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DETERMINATION OF BUSINESS SUCCESSFUL OF SUPPLY CHAIN AND INFLUENCE ON CUSTOMERS AND EMPLOYEES

Abstract: Latest state of model for determining of business successful of the supply chain based on supply chain performances and indicators of performance are discussed in this paper. Several theories and definition were discussed by considering the current problems. Based on the investigation, the correlation has found between businesses successful that has directly influenced the life of customers, employees and for social community. Additionally, important parameter in view modern concept of supply chains, supply chain structure and supply chain management were described in detailed.

Keywords: business successful, supply chain, performances, indicators, customers

1. INTRODUCTION

The main strategic objectives of each company (organization, enterprise) should be a focus on customers (clients, users) and strive to meet their demands, good market position compared to the competition, as well as the realization of successful cooperation with other companies. In order to meet the requirements of enterprise customers and be competitive in the market, it is necessary to establish partnerships with other companies, namely with suppliers and direct customers. The sequence that is formed by linking of companies, the flow of the products, money, and information, from one to another company, referred to as supply chain. Each of the companies involved in the supply chain is one link in this chain, which together connect the source of raw material occurrence with customers and with their demands. The term chain of supply, as referred by preliminary analysis, is not suitable because a part of the supply chain enterprise co-operates with multiple suppliers. Also, product to the final customer is offered across multiple vendors and distributors, and one product is usually intended for a larger number of customers. Therefore, some researchers believe that it is better to use the term supply network in relation to the term supply chain.

Delfamn (2000) believes that the supply is not a good term, due to the requirements for the product or service starts from the customer

or from the end of the chain and moves towards the first link in the chain [1].

The supply chain includes all processes, activities and their participants, from manufacturers, their suppliers, through distributors to end-users, and consists of the following components [2]:

- supply,
- storage and
- distribution.

The main objective of forming chains or networks of supply is the reduction of time and costs during the implementation of each process. By forming of supply chain companies work together for the collective benefit, create good partnerships and help each other to overcome the problems. In this way, companies gain confidence in doing business, so they can more effectively monitor changes in customer demands. Therefore, it can be considered that the construction and preservation of a good position in the market caused by the partnership relations between the company and with the creation of supply chain [3].

The partnership between companies has the task to eliminate the disadvantages and to overcome the individual weakness of each company in the supply chain, and provide a better supply and resource management. One of the priorities of the supply chain is the optimal use of resources between companies in order to reduce unnecessary resources. Also, companies among themselves exchanged experiences and

knowledge, creates good interpersonal relationships and complement and improve the competence of employees [4].

This paper is organized in the following way: in Section 2 the literature review is given, in Section 3 the performances of the supply chain, in Section 4 the proposed model, and conclusions are presented in Section 5.

2. LITERATURE REVIEW

The concept of supply chain management is relatively new since the first scientific paper on this topic appeared in the early 80s of the 20th century, and a decade later, this area is beginning to acquire a more important place in serious scientific research [5].

Given that the supply chain is a relatively new term and the relatively new field of study, as some researchers believe this notion had to distinguish from the concept of logistics management. Christopher (1994) believes that logistics is the process of transport management, procurement, production, and storage and distribution of finished products, while the most of emphasize are placed on the management of information related to all these operations. Additionally, under the management of supply chain management involves the relationship of companies with suppliers and customers, in order to create additional value and delivery of products or services, and with a reduction in costs and delivery times. Therefore, supply chain management is the management of the relationship between the participants in the chain, and significantly extensive concept compared to logistics management. Thus, by considering the author believes it has been well verified that logistics management is only one part of the concept of supply chain management [6].

Today, there is no general definition of terms such as supply chain, the structure of the supply chain, the supply chain management; however, there are generally accepted and respected definitions of many authors. The reason for this is actually the complexity of these notions, due to supply chains differ in many characteristics, which including: the type of product, the target market, the number of the chain links (companies), geographic location, size of companies in the chain, the type of industry which companies are belong, etc. some

of the recent examples of definitions of the supply chain are as mentioned below:

- The supply chain includes all interested parties involved, directly or indirectly, in the process of meeting customer [7].
- The supply chain is a network of partners that together transform the basic raw material into a finished product that needs to meet customer requirements [8].
- The supply chain is more properly defined as a network of facilities and distribution options to perform the functions of procurement of raw material and their transformation into finished products, and distribution of finished products to users [9].

The structure of a supply chain will vary depending on many factors; on the other hand, two identical supply chains cannot be identical due to supply chain companies different operating policies. This arising difference is evident between supply chains which belong to the same activity or areas of industry and manufacturing. Factors affecting the structural complexity of the supply chain can be the type of industry, the complexity of product making, the number of suppliers, markets in which the supply chain operates, the number of supply chain members, relationships between the participants in the supply chain, availability of raw materials etc.

As for the concept of the supply chain, as well as for the concept of the management of the supply chain there is no universal definition. Thus, supply chain management can be defined in several ways:

- Supply Chain Management encompasses the planning and control of all processes, from raw materials to finished products shipped to the customer [8].
- Supply chain management is the management philosophy of distribution channels ranging from suppliers to consumers [10].
- Management of supply network is defined as the management of material and information flows, both within and between facilities, such as commercial, manufacturing, assembly facilities and distribution centers [11].

A modern approach to supply chain management, which mainly focuses on the requirements and needs of customers, differs from the traditional approach where they produce a large range of products and placed on the unexplored market [12].

3. THE PERFORMANCES OF THE SUPPLY CHAIN

To be able to assess the performance of the supply chain, it is necessary to define specific performance, by means of which the supply chains were evaluated. The basic fundamentals supply chain performances, discussed in this paper are:

- uncertain demand,
- quality and
- added value.

Uncertain demand relates to the operating conditions that are often unpredictable, but there is some uncertainty varies depending on the type of industry and the type of product that is sold to the customer. Uncertain demand, as well as two other supply chain performances, has their own indicators. These indicators are measurable and evaluated the characteristics of each performance. Based on the knowledge, experience and good practice are determined indicators of uncertain demand:

- customer uncertainty,
- technological uncertainty,
- the economic situation,
- competitive of market and
- integration of institutional norms.

Quality is a way to build a good relationship with customers because inadequate quality has a significant impact on the decline in the interest of customers for a particular product. In this paper, the following specific performance indicators qualities discussed:

- competitiveness,
- CSFs - critical success factors,
- strategic component and
- paradigms and activities of quality.

Added value can be characterized as an additional success of the company in their business, which is achieved through cooperation with many companies interested parties with an overview of the social responsibility of companies towards the environment. As indicators of this performance are defined:

- average number of stakeholders,
- profit growth,
- utilization of property,
- credibility and
- social responsibility.

4. THE PROPOSED MODEL

4.1 Notation

This section shows the model for assessing the operating efficiency of the production supply chain. Production supply chain consists of E production companies and lets the index for the company designated as e , $e = 1, \dots, E$. The performances of the supply chain in the sense of taking into consideration the efficiency of the supply chain are: uncertain demand, quality, and added value. These performances are decomposed into key performance indicators (KPI) and are described in section 3. Performances do not have equal importance, and in this paper, the relative importance of performance is given by a comparing pairs matrix. The relative importance of performance is not equal and it depends on the types of the supply chain. Many authors believe that it is easier and simpler, and therefore more accurately, that decision makers observe the relative importance of each pair of considered performance [13].

In other words, the relative importance of performance is given by a comparing pairs matrix. The values of matrix elements belonging to the set of real numbers, which are belong to the interval [0-9]. A value of 1 means the same significance of performance p and performance p' . In the case that the performance p is of greater importance compared to the performance p' , or less importance, then the ratio of performance p , in compared to performance p' , shows the reciprocal value.

The matrix of comparing the relative importance of performance must be consistent. Checking a consistent was carried out using the method of the engine vector [14]. The weight of each performance W_p , $p = 1, \dots, P$ are described by ordinal numbers and was set normalized. It is believed that each indicator has a performance has same as the importance of the performance which it belongs.

Weighted value of performance p is calculated with the multiplication between 1)

the value of weight performance and 2) and the sum of aggregated values of all indicators at the level of every individual performance.

The values of key performance indicators at the level of each company in the supply chain considered as assessed by the management teams of companies. It is believed that the management team at the level of each company decides on the value of KPI's by consensus. Decision makers of their evaluation are reported by using real numbers, which are defined on the interval of the [1-9]. One value indicates that the KPI has the minimum value, a value 9 to a value KPI is the target value or the largest value.

KPI's can be cost and the beneficial nature [15]. The beneficial type of KPI's are defined as follows: the higher the value of the KPI's, it is better; and vice versa. Cost-type KPI and is defined as follows: the smaller the value of the KPI, the better it is; and vice versa. Based on the assumptions introduced it can be concluded that it is necessary to perform a normalization value of KPI's. Using the procedure of normalization, all the values of KPI's are mapped to a set of real numbers in the interval [0-1]. The calculated normalized value of KPI's is comparable. A value of 0 indicates that the KPI has the lowest value, and the value of 1 have a maximum value. The general method of linear normalization was employed, which is defined in (Pomerol, Barba Romeo) [16].

Aggregated normalized value of each performance at the level of each company is calculated using the statistical mean method.

The total weighted normalized value of each actual performance is calculated by dividing the total number of companies which make up the supply chain and the value of the weighted performance considered. Weighted performance value is calculated as the multiplication between the calculated weight performance and the sum of aggregated normalized values considered performance that is calculated at the level of each company.

Efficiency index of the supply chain is calculated using the sum of total weighted normalized values of all performance.

By applying the rules of mathematical logic can be evaluated using the level of business operations of the production supply chain. According to the results of the supply chain, the management team needs to define a strategy to improve the business.

4.2 Suggested algorithm

Steps of suggested algorithm for assessing the efficiency of the supply chain are:

Step 1: Determination of weight by comparing each other's performance, i.e. the mutual relationship of each performance with each other. A method for determining the weight of performance is shown in the matrix and the method further explained.

W_p – Weight of performance

W_1 – Weight of uncertain demand performance

W_2 – Weight of quality performance

W_3 – Weight of added value performance

$$W_p = \begin{bmatrix} W_1/W_1 & W_1/W_2 & W_1/W_3 \\ W_2/W_1 & W_2/W_2 & W_2/W_3 \\ W_3/W_1 & W_3/W_2 & W_3/W_3 \end{bmatrix} =$$

$$\begin{bmatrix} 1 & W_1/W_2 & W_1/W_3 \\ W_2/W_1 & 1 & W_2/W_3 \\ W_3/W_1 & W_3/W_2 & 1 \end{bmatrix} \begin{matrix} \sum X_1 \\ \sum X_2 \\ \sum X_3 \end{matrix}$$

$$W_1 = \frac{\sum X_1}{\sum X_1 + \sum X_2 + \sum X_3}$$

$$W_2 = \frac{\sum X_2}{\sum X_1 + \sum X_2 + \sum X_3}$$

$$W_3 = \frac{\sum X_3}{\sum X_1 + \sum X_2 + \sum X_3}$$

Where $\sum X_1$ is sum of values of first row in matrix, $\sum X_2$ is sum of second row in matrix, and $\sum X_3$ is sum of third row in matrix.

Step 2: Evaluation of indicators values of each performance on a scale [1-9], $V_{i,e}^p$.

e – Index of company

p – Index of performance

i – Index of performance indicator

Step 3: Normalization of values from the previous step by linear normalization, n_{ip}^e .

For benefit type:

$$n_{i,e}^p = \frac{V_{i,e}^p}{\sum_{i=1}^e V_{i,e}^p}$$

For cost type:

$$n_{i,e}^p = 1 - \frac{V_{i,e}^p - V_{i,e}^p \min}{V_{i,e}^p \max}$$

Step 4: Determination of the aggregate value of the performances:

$$d_{p,e}^i = \frac{1}{I} \sum n_{i,e}^p$$

I - the total number of indicators for considered performance

Step 5: Determination of weighted normalized performance value p on level of entire supply chain, D_p .

$$D_p = \frac{1}{E} \cdot W_p \cdot \sum_{e=1}^E d_p^e$$

Step 6: Determination of efficiency index of business operations for entire supply chain, I_E :

$$I_E = \sum_{p=1}^P D_p$$

Efficiency index of business operations expressed on a scale [0-0,1].

Step 7: Determination of the level of performance of the supply chain by using the diagram -"if - then":

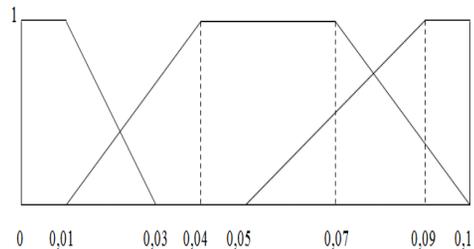


Diagram 1. Determination of the level of performance of the supply chain

Step 8: Determination of priority of initiative management.

5. CONCLUSION

Modern supply chain management is the future for the business of every company in the world, and has a big influence on customer satisfaction. Besides satisfying the customer, supply chain management is facilities job for employees and allows them to work in a better and safer business conditions. When employees and customers are satisfied company can afford to join in social activities. That means successful supply chain is good for customers, employees and for social community life.

In this paper is shown model for determination of business performances of the supply chain. It is a way that shows how can measure the supply chain success. In this way management team know that what will be next steps in planning for future.

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