouses and choice of transport that can shorten the delivery time.

Stocks of major party goods or supply cycle are formed when the company produces, sends or procures certain products in large quantities than its current needs. Companies are buying more stocks in order to achieve economies of transport, quantity discount in the purchase, the greater level of bargaining power or reduction of purchase costs per unit of goods [6].

Safety stocks are used to neutralize outcomes of the

anticipated variations in consumer demand or unforeseen delay of suppliers in delivery of goods. The main function of a safety stock is to avoid stock shortages. The company can reduce the safety stocks applying the computer control system of stock level, using reliable sources and modes of delivery and choice of suppliers with higher quality control.

Seasonal and adjusting inventories reflect the temporal and quantitative discrepancies between production and consumption. Stocks of many easily perishable products can be increased in the summer months, and sold throughout the year. Minimization of seasonal and adjusting inventories can be achieved by overtime and extended work in production [3].

None of the mentioned types of stocks do not reflect the stock used in production or supplies required for the sale of goods. These types of inventories indicate that quantity of product in stock must be higher than necessary due to the need for [5]:

1. Inventory in transit (process inventory),
2. Bargaining power (large stocks of commodity parties),
3. Reducing the impact of uncertainty in supply and demand (safety stocks) and
4. Due to the need to mitigate seasonal and other discrepancies between production and consumption (seasonal and adjusting inventories).

Each of these stocks can be reduced by using a system of inventory "in time" and inventory system for rapid response.

The system supplies "in time" endeavors to minimize inventory investments using frequent deliveries and smaller average deliveries from a group of small suppliers. This system is called the system of stocks for rapid response. It is clear that excessive inventories are harmful. Moreover, inventories can be viewed as a means of masking problems in procurement (poor quality of suppliers or poor performance of supplied deliveries) and in production (large stocks cover high fixed costs of production regulation).

The system supplies "at the right time" or system supplies for fast response, is based on:

1. tracking of inventory and sale at the level of items,
2. the use of high technology,
3. product packaging at the customers level and
4. availability of goods ready for use or sale directly from the dispatch container.

The use of new technologies such as: coding, testing at the point of sale, marking of goods in dispatch container, electronic data interchange and the like, is essential for effective communication of sales data and documents between resellers and suppliers. The product packaging at the store level eliminates large supply of retail distribution center, repacking of goods and delivery of goods to different stores. The system supplies "in time" has four important characteristics [7]:

1. orientation of strategy attraction
2. flow of inventory,
3. marketing partnership and
4. locating bidders near important customers.

The system supplies "in time" is focused on attraction strategy, unlike of traditional inventory management system that is focused on the strategy of pushing. The strategy attraction encourages production to respond to the current demand, while pushing strategy encourages production to respond to anticipated demand. In the system of attraction materials will not be produced until they are required from organization center of operational production. On the contrary, in the traditional system of pushing, parts are produced as designed and delivered to the next production or sales organization for its intended use. The traditional pushing system requires safety stocks due to poor estimates of demand and anticipated failures of machines.

The character of inventory flow "in time" addresses to high degree of cooperation between the buyer's requirements and seller's production and delivery. Instead of the production process main efforts must be focused on the flow of supplies. This means that stocks of large goods parties, long time of preparation, a high percentage of scrap in the production and sale and large delays in the use of machines have no place in the system of stocks "in time".

Partnership marketing has several characteristics that are also important characteristics of the inventory system "in time". These are: the long-term contracts between suppliers and customers, several vendors that serve manufacturers and resellers, the exchange of information on inventories and sales between suppliers and customers and the buyer's transport control [8].

Locating of bidders near the main buyers is essential in the system stock "in time" due to the fact at the buyer's location there are no safety stocks. Nearness of bidders contributes to reduce variations in the time of delivery. Nearness of bidders, also, creates a sense of buyers that the bidder's capacities for delivery are integral parts of his factories. For the successful functioning of the stock system "in time" an enormous significance have timely deliveries, perfect quality of semi-products and final products, efficient handling of materials, constructed plateaus and dispatch ramps for arranging the direct shipping.

The system supplies "in time" has many advantages and few disadvantages [9]. As important advantages could be highlighted: reduction of investments in stocks, reduction of costs to hold stocks, increase in sale range due to small shortages of goods in stocks, reduction of need for lowering of price, reduction of number and size of storages, better response to current trends in sale, higher quality control of stocks, efficient reaction to

changes in demand, faster detection of failures and less need for paper documentation. Among the shortcomings of the stock system "in time" most often are emphasized: the inability to apply this system in the distribution of high seasonal items whose sales are difficult to be predicted, high costs of dispatch and transportation.

III. CONCLUSION

As a key trend in goods flows of foods production appears physical distribution. Management of physical distribution means to decide on key decisions related to activities of: transportation, storage, stock control, handling of goods, processing of orders and packaging. Alternative solutions about packaging include the choice of transport model and mode of the most adequate protection of products considering size, perishability, weight, fragility and the like. Decisions on selection of choice and size of warehouses means optimal decision related to costs, a range of economy, capacity and species of used warehouses. Handling of goods is an essential trend of physical distribution where are expected optimal decisions in connection to keeping and handling of inputs and stock control of finished products and removing of incorrectly produced outputs. In the process of decision-making on packaging of products an actual trend remains the qualitative packaging. Decision-making on packaging must respect a need minimizing the difficulties in handling of goods as well as specific requirements of the customers and products for more effective shaping of products.

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