Study for the optimization of the supply chain in the commercialization of certified organic powdered panela

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Abstract

The general purpose of this research is to carry out a study for the optimization of the distribution chain in the process of production and marketing of certified organic powdered panela, in ASOSEYNEKUN, an association of productive indigenous families of the Sierra Nevada de Santa Marta, based in the theoretical postulates of Castellanos (2015), Mora (2008), Ballou (2004), Palella & Martins (2012), Hernández (2010), among others. The research methodology is explanatory, with a non- experimental, transactional and field design. Of the total of 170 cane producers affiliated with the association, a representative sample of 118 was analyzed, of which 10% was used to measure reliability through Cronbach's alpha (0.924). The results obtained with the instrument, validated by 10 experts, showed that there are differences between the results obtained (significance of 0.0000) with the Anova technique, and, with Tukey's post hoc, it was identified that there is a great difference in the first dimension between provisioning and storage indicators and between order processing and transport in the second dimension, order processing, it has a great difference with transport, concluding that there is poor knowledge in the management of its productive and commercial chain. Thus, actions that lead to an optimization of the Association's distribution chain must be implemented, since weaknesses were evident in indicators, such as the systematization of orders, the commercial relationship between the other services provided, the outsourcing of physical distribution services and, finally, a poor flow of information between the areas in charge, which becomes one of its main problems for the optimal production and marketing of its products.

Key words: distribution chain, commercialization, organic powdered panela, indigenous producers, production

Introduction

The production of panela in the department of Cesar shows low productivity compared to the other paneling departments of Colombia, due to the extension of a traditional production system that generates qualitative deficiencies in the product, in its marketing, and delays in the application of technologies. Thus, it becomes necessary to carry out a study for optimizing the

supply chain in ASOSEYNEKUN, an association of productive indigenous families of the Sierra Nevada de Santa Marta, a main producer of powdered panela in the Caribbean region, interested in marketing their products to foreign markets, with the best quality, reducing costs and providing for the economic, social and environmental development of indigenous communities.

The content of the article begins with the exposition of the problem, the objectives, general and specific, showing the results obtained to date with the realization of a diagnosis on the current situation of the production of organic panela production in Pueblo Bello, Cesar.

The supply chain variable is thus analyzed as an object of study to be able to optimize the indicators that make up the productive and commercial chain, which will then allow designing a strategic plan for the optimization of the distribution chain in the commercialization of the organic powdered panela.

Exposition of the problem

The production of panela is one of the most traditional rural agro-industries in Latin America and the Caribbean. Colombia occupies the first place in terms of per capita consumption, and the second place worldwide in the production of panela (non centrifugal cane sugar), surpassed only by India (Rodríguez, García & Roa, 2004) according to a report for FAO. However, the country presents great contrasts in the distribution of panela production by regions, yielding to the Caribbean region and other regions that produce panela, due to the existence of traditional production methods and high production costs which result from the use of agricultural technologies and industrial rudimentary (Unilibre Repository, 2002).

That is why the low productivity and commercial lag motivate the present investigation that studies the optimization of the supply chain within ASOSEYNEKUN, an organization that has expressed difficulties for the commercialization of its products because it does not have an optimal productive and commercial chain.

The importance of analysis of the supply chain thus lies in the fact that it allows each subprocess that composes to be evaluated, resulting in measures to carry out effective controls in the monitoring of the critical aspects of the business (García, 2006). Consequently, it will provide the company with a strategic plan for decision-making, for which it will offer leaders a global approach that includes the company as an integrated totality of resources, capacity, and potential for decision-making based in trials and not just data (Chiavenato, 2017).

Based on the above, the problem is formulated through the following question: How

to develop a study for the optimization of the supply chain in the commercialization of certified organic powdered panela?

General objective

Conduct a study for the optimization of the supply chain in the commercialization of certified organic powdered panela.

Specific Objectives:

Make a diagnosis of the current state of the production of organic panela in Pueblo Bello, Cesar.

Analyze the distribution chain in the production and marketing process of organic powdered panela.

Design a strategic plan for the optimization of the distribution chain in the commercialization of organic powdered panela.

Methodology

The research methodology according to Palella & Martins (2012) involves the application of a series of rules and strategies that specify how a problem can be addressed, defining, in turn, a quantitative cutting research, such as the one according to which quantitative data on variables are collected and analyzed. This provides a description of the measurement of one or more variables in a group of people or objects.

Méndez, Gordon & Vidal (2018) recommend that investigations of this type should be carried out under the quantitative approach, since data collection and analysis were used to answer the central research question, prioritizing numerical measurement, count and the use of statistics.

Likewise, it is of an explanatory type with a non-experimental transversal design, characterized by the collection of data in a single moment (Fernández, Hernández & Baptista, 2015). The data collection is carried out directly from the reality where the events occur, with the subjects involved, which implies an investigation with field design, without manipulating the variables.

Information and/or data analysis

Population and sample

The population of this study is made up of one hundred seventy (170) indigenous producers from the Sierra Nevada de Santa Marta in the municipality of Pueblo Bello, Cesar, members of ASOSEYNEKUN. According to Tamayo y Tamayo (2009), this population is defined as the total set of individuals, objects or measures that have some common characteristics observable in a given place and time.

Likewise, according to Martinez (2012), a simple random sampling is performed when the population is not large, the units are concentrated in a small area, the investigated characteristic has very little variability. Therefore, from the total of the indigenous producers, a simple random sampling was carried out resulting in a total of 118 producers with a 5% error and a 95% confidence level.

Results

According to Castellanos (2015), a company's supply chain consists of three main processes: order processing, where supply is mainly involved, followed by the production process to reach the customer's attention, and distribution.

After applying the research instrument, results were obtained in the provisioning indicator. 85% of producers said they planned purchases. However, according to what was observed and expressed by them about the difficulties that arise, since the cane cultivation areas are in hard-to-reach territories, mountainous areas where the distances between the paths and the urban area are quite considerable, supply is affected.

Figure 1. Purchase planification

The results obtained for the production indicator, a part of the productive and commercial chain, established that 85% of the cane producers surveyed manage an inventory of raw material. However, of that total, only 54% perform a control of the products stored there which results in problems to supply the production area by not anticipating the existence of cane required, and also the possibility that the cane loses its quality and ripeness.

Figure 2. Control over raw material inventory

Source: own investigation (2019)

This situation is different from the inventory of the finished products, since of the 85% of cane producers surveyed who claimed to have this inventory, all declared to carry out an inventory control of the finished product which would allow monitoring in order to guarantee the safety of the final product.

Figure 3. Control over finished product inventory

Source: Own investigation (2019)

Likewise, the results of the survey also showed that most of the producers agree on the main procedures used for the new cane cultivation, where 100% of the respondents apply a breakdown, ditching, sowing, first weeding, second weeding and peel or final defoliation. Other procedures show a difference in its application. It was observed that, in the visit made to the producers, the processes are managed in an empirical and artisanal way, which is a factor that affects the productivity and competitiveness of the producers, the main focus of this research study.

Figure 4. Procedures performed for new cane cultivation

Source: Own investigation (2019)

In turn, for the physical distribution and distribution channels used by the surveyed

producers, 100% of them claim to use wholesale distribution channels because historically, as farmers, they have partnered to be able to take their products to market.

This is because having difficult access to ways to market their products increases their costs, which becomes the main barrier for the distribution of their products.

Figure 5. Distribution channels

Source: own investigation (2019)

To conclude with the study of the indicators, according to what has been observed, it can be diagnosed that the flow of information through the areas ordered from does not guarantee that the orders are delivered to the client in a timely manner. This can generate discomfort between them since, as stated by Ballou (2004), buyers recognize customer service in the logistics and often even rate it above the price of the product. The project continued with the application of an instrument to 118 producers of organic panela in the Pueblo Bello region (Sierra Nevada de Santa Marta). The statistical approach to the data was carried out using the Variance Analysis technique (ANOVA) and the Tukey Post Hoc Test in order to appreciate the differences of means by dimension, in contrast to the lowest. As for the discussion, the results are interpreted according to the main theory of the study, while the selected background was used to contrast them, also serving in the precision of the conclusions about the behavior found in the variables and their components.

Starting with the first dimension, Materials Management, the statistical technique Analysis of Variance (ANOVA) was applied, which allowed us to specify the significance obtained in the comparison of the averages achieved by the indicators of the dimension, which were

provisioning, production and storage, and inventory, placing a significance level of 0.000. This value was less than 0.05 (0.000 <0.05;

reference significance level), therefore, there are no significant differences between the indicators compared, as shown in Table 1.

For the purpose of analyzing and interpreting results, explanation parameters were established. As pointed out by Kerlinger & Lee (2002), a numerical value is meaningless quantitatively, unless a meaning is assigned. These assignment rules must have correspondence and must be linked to reality.

In this sense, the scale developed for the interpretation of the results was established based on the quantity of the alternatives of the scale, taking into account five (5) categories, which will guide the calculation of the intervals using the following formula: IB = (v - v) / nº categories, where IB interval of the scale, value greater than five (5) and the lowest one (1), resulting in 0.80 (see Table 1).

Chart 1. Scale for Interpretation of Results

Source: own elaboration (2019) Anova factor 1: Management of meterials

Table 1. Homogeneity test of variances

Source: Own elaboration (2019). Data obtained by applying SPSS V-20

Regarding the Tukey Post Hoc multiple ranks test, the established comparison reveals that the differences between the various indicators of the "Management of Materials" dimension do not show significant differences between them, making it possible to appreciate the proximity of the scores reached for each indicator. Even among the one that obtained the highest score, compared to the one that placed the lowest score it shows a non-significant difference. At the same time, the homoscedasticity of the variances between the indicators is highlighted, as can be seen in Table 2.

Table 2. Tukey's HSD

Source: own investigation (2019). Data obtained by applying SPSS V-20

As a result, the first indicator is within the range of moderately present and the other two in the present range, inferring that, despite having indicators that do not show significant differences, an important positioning is revealed in each of the aspects involved in the development of the Management of Materials dimension, by the producers of organic panela, but it presents weaknesses in the knowledge and application of the processes.

Anova factor 2: PHYSICAL DISTRIBUTION

Continuing with the second dimension, Physical Distribution, the statistical technique Analysis of Variance (ANOVA) was applied. It allowed specifying the significance obtained in the comparison of the averages achieved by the indicators of the dimension, which were order processing, service to the customer, packaging, and transport. The level of significance was 0.000, less than 0.05 (0.000 <0.05; level of referential significance). Therefore, no significant differences can be seen between the indicators compared, as shown in Table 3.

Table 3. ANOVA of a factor

Source: own investigation (2019). Data obtained by applying SPSS V-20

In the Tukey Post Hoc multiple ranks test, the established comparison reveals that the differences between the various indicators of the "Physical Distribution" dimension do not show significant differences between them. The proximity of the scores achieved for each indicator can be appreciated, and even the one that obtained the highest score compared to the one with the lowest score show a non-significant difference. At the same time, the homoscedasticity of the variances between the indicators is highlighted, as seen in Table 4.

Table 4. Tukey's HSD

Source: own investigation (2019). Data obtained by applying SPSS V-20

The result is that the first and second indicators are in the range of moderately present and the other two in the present range, inferring that, despite having indicators that do not show significant differences, an important positioning is revealed in each of the aspects involved in the development of the Physical Distribution dimension by the producers of organic panela, which present weaknesses in the knowledge and application of these processes.

Conclusions

After making the diagnosis based on the application of the research instrument to the cane producers of ASOSEYNEKUN, it is concluded that these families must implement actions that lead to an optimization of its supply chain, since there were weaknesses in certain indicators

such as the systematization of orders, the commercial relationship between the other services provided, the outsourcing of physical distribution services and, finally, a poor flow of information between the areas in charge, one of its main problems to develop optimally the marketing of its products.

The company ASOSEYNEKUN, who is responsible for collecting, accompanying and advising the producers of organic panela of the municipality of Pueblo Bello, Cesar, Colombia, should train them in everything related to the different processes of the logistics distribution chain of the product, with special emphasis on processes such as provisioning and order processing, those with the lowest value in the statistical analysis.

The fact that knowledge is given to an indigenous community, such as the Arhuaca ethnic group, located in the Sierra Nevada of Santamarta, Colombia, contributes to the preservation of their culture and ancestral customs in the process of extracting the panela of the sugar cane.

In most of the articles reviewed in Scopus, it is observed how most of the authors write about energy production from sugarcane residues, but very few research on the generation of organic food products, free of Chemicals that threaten human health and help reduce the onset of diabetes.

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