

ECONOMIC ASPECTS OF LOGISTICS DEPOSITS

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Abstract:

The purpose of this paper is to describe warehouse economy logistics. The research has been carried out within the frame of a project that examined the economy for a business of warehouse logistic. Warehouse management systems is based on such factors as statistics and trends. This article examines the feasibility that arise while trying to organize and optimize its transportation economy. Also, economic aspects of other logistics procedures like collection and warehousing, are analysed.

Key words: Logistics goods, logistics deposits, automated storage systems

JEL classification codes: L23, L91, M21

1. Introduction - conceptual approaches to logistics goods

Logistics plays an increasingly important role in companies' activities, being a permanent connection with the manufacture, sale, marketing and customer service. By organizing a logistics activitie, this function can make a real contribution to the growth of the company. Logistics include two categories of core activities and supportive. The main groups of activities within the logistics are logistics activities functional regarding security of supply, storage, design and organization of flows, programming flows and maintenance and logistics business operational, which covers all handling activities, transport, handling, control, maintenance flows etc.

In the current business environment, as in the future, it is not advisable for companies to implement and execute those strategies aimed only fulfill marketing plan with the lowest possible cost. More and more practitioners and mentors in the conceptual states that logistics is a real source of competitive advantage. By reconsidering the strategy of logistics services for customers, the organization can meet a higher level expectations of business partners.

Logistics occupies a unique position within the company that allows it to coordinate relations they influence both the flow of information, and on the goods, with the ultimate aim execution of orders received. The flow begins when the client decides to make an order and ends when the order is fulfilled.

Today, logistics departments are present in the organization charts of many large companies in Europe, UK and the US, along with the departments of marketing, production and finance. Companies who believes that the only purpose of any business is serving the customer understand the strategic significance of logistics in the process.

In Romania, this function has been realized relatively recently, and in most cases, both in private companies and public sector, "rings that form the supply chain" are managed in isolation, being absent integration between the various logistics functions.

Important component of the economic activity of businesses in the retail, distribution of goods has recently become an important function by transforming the enterprise in terms of practical and scientific coverage and transition to the broader concept of freight logistics.

2. Deposits - classification and location rules

Merchandise warehouses are storage or storage points respectively, located along the physical path of a product from manufacturer to end user. It has to distinguish between the concept of deposit and the warehouse. It is estimated that the warehouse is storage for raw materials in general good under processing or use, while the deposit is to keep in perfect safe qualitative and quantitative goods for sale to customers.

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Deposit can be defined notion of economically and technically. From the economic point of view, the deposit base unit is in the process of technical and material supply includes all stocks of materials or finished products stored within the enterprise to supply uninterrupted supplies to beneficiaries.

From a technical standpoint deposits consist of entire buildings or areas specially equipped with machinery, facilities and equipment necessary to carry out various operations, in order to preserve materials or finished products.

Depending on the form of ownership, deposits can be: the producer, wholesale trade, retail trade or of trustees.

The importance comes from the fact that deposit on their side now can take action to reduce costs and inventory and upside profitability through higher levels of service to customers as a result of the application of modern techniques serving.

Over time, the emergence of modern sales techniques just-in-time storage pregnancy decreases the importance of increasing the constant movement in a time of increasingly shorter and better conditions all resources to customers. While deposits increased importance because, in addition to storage function, they acquired the reception function and delivery of orders, especially by electronic means, which leads to transformation into a warehouse distribution center.

The number and location of deposits are determined by the spatial coordinates of customers and production facilities, and products particularities.

A deposit will be set on a particular location, unless generate favorable effects in marketing and sales and reduce total costs

3. Automated storage system

Next a description to an automated system for storing different product categories and its virtual prototype. The storage system AS-RS (automated storage and retrieval system).

AS-RS systems consist in a variety of items controlled automatically placing or retrieving products from storage areas defined. [1]

These systems are commonly used in applications where: there are a number of products moving in and out of the storage; density storage spaces is important because of constraints due to space; accuracy is critical due to the potential damage that may occur on products;

AS-RS systems can handle both products stored in standard and non-standard units (eg stacks of boxes on pallets standard), just like in the following figure.

Systems of the type shown above (Figure 1) share the deposit in three areas:

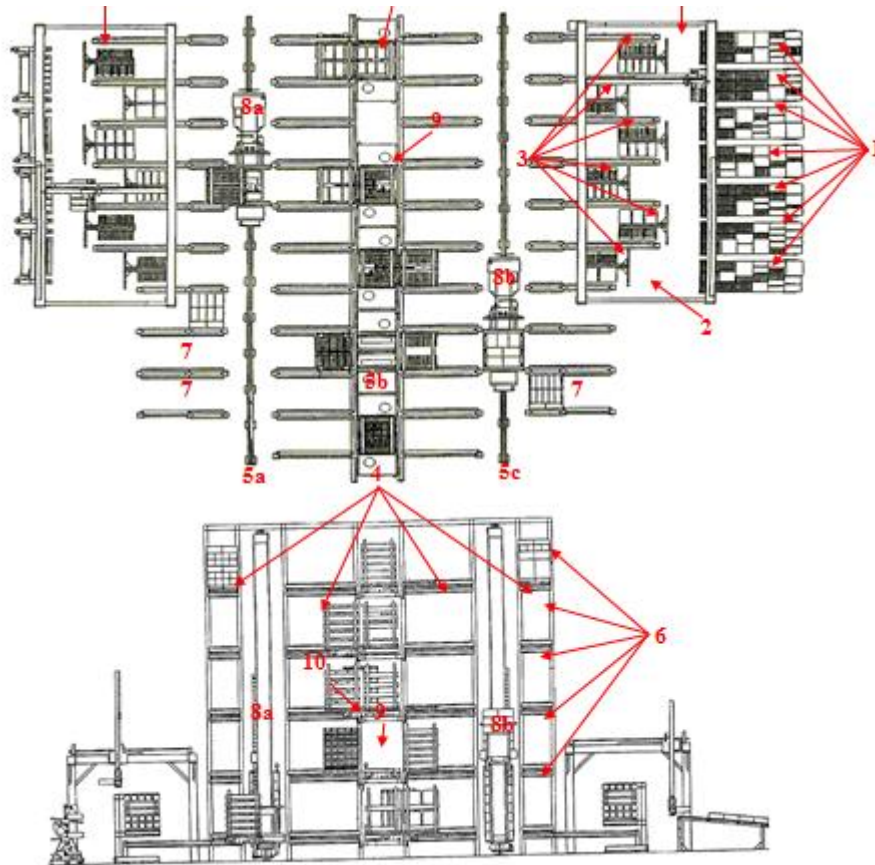
- I. A loading area;
- II. A storage area;
- III. A download area.

Cargo area is made up of accumulation conveyors 1, palletizing system of double Portal 2 and stationary storage devices 3. Stacks products are formed and placed on fixtures, where they will be taken over by a transport device type shuttle .

Storage area shows several vertical racks 4, lanes divided by vertical 5. vertical racks are divided horizontally into six different levels, each level being divided in turn into areas for storage of products 7. Lanes vertical (a, b, c) are used to transport products stacked to be stored or retrieved from racks.

Automated vehicles cross the aisles between racks of storage. Vehicles transporting goods from the loading of the storage area and then unloading area. The products are transported being placed on pallets in a stack.

Figure 1 – Storage system



Exterior corridors 5 (a and c) moving an automated mobile crane type 8 (a and b), which can perform translational movement horizontally along the aisle, and vertical translation movement. Inside track 5b is divided into 5 levels, each level featuring a transport system type mobile cart 9 and moves itself. Both the 2 mobile cranes, and cart-type systems shows horizontal platforms designed to store type system ensures takeover shuttle 10 respectively storing stacks of products.

The whole movement of goods in and out of the storage area is controlled by an electronic inventory. This system monitors controls the routes to transport stacks of products. The controller provides storage and stacks after taking algorithms such as first in - first out (FIFO) or last in - first out (LIFO).

Download area presents a more fixed storage devices 3, which will be taken over stacks of products using other instruments for transport. Storage system shown in Figure 1 consists of several subsystems operated electro-mechanics, each with its own role (storage, transport, transfer). System components are presented in Table 1.

Tabel 1

System components

No. Crt.	Name	Number
1	Conveyor feed	21
2	Palletizing System	1
3	Fixed storage devices	10
4	racks	4
5	Transport corridors	3
6	Storage levels	5
7	Storage products	290
8	mobile cranes	2
9	automated cart	5
10	shuttle system	5

4. Case study - MACROMEX

The company that makes the study of this project is called S.C. Macromex S.R.L and is headquartered in Bucharest, str. Mihai Eminescu, nr. 27, sector 1.

Macromex was established in 1993, in a difficult time of transition from a controlled economy to a truly democratic, which is characterized by competitiveness, not least performance and professionalism.

Similarly, the company Macromex aims in the immediate future, strengthening its position as a dominant player Macromex Food Service in HoReCa sector.

The expanding operation in countries neighboring the EU is also on the priority list of Macromex. The first countries where Macromex opened subsidiaries are Czech Republic and Slovakia, but the list remains open.

The products are imported from companies in Europe (the Netherlands, Spain, Belgium, France), USA, Brazil and Canada, Macromex the sole distributor in Romania of some international brands such as: President, Societe, Philadelphia, Linco, Dujardin, FarmFrites Royal Greenland, Guseppe, Sadia.

Customers of this company are many, namely over 6000. Macromex is allied with them in the fight with the biggest competitor that they have: TIME. Customers are the most important: CORA, XXL, Penny Market, Kaufland, Matrose, Carrefour, Selgros, Auchan.

In essence, transport involves carrying out the following activities:

- choosing the most appropriate mode of transport (road, rail, sea, air, through pipelines);
- Evaluation and selection of bidders transport services, which the company calls;
- strengthening transport;
- establishing transport routes;
- timing of shipments.

Macromex has developed an infrastructure extremely effective based on the material, human and integrated systems IT enabling tracking activity step by step and provides flexibility by linking all processes in order to obtain permanent lowest cost depending on each situation. Routes are determined by a software tool that depending on the point of delivery and the delivery schedule agreed with clients, establishes the dynamic optimal route. Basically the organization in the field of resources and the implementation of work procedures creates one of the most important advantages of Macromex: the most efficient distribution network in Romania.

Direct distribution of products has the following advantages:

- products are shipped quickly and directly from the company to customers, reaching fresh to them;
- transport company ensures optimum transport products;

Macromex have an auto park with 160 trucks, including 70 trucks and vans of ultimate generation with miscellaneous dimensions, most important of them have refrigerated spaces with two temperatures, realizing dynamic allocations of trucks and optimizing routes, using digital maps incorporated in ERP sistem, processing commands in real time, selection and application of filters on data base with monitorizing of payments on every location; manipulation, transport itself, storage with immobilizations and loses.

We suppose as Macromex imports 2 tons of congealed fish from Nuuk, Groenlanda, at logistic center from Bucharest, choosing 2 methods of transport: firstly, the chosen transport is road, and secondly case the transport is secured by a ship at Constanta, after this the goods is transported road at storage from Bucharest.

The transport cost is calculated by:

$$CT = C_a + C_m + C_t + C_d + C_i + C_p$$

1. Transport rutier (unimodal)

a. $Q_m = 2$ tone

$$P_a = 10 \text{ euro/buc}$$

$$n_e = 30$$

$$k = 1,25$$

$$C_a = \frac{100}{Q_m} * \frac{P_a}{n_e} * k$$

$$C_a = \frac{100}{2} * \frac{10}{30} * 1,25$$

$$C_a = 21 \text{ euro/t} * 2t = 42 \text{ euro}$$

b. $n_m = 2$

$$p_m = 3 \text{ euro/t}$$

$$n_{tr} = 2$$

$$p_{tr} = 2 \text{ euro/t}$$

$$I_s = 0,5 \text{ t}$$

$$C_m = n_m * p_m * \frac{n_{tr} * p_{tr}}{I_s}$$

$$C_m = 2 * 3 * \frac{2 * 2}{0,5}$$

$$C_m = 14 \text{ euro/t} * 2t = 28 \text{ euro}$$

c. $C_{tmi} = 0,5 \text{ euro/t/km}$

$$D_{tmi} = 5000 \text{ km}$$

$$C_t = 0,5 \text{ euro/t/km} * 5000 \text{ km} = 2500 \text{ euro/t} * 2t = 5000 \text{ euro}$$

d. $C_d = 0$

e. $V = 5000 \text{ euro}$

$$d' = 8 \%$$

$$T_t = 6 \text{ zile}$$

$$C_i = \frac{V + d'}{365} * T_t$$

$$C_i = \frac{5000 * 0,08}{365} * 6 = 7 \text{ euro}$$

$$f. C_p = \frac{2}{100} * 5000 = 100 \text{ euro}$$

$$CT = 42 + 28 + 5000 + 7 + 100 = 5177 \text{ euro}$$

$$CT/kg = 5177/2000 = 2,6 \text{ euro} \cong 10 \text{ lei/kg}$$

2. Shipping and road (bimodal)

a. $C_a = 42 \text{ euro}$

$$b. C_m = 3 * 3 * \frac{3 * 2}{0,5}$$

$$C_m = 21 \text{ euro/t} * 2t = 42 \text{ euro}$$

$$C_t = C_{tmn} * D_{mn} + C_{tmr} * D_{mr}$$

$$c. C_t = 0.2 \text{ euro} / t / km * 4000 km + 0.5 \text{ euro} / t / km * 250 = 925 \text{ euro}$$

$$C_t = 925 \text{ euro} * 2t = 1850 \text{ euro}$$

$$d. C_i = \frac{5000 * 0.08}{365} * 14 = 15 \text{ euro}$$

$$e. C_p = \frac{2}{100} * 5000 = 100 \text{ euro}$$

$$CT = 2049 \text{ euro}$$

$$CT/kg = 1,03 \text{ euro} \cong 4,2 \text{ lei} / kg$$

Table 2

Two variants calculated

Variant 1 (unimodal)	Variant 2 (bimodal)
$C_a = 42 \text{ euro}$	$C_a = 42 \text{ euro}$
$C_m = 28 \text{ euro}$	$C_m = 42 \text{ euro}$
$C_t = 5000 \text{ euro}$	$C_t = 1850 \text{ euro}$
$C_d = 0$	$C_d = 0$
$C_i = 7 \text{ euro}$	$C_i = 15 \text{ euro}$
$C_p = 100 \text{ euro}$	$C_p = 100 \text{ euro}$
CT = 5177 euro	CT = 2049 euro

At final, will be choosed the variant 2 because generate lowest transport costs then roading transport, the naval transport is more cheaper than all options.

Figure 2 - The variant chosen



From the perspective of logistics profitability, the stocks own a critical weight in a ensemble of costs, about the management of stocks, through the main activities realised by logisticians, sign up:

- developing policy about stocks of raw materials, materials and finished products;
- established the mix of products from stock, depending by contribution of various articles at sales/company profit;

- determination of safety stock and at level of resupply;
- application the strategy "just-in-time".

The necessity of savings the material resources and money, using with maximum of efficiency at current assets need an optimum level of stocks (Adochiței M., Adochiței A., *Finanțele întreprinderii în economia de piață*, Editura Mitrea, Piatra Neamț, 1993, pag. 103). For this it is necessary judicious organization of supply in order to reduce the assets of material values, for insurance of stocks synchronized with real needed of production. In the sight establishing of optimum stock, optimum amounts the stocked and optimum interval of resupply it is necessary to found ways to balancing of two antagonistic costs: storage stocks (who grow up with ordered quantity) and the cost of order (who decreases with the ordered quantity).

Although the stocks have a general common structure, as a result of different ways are managed is not possible to generalize one optimization model (Băsanu Gh., Pricop M., *Managementul aprovizionării și desfacerii*, Editura Economică, București, 1996, pag. 110). The option for certain method heed about the concrete factors who influences the size of storages for each material resource.

In conditions of differential stocks it is used with good results the ABC system. This grouping the materials goods which supplies and it stocked in three groups. The criterias of grouping are multiple: delivery frequency, individual value and totally of material resources founded in stock; insurance source (by import or internal); supply form.

The most used criterias in group assets by ABC method relate at value of medium stock at different goods. Using this criterias of grouping, the ABC method allow the formulation of some stocks as low possible resources, ensure by a accelerative speed of rotation and a necessary moderate finance.

In case of group A of importance, the attention is targeted in sense of using demanding mathematics methods, which will be considered elements (factors) concrete who conditioning the level of stocks and it insurance his formation at lowest possible dimensions.

For group B it applied two strategies:

- established of distincts models with one degree of a medium exigency for dimensioning stocks of products from this group;
- usage methods elected for group A at materials which, from value perspective presents features of this group and at models for group C, products which can be assimilated.

For materials from group C can be used models less demanding and which will retain into account just factors with decisive action in dimension stocks. The method insurance the dosing efforts to touch principal objective of stocking gestion, that to owned products stocks as low possible, but which allowing rhythmic consumption, with minimum costs, in conditions of controlled risk.

Grow up program of logistics efficiency activities

The marketing program represent an unfolded plan of a complex activity of marketing, made up by an ensemble of practical actions, in order achievement or a set of objectives, trailloads in time, with responsibility precision, of human resources, materials and financial necessary. In vision of A.W. Frey, the concept of program is "an writing formulation, specifying objectives of marketing and describe the principals middle of realizations of them; he show where want to get one firm and how intend to go there".

In practics, the program of marketing return the strategy of marketing of firm for next period, indicating the points where will be necessary to take some decisions, integrating and coordonating controllable factors in activity of marketing of firm, the components of mixed marketing, such that to generate maximum efficiency in every moment during the program, like for all provided period.

In development of marketing programs it calls at one series of cantitative methods of identification and evaluation of proceses which composing the environment of underway the firm activity.

Activities program

Simbol	Content activites	Time activites	Activities		
			After	Simultaneous	Before
A	Market study of congealed products from Cehia	60 zile	-	-	-
B	Analyze study results	14 zile	A	-	C
C	The decision to establish a subsidiary in Cehia	21 zile	A, B	-	D
D	Register society in the host country	60 zile	C	I, F	E
E	Closing the distribution area	30 zile	D	-	J, K
F	Setting area of distribution	14 zile	C	I, D	G
G	Selection and contacting potential customers	20 zile	F	-	H
H	Closing contracts for distribution	30 zile	G	-	J
I	Appointment subsidiary director	10 zile	C	D, F	E
J	Purchase technology of management	60 zile	E	K	L
K	Purchase vehicles	40 zile	E	J	L
L	Hiring the operative and executive personal	30 zile	K, J	-	-

Activities budget

Activitie	Budget
Study of market frozen products from Cehia	10.000 euro
Analyze study results	2000 euro
Decision to establish a subsidiary in Cehia	1000 euro
Register society in host country	20.000 euro
Renting necessary space(5 years)	3.000.0000 euro
Establish the area of distribution	5000 euro
Selection and contacting potential customers	1000 euro
Renting contracts for distribution	500 euro
Appointment the subsidiary director	1000 euro
Purchase the technologies of administration	600.000 euro
Purchase vehicles	250.000 euro
Hiring operational and executive personal	8000 euro
Total buget	3.898.500 euro

5. Conclusions

Macromex means professionalism, a force in distribution and logistics which offered complete and effective services of her clients. Benefiting of experience,resource,information and flexible infrastructure, the company offers his partners the possibility to be always with one step before events which characterized market.

The vision was and is Macromex to become a leader in terms of logistic infrastructure and to be a distributor of some international strong brands on romanian market. Over the time Macromex acquired an incontestable position of leader in imports domein and distribution of refrigerate and frozen foods field which need some special services at high standards like and precision looking the absolut control about temperature of storage and transport. Starting with month july of this year will start an project of the foundation of first subsidiary external, in Cehia, program whose the budget is estimated at almost 3.900.000 euros, what will be strengthen the position on the products frozen and refrigerated in market.

In future, Macromex, counting on potential of grow up of HoReCa (hotels, restaurants, catering), what would determinate taking the decision to establish a separate division for this type of services. Beside the development of segment HoReCa, Macromex will be establish investitions to extending logistic infrastructure and sharing,but in advanced technologys of gestion of stocks.Have a permanent changing process of auto fleet,the maximum duration of use at vehicle being 5 years.

In all these years of activity, Macromex have the strength and the vision to dezvolting himself and to permanently upgrade his services,become a partner of european waist.Firm services bring a

plus of competitiveness to products and own brand values certified or providers and carry on all of this qualities to end consumer by Macromex clients, increasing also the value of his services.

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