DISTRIBUTION LOGISTICS OF SC PRODLACTA SA

Determination of the storage area of dairy products in shelves in the Prodlacta Warehouse in Bucharest

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Distribution logistics is a complex process that has a direct impact on the quality and profitability of a product. Therefore, it is necessary to pay attention to all stages of this process: transport, storage, warehousing and information flow. Regarding the determination of the storage area of dairy products in the shelves, a series of indicators will be calculated such as the Total number of partitions, The number of shelves, The storage area on which the shelves are located, The main area, The total area, The utilization index of area and Deposit Volume Usage Index.

Keywords: logistics, distribution, Prodlacta, storage area, quantitative analysis

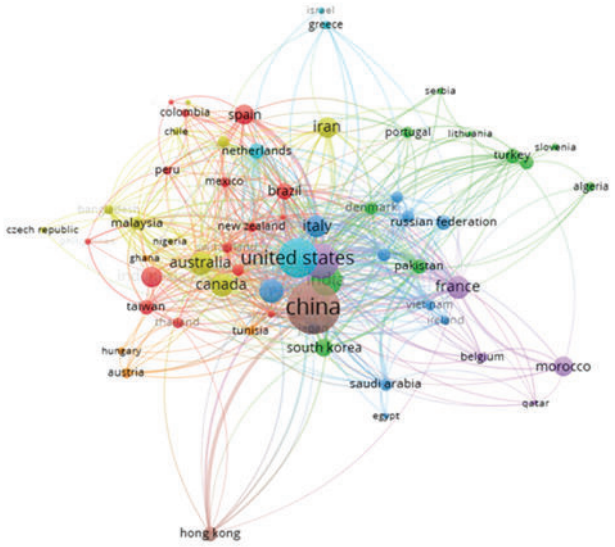
I. Review of scientific literature

Quantitative analysis of scientific documents found in the Scopus database - Bibliometric analysis performed in VOSviewer

In this chapter, a quantitative analysis of scientific documents published in the field of logistics and supply chain management was performed. Approximately 2,000 documents from the Scopus database were analyzed. Thus, in figure 1 is presented the Analysis of the collaboration relations between states.

Analysis of the collaboration relations between states

Fig.1



Source: own conceptualization based on data from Scopus

62 states were analyzed. In the first place in terms of the number of cooperation relations with other states is China with 48 links and 482 published documents. The second position is occupied by the United States with 47 links and 264 published documents. Last but not least, the third place belongs to India with 20 links and 168 documents published in the field of logistics and supply chain management. Figure 2 shows the Analysis of the keywords used by the authors.

Analyze keywords used by authors

Fig. 2

Source: own conceptualization based on data from Scopus

The most commonly used word in logistics research is "supply chain management" with 712 occurrences, followed by "supply chain" with 147 occurrences.

II. Research methodology

In the first part of the paper, a quantitative analysis was performed on the advertising activity in the field of logistics and supply chain management. Next, the stages of distribution logistics for Prodlacta were analyzed and a series of indicators were calculated that show the efficiency of the use of storage space.

III. Results and discussions

3.1 Distribution logistics: transport, storage, warehousing, handling, information flow

Distribution logistics is a complex process that has a direct impact on the quality and profitability of a product. Therefore, it is necessary to pay attention to all stages of this process: transport, storage, warehousing, handling and

information flow. Within the Prodlacta company, road transport is used. Thus, Prodlacta has a factory in Brașov, Homorod, Moeciu and Făgăraș specialized in a certain type of product and a warehouse for each factory, plus one in Bucharest. All factories are about 60 km from Brasov. The products leave from the warehouse of each factory to the central warehouse in Brașov and the one in Bucharest, and will be distributed further to the big retailers. For example, for the transport of a product truck from the central warehouse in Brașov to the one in Bucharest, Prodlacta records fuel costs of approximately 944.88 lei (186 km * 5.08 lei / liter), to which is added the driver's salary. To expand distribution nationwide, the company has entered into a contract with logistics operator Whitland Logistic. In order to optimize the logistics costs, Prodlacta continued its own distribution in Brașov County, Prahova Valley, Ploiești, Sibiu, Turda, Argeș, Pitești, Iași, Constanța, Bacău and Bucharest. The most important aspect in the transport activity is to maintain the cold chain, so that the products do not spoil. This is done by transporting the products in refrigerated trucks. Storage is the quantity of raw materials, materials and finished products accumulated in the warehouse, in a certain quantity, for a determined period, obtained as a result of the supply activity. It is very important that every company has stocks of raw materials and finished products, so that if an unforeseen event happens and part of the production is altered, there is a back-up. Thus, at the level of 2019, Prodlacta registered stocks worth 7,849,946 lei. In terms of warehousing, it is one of the most important elements in the distribution logistics process. As previously mentioned, Prodlacta has warehouses in Brașov, Moeciu, Făgăraș, Homorod and Bucharest. This allows the distribution of products to several points in the country. The technology with which the warehouses are equipped is of the latest generation, in order to ensure the maintenance of dairy products in optimal conditions. Warehouses must be provided with grills and shelves so that the products do not touch the floor. The optimal microclimate for the maintenance of dairy products must also be ensured, and the products must be placed in an orderly manner on the assortments and according to the shelf life. Disinfection of the deposits is performed at least twice a year. With regard to the handling of dairy products, the 2004 Veterinary Sanitary Regulation on the additional conditions for the transport, storage, marketing and veterinary sanitary control of milk and milk products must be complied with. This rule emphasizes compliance with the principles of hygiene, the presence of evidence that the vehicle with which the products are transported has been disinfected, as well as compliance with the temperatures set by the manufacturer. Thus, handling does not only refer to the finished products, but also to the stages of the production process. Last but not least, in order to ensure a qualitative distribution logistics process, the flow of information is extremely important. It is necessary to know

the type of product, the quantity to be distributed, the transport conditions, the transport routes (streamlining the transport process), the quantity stored and the quantity stored. In this way, one can know if there is the necessary quantity of product to honor all contracts, one can estimate the delivery time, delivery cost and other variables that have a direct impact on the profitability of the company. Distribution logistics is, in fact, the placing on the market of the product, the way in which it comes into contact with the outside of the factory, with large retailers and implicitly with consumers. Therefore, it is important that the information flow within the company is efficient, without any communication deficiencies. Following the study, it was found that Prodlacta ensures a well-developed flow of information: it knows the stocks of products and the quantity that must be made to honor its contracts, it has a sufficient number of warehouses to ensure its distribution at the level of several counties and turned to a logistics firm to expand its covered area. Prodlacta is a company oriented towards achieving its objectives and each process carried out is based on an impeccable logic. It is obvious that within Prodlacta the managerial communication is well mastered and there are no deficiencies from this point of view. In short, Prodlacta ensures the logistics of the distribution process in an efficient way.

3.2 Determination of the storage area of dairy products in shelves in the Prodlacta Warehouse in Bucharest

The table below shows the data needed to calculate the main indicators that determine the storage of dairy products on the shelves.

Items regarding storing dairy products on the shelves

Table 1

Crt.nr.	Explanations	Symbol	MU	Value
Shelving				
1	Maximum standard stock	S_{mn}	Tons	513
2	Volumetric weight	G_v	Tons/m^3	3,5
3	The volume of a partition	V_d	m^3	1,8
4	The filling coefficient of a partition	K_u	%	90
5	Number of partitions on a shelf	N_{dr}	Nr.	6
6	The length of a shelf	L	m	5
7	The width of a shelf	l	m	2
8	Shelf height	$\hat{I}_r$	m	8
9	Warehouse height	$\hat{I}_d$	m	12
10	Auxiliary surface	S_a	m^2	110
11	Sorting / calibration surface	S_s	m^2	0
12	Construction area (elevators, poles)	S_c	m^2	10

Next, the Total Number of Partitions, Number of Shelves, Storage Area on the Shelves, Main Area, Total Area, Area Usage Index, and Storage Volume Usage Index will be calculated.

a) Total number of partitions (Ntd) = Smn / (Vd * Gv * Ku), where Smn is the maximum normalized Stock, Vd is the Volume of a partition, Gv is the Volumetric Weight and Ku is the Partition Filling Coefficient. Thus, Ntd = 513t / (1.8 m3 * 3.5l / m3 * 90%) = 90 partitions

b) Number of shelves (No) = Ntd / Ndr, where Ntd is the total number of partitions and Ndr is the number of shelf partitions. Therefore, No. = 90 compartments / 6 compartments in a shelf = 15 shelves

c) The storage area on which the shelves are located = L * l * nr shelves. Thus, Srf = 5 * 2 * 15 = 150 m2

d) Main surface = Shelf surface = 150 m2

e) Total area = Sp + Sa + Ss + Sc, where Sp is the main area, Sa is the auxiliary area, Ss is the sorting area and Sc is the construction area. St = 150 m2 + 110 m2 + 0 m2 + 10 m2 = 270 m2

f) Area utilization index = (Sp / St) * 100, where Sp is the Main Area and St is the Total Area. Ius = (150 m2 / 270 m2) * 100 = 55.5%

g) Deposit volume utilization index = (Vp / Vt) * 100, where Vp is the Main Volume and Vt is the Total Volume. Vp = Sp * Îr, where Sp is the main area and Îr is the shelf height => Vp = 150 m2 * 8 m = 1,200 m3. Vt = St * Îd, where St is the total area and Îd is the Depot height => Vt = 270 m2 * 12 m = 3,240 m3 => Iuvd = (1,200 m3 / 3,240 m3) * 100 = 37.03%.

According to the above calculations, the Area Usage Index is 55.5% and the Deposit Volume Usage Index is 37.03%. This means that the Prodlacta warehouse in Bucharest is not used in the most efficient way possible. In this regard, part of the ancillary storage area could also be used and more rigorous product storage and storage management could be implemented. For this to be possible, action needs to be taken on several levels. For example, the end-to-end visibility in the supply chain needs to be increased, ie the stock should be known in all locations and stages of transit. It is also important to have visibility on orders as labor resources can be allocated more efficiently. Specifically, they can be allocated part-time or full-time depending on the daily / weekly upload level. This will lead to more efficient production flow and increased labor productivity. Moreover, the most important thing to increase the Area Usage Index and the Storage Volume Usage Index is the efficient allocation of storage space. Thus, the products must be placed in such a way as to reduce the travel time in the picking processes.

Conclusions

Following the case study, it was observed that the value of the Surface Use Index and the Storage Volume Use Index indicates an inefficient use of storage space in the Prodlacta warehouse in Bucharest. Thus, the following improvements are proposed for the logistics system of SC Prodlacta SA.

- Proper management of inbound processes (dock management, reception, putaway)
- Use technology to see what happens to each warehouse area and product stocks in real time
- Eliminating the differences between the written stock and the actual stock by using a computer system that alerts those responsible for the logistics activity
- Redesign of warehouse space based on transaction history - depending on the evolution of the product mix and individual demand, the warehouse space is reconfigured to ensure the most efficient handling of products and to reduce the costs of this process.
- Development of a set of KPIs that are easy to understand and that give the logistics activity an orientation towards achieving the objectives

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