CONSTRUCTION OF THE ALGORITHM FOR DETERMINING THE STRUCTURE OF MARKETING PRODUCT CATEGORIES AND ITS SIGNIFICANCE IN THE DEVELOPMENT OF LOGISTICS DISTRIBUTION

KOZIOŁ Agata[1]

[1]*WSB University in Wrocław, Wrocław, Poland, EU*

Abstract

The article shows the idea of building the algorithm to examine the structure of marketing product categories, which could become the basis for shaping the logistics systems of distribution. In the face of changing needs of consumers as well as models of purchasing decisions, this approach may be an important factor in increasing the competitiveness of distribution companies. The algorithm is universal and can be used in different sectors of the economy where there is an independent demand.

Keywords: Category management, logistic system, distribution

1. INTRODUCTION

Identifying the structure of relationships in the marketing product category is a complex process implemented in several stages, covering aspects of research on customer preference aimed at selecting products to a category in a way which would allow the fullest possible realization of the needs and expectations of customers, and at the same time would allow for standardisation of methods for managing flows of products and information in an enterprise

The resulting effect, in the form of a structure of relationships, should indicate their number and strength, as well as allow for the use in management areas other than marketing, with a particular contribution of the logistics area, which is responsible for the proper, harmonious flow of goods and information.

Marketing reasons are at the core of creating product categories, which means that an essential criterion for the selection of products to a category is the perception of these products by customers or the willingness of companies to create offers in such a way that customers perceive products as interrelated. This assumption can be derived from observing the impact of the way in which products are presented on the perception of their usefulness by customers.

2. MARKETING PRODUCT CATEGORY

Consumers are looking for solutions that maximize the level of fulfilment of their expectations, save time and energy spent, as well as the amount of money spent. This means searching for stores where one can buy not a specified product, but a product package that fully satisfies a specific need. Such customer behaviour cannot remain unanswered by the distribution sector. The organization of the flow of goods and information, in particular, information from the client, in the supply chain structures plays an important role, and must be arranged so as to efficiently and effectively meet these newly created needs.

Category management is part of a broader concept of CPFR (Collaborative Planning, Forecasting and Replenishment) and develops the concept of ECR [1]. This approach imposes specific business practices related to intelligent collaboration of partners in the supply chain as part of planning and meeting customer needs. It enables the inclusion of a category management strategy, which represents a marketing approach to sales, into planning in the supply chain and operational processes to increase availability and flexibility while

reducing inventory, transportation, and logistics costs. Product category is an explicit, manageable group of products/services which consumers perceive as related and/or substitutable in meeting customer needs [2].

Category management is the pursuit of constructing interrelated product groups from the consumer's/customer's point of view. This approach significantly influences the perception of category management throughout the supply chain. It is a strategy which assists sellers in forming the right combination of products, at the right prices, with the right promotions, at the right time and in the right place [3]. Category management is considered one of the pillars of the ECR strategy.

Category management involves creating cross-sectional teams identifying product categories, introducing solutions within categories by giving them the status of strategic business units. The objective is to achieve operational (current) results by sellers and associated partners in the supply chain, including manufacturers, distributors and intermediaries, by focusing on consumer needs [4]. It is a strategy of qualitative changes in the supply chain. The requirements of the strategy of category management force the supply chain participants to make qualitative changes in the chain. The basis for these changes is a different perception of product belonging and a different classification.

3. STATISTICAL METHODS USED TO DETERMINE THE STRUCTURE OF MARKETING PRODUCT CATEGORY

Studying the structure of product categories requires the disclosure of the relationships between the demand for particular products in the category. This is particularly important for links of wholesale trade and manufacturers, as the demand, which can be studied for these units, results from aggregated data about orders from a selected segment, and does not necessarily reflect the actual consumer demand. In order to make the study of category structure useful, it is important to pay special attention to the flow of information and the role of coordination in the supply chain. By implementing a strategy of cooperation and using the right tools, it is possible to influence the reduction of errors and fluctuations in demand and make the demand in higher links of supply chain as realistic as possible.

Based on this approach to the problem, the following tools were used to examine the structure of product categories:

1. Correlation coefficient, whose task is to reveal the strength of existing relationships between the demand for products. This coefficient will also introduce a division in a category: for products which build up the category structure and products which complement the category. The substantive interpretation will be aimed at identifying the products on which a particular emphasis should be put, given their importance in the category hierarchy.

From among correlation coefficients, the r-Pearson correlation coefficient was chosen. The basis for making such a decision were the following considerations:

- the study of dependency will involve two variables at a time. The correlation between each pair of products in the category will be examined,
- data on demand are measured on a ratio scale,
- a large sample was used to generate the data: for analysis, aggregated data from over 30 orders in each period were used,
- variables have breakdowns which allow the examination with the r-Pearson correlation coefficient.

The significance of the correlation coefficients will be studied with Student's t-test at the significance level α = 0.05 and α = 0.01.

2. Factor analysis, whose task is to reveal the existence of factors which are difficult to identify and measure and which affect the grouping of products within the category. The procedure will be carried out according to the following steps:

- creation of observation matrix,
- standardization of variables by the least squares method,
- selection of the number of factors - with scree method,
- creation of factor loadings matrix,
- creation of rotated factor loadings matrix,
- creation of implementation factor matrix.

Based on the results of the analysis of the correlation coefficients and factor analysis the structural subgroups of product categories will be created.

- The graphical description will be made using a tree graph, which will be used to indicate the ways of division and the number of structural subgroups. The division shall take place in two steps:
- step 1: the criterion of the division is the significance of the correlation coefficient. The result of the division is the creation of two subgroups of first-tier products with coefficients demonstrating the relevant relationships and products with coefficients not showing relevant relationships,
- step 2: applies only to a subgroup of products with coefficients showing significant relationships. The breakdown will follow the criterion of attribution to factors and will help distinguish subgroups of the second-tier: the number of subgroups will depend on the number of main factors identified in the factor analysis and will be increased by a group of products not attributed to any factor.

4. THE ALGORITHM FOR DETERMINING THE STRUCTURE OF PRODUCT CATEGORY

Determination of structures of product category is the recognition of existing relationships and grouping products in subgroups, which form the backbone of the structure.

The study of category structure involves the following steps:

1. designation of product categories
2. designation of correlation coefficients between products,
3. tests of significance of correlation coefficients,
4. designation of product categories, structure of relationships, control products,
5. factor analysis,
6. division into subgroups.

The algorithm for determining the structure of product category is presented in **Figure 1**.

Identification and analysis of the product category structure is the foundation for identifying the essential elements characterizing the product category, and then transferring these characteristics to logistics management.

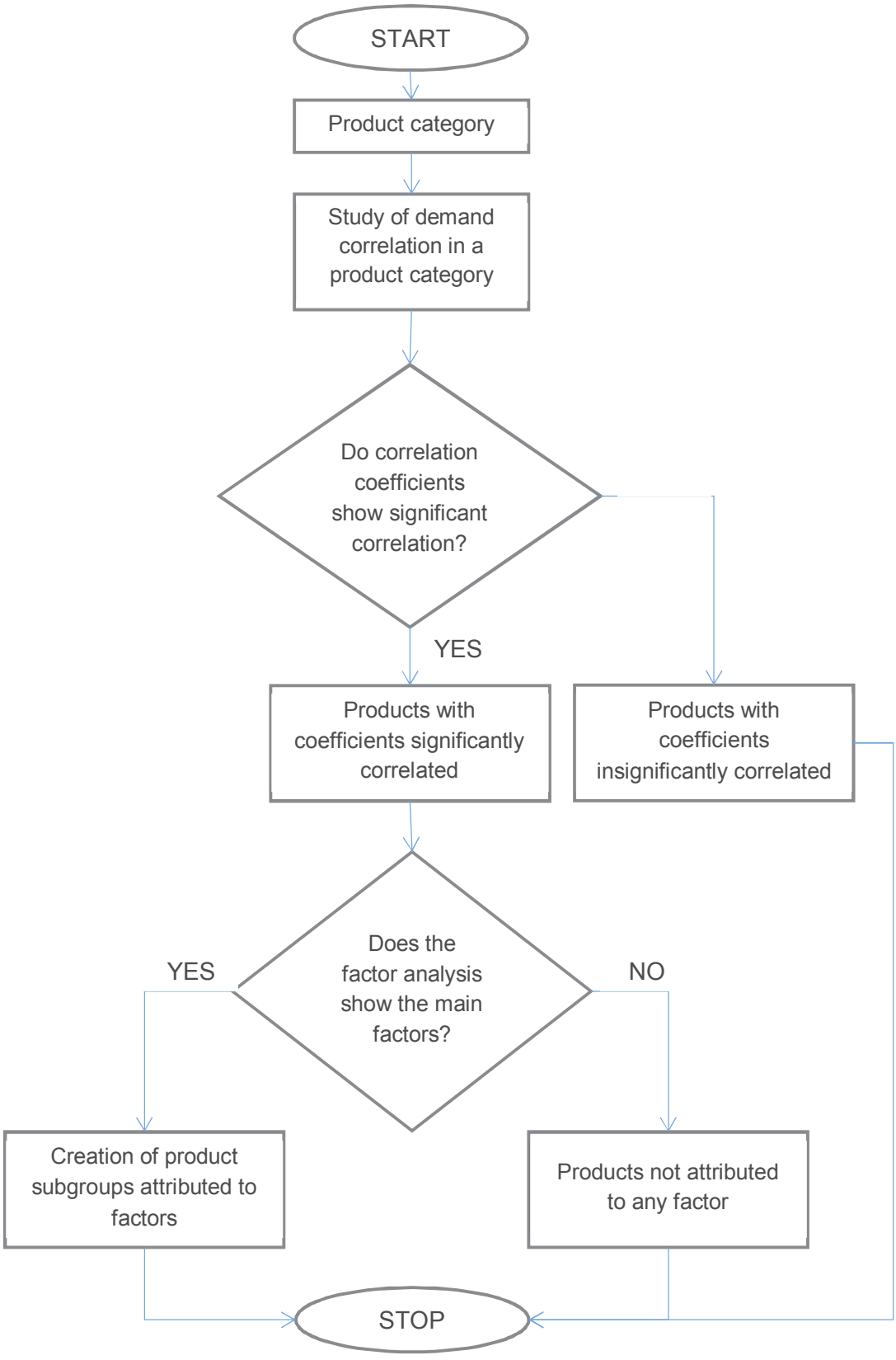

Figure 1 The algorithm for determining the structure of product category; Source: own study

5. THE IMPORTANCE OF THE STRUCTURE OF THE MARKETING PRODUCT CATEGORIES IN THE FORMATION OF DISTRIBUTION LOGISTICS

Category management is a strategy based on marketing principals. Its basic assumptions are targeted on price management, promotion and arrangement in the shop space so that the consumer is offered the most attractive layout possible.

Due to the way product categories are structured, managing them makes new demands for logistics, because of a change in product management approach. This change can be described as follows: we sell what customers want from us and not what we can offer to them.

The essence of this statement lies in the assumption that the shape of the offer is mainly influenced by the recognition of customer needs and the dynamics of changes in the customer market, while the ability to meet these needs is the task of logistics. Apparently, it may seem that the change is irrelevant, but by implementing a strategy of product category management, new quality is created for the management of a group of differentiated products rather than individual products.

The importance of structure of marketing product category can be viewed in terms of a few elements of logistics distribution:

1. information systems - The flows of information in the supply chain of a product category should be dependent on its structure. This means the ability to use the knowledge of the structure of marketing product category to properly plan the relationships between partners in the supply chain, to properly prepare the procedures of product management so as to take into account the structure of the category.
2. material flow planning - In product category management the basic reference for planning is the creation of category managers who are responsible for the category as a whole. In the science of marketing, managers are responsible for all aspects of marketing product management in the category. To maintain a high level of customer service, the category manager's marketing functions must include logistics tasks for the category. This is a fundamental change in the approach towards product management in an enterprise. The creation of units consisting of specialists from various departments (marketing, logistics, sales and others), gives the ability to manage product groups as a whole. This means moving from the approach based on the analysis of individual products or type groups to managing categories made up of different products coming from different sources. These units take over the role of supplies coordinators; functions properly operational in supply chains.
3. shaping of product availability - Product availability is one of the most important elements of customer service which assesses its level. Customers expect the opportunity to purchase goods at the time of need, which results in the need to keep stock of products. Product availability may determine whether a customer makes a purchase or turns to competitors. Availability of products in the distribution process, point of contact with the end customer, is formed through cooperation with partners in the chain, and in particular with suppliers of products. This collaboration in product category management should primarily be based on good flow of information and the awareness of participation in building a category management strategy. The essence of this cooperation is the establishment of common principles on which a logistics system supporting the flow of products in the category should be based.

Such specific aspects of implementing a structure of product category allow a broad perspective on logistics system and distribution processes in the context of marketing product category.

6. CONCLUSIONS

Recognizing the structure of marketing product category is of vital importance for logistics management in distribution processes. The ability to confirm the statistical dependency of demand for different products

provides objective information which can be used to shape the logistics processes of distribution through creating product availability where the customer wants to purchase them. The versatility of the presented model offers the potential to use it in different sectors of the economy where demand is independent and the factors which influence customer's purchasing decisions can be studied.

REFERENCES

[1] SEIFERT D., Collaborative planning, forecasting, and replenishment: How to create a supply chain advantage, AMACOM Div American Mgmt Assn, 2003; https://books.google.pl/

[2] ECR EUROPE - Europe Category Management Best Practices Report; www.categorymanagement.com

[3] GRUEN T., SHAH R., Determinants and outcomes of plan objectivity and implementation in category management relationship, Journal of Retailing, 2000, Vol. 76,No.4

[4] KOESTER L., Building a category management capability, UPS Supply Chain Solutions White Paper, Cleveland 2005