

The Supply Chain Management and Supply Chain Responsiveness in the Competitiveness of the Agrofood Sector: An Econometric Analysis

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Abstract—The purpose of this article is to conduct a theoretical and empirical study in order to analyze how the Supply Chain Management (SCM) and Supply Chain Responsiveness (SCR) affects the competitive advantage of the agrofood sector in 2017, in particular, the exporting companies of berries in Mexico. This work is presented in two parts, as a first part is developed a theoretical analysis of the main studies to measure the variables subject to the study. Subsequently an empirical study is carried out through field work and to process the data a logical econometric model is performed to be able to evaluate the effect of the SCM and SCR on the competitive advantage in the companies exporting berries. The results suggest that the SCM has a positive effect on the competitive advantage of the companies under study, so it is necessary to implement greater practices oriented towards a suitable SCM for the companies to achieve a competitive performance. In the case of SCR, it was found that this variable does not have effect on competitive advantage.

Keywords—Competitive advantage, econometric model, supply chain management, supply chain responsiveness, sustained competitive advantage.

I. INTRODUCTION

THIS paper analyzes the relationship between SCM, SCR, and competitive advantage in the berry export companies from Mexico in 2017. Agriculture is a source of income and food for many of the inhabitants of rural areas of Mexico, this country has the agroclimatic conditions that allow it to produce a large amount of counter-season products. Within agriculture it can be distinguished the production of the berries (strawberry, raspberry, blackberry and blueberry). The merchandising of these fruits is important for Mexico because now the berries have positioned themselves among the main agrofood products that Mexico export to the world. In order to improve the competitive advantage for berry export companies it is proposed to study the impact of SCM practices and SCR in competitive advantage.

The supply chain is a key part of a company, it consists of a set of activities related to the flow and conversion of goods from raw material to finish goods and to the delivery of final goods to final customer which it involves an interconnected network of suppliers, producers, wholesalers, distributors, transporters and retailers, among others [1]. SCM study attempts to maximize the value of the company's resources through a better

use of these resources among the activities that are from the supply of raw material to the delivery of final products to customers [2]. On the other hand, companies must be prepared to respond to the challenges that arise within a highly competitive and changing environment, where customers demand products of high quality and low price [3]. For the challenge that arises within a global environment, SCR studies the ability of a company to address changes in customer demand [4]. In order to study the relationship between the variables, an econometric model is carried out. It is found a positive relationship between SCM and competitive advantage. However, SCR seems to be a variable that does not affect the competitive advantage.

The rest of the paper is as follows: Section II presents the literature review that supports the SCM and SCR variables as a source of competitive advantage. Also a literature review for competitive advantage is presented. Section III contains description of the constructs proposed to carry out the study. Section IV describes the econometric model used to test the hypothesis. Section V highlights the main results achieved from applying the econometric model discussed in this paper. Finally, Section VI contains some conclusions in relation to this research.

II. LITERATURE REVIEW

In the study of strategic management, two perspectives have emerged to find sources of business profitability. On the one hand, the perspective from the competitive environment stands out due to the importance given to the position of a firm within the industry, whose analysis and strategies have been derived from the model of the five competitive forces [5]. On the other hand, there is the Resource-Based View (RBV) approach that has been very influential since attention has been paid to the internal sources of competitive advantages of firms, as opposed to an external competitive advantage [6].

The present study is conducted by the RBV perspective, which establishes that a competitive advantage rests on the idiosyncratic and difficult to imitate resources of the company [7]. The resources of the company are those tangible and intangible assets that are linked semi-permanently to the company, such as brands, knowledge of the technology developed within the company, employment of qualified

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personnel, commercial contracts, machinery, efficient procedures, capital, etc. This approach tries to provide a basis for formulating the strategy to achieve a competitive advantage knowing which resources a firm should be based on, which resources should be developed, in which markets it should be diversified, among other issues [8]. In this sense, [9] presents an analysis of the link between firm resources and sustained competitive advantage, that is, under what conditions the firm's resources can be a source of sustained competitive advantages. According to [9] it is said that a company has a competitive advantage when it is implementing a value creation strategy that is not being simultaneously implemented by any current or potential competitor; and for competitive advantage sustained when a value creation strategy is being implemented that is not being implemented simultaneously by any current or potential competitor and when it is impossible for them to duplicate the strategy benefits.

In the search for sources of competitive advantages, has arisen some work that study SCM as a source of competitive advantage [4], [10]-[16]. Some authors [10] have been working on develop an instrument to measurement to SCM practices using different constructs as information quality, information sharing, customer relationship, strategic supplier partnership, internal lean practices, and postponement to evaluate its influence in two of the performance outcomes of SCM practices, delivery performance and time to market. Its major contribution of [10] was the development of a set of SCM practices constructs as well as a validated measurement instrument for collecting data in studies on SCM practices and their relationships with other organizational processes and outcomes like competitive advantage, SCM performance, and organizational performance. In [15] it can observe the use of strategic supplier partnership, information sharing, information quality, customer relationship and internal operation to assess its relationship with competitive advantage. Another study [11] tests the relationship between SCM practices, competitive advantage, and organizational performance, using as dimensions to measure SCM: level of information sharing, postponement, quality of information sharing, customer relationship, and strategic supplier partnership.

Reference [11] found that higher levels of SCM practices can lead to enhanced competitive advantage and improved organizational performance, and also, competitive advantage can have a direct positive impact on organizational performance. Another work study the role for SCM to achieve competitive advantage using strategic supplier partnership, customer relationship, level of information sharing and quality of information sharing, and postponement, as a constructs for SCM practices [12]. In [13] it presents a research about SCM and its influence on operational performance where as a SCM measurement they considered information sharing, long-term relationship, cooperation and processes integration to measure the SCM practices and finding that SCM in emerging economies can be a source of competitive advantage leading to superior performance in information sharing, long-term relationship, cooperation and processes integration dimensions simultaneously. In [14] is carried out an empirical investigation

between SCM and competitiveness, measuring the SCM as an one-dimensional variable, its results show that SCM has a positive influence in competitiveness level, as well as in the financial performance, cost reduction and the use of technology of the small and medium-sized enterprises. Reference [4] includes in its research the study of SCM, SCR and its impact on competitive advantage, for SCM measurement is used the following constructs: strategic supplier partnership, customer relationship, and information sharing. References [17] and [18] presents special attention to the information sharing as a tool to improve supply chain performance and to improve the supplier network responsiveness, respectively. Also, some research has included the study for SCR as a source of competitive advantage [4], [19], [20]. In [4], suggest that today the current business practices are characterized by variations in demands and differences in customer requirements, and in this sense the paper examines how important are the capacity of the firm to respond to these changes as sustain and further create competitive advantages, for this reason includes in its work the study of SCR using as a constructs operations system responsiveness, logistics process responsiveness, and supplier network responsiveness. In [19] and [20], the same constructs are used as [4] for measuring the SCR. Reference [19] shows that SCR is positively associated with competitive advantage of a firm. In [20] the results indicate that higher level of operations system responsiveness creates higher level of competitive advantage for companies.

III. RESEARCH MODEL AND HYPOTHESIS

The main purpose of this research is to investigate the effect of SCM and SCR to competitive advantage. Hence, the following hypothesis will be tested:

- H1. Strategic supplier partnership is positively related to competitive advantage.
- H2. Customer relationship is positively related to competitive advantage.
- H3. Logistics process responsiveness is positively related to competitive advantage.

Hence SCM refers to a management of material, money, men, and information within and across the supply chain with the purpose of maximizing customer satisfaction and to enhance competitive advantage [4]. Also, SCM can be defined as a coordination and management of a complex network of activities involved in the product manufacturing until delivering a finished product to the end customer. These activities include sourcing of raw materials and parts, manufacturing and assembling products, storage, order entry and tracking, distribution through the various channels and finally delivery to the customer [21]. Further, SCM has been consider as a fusion of various aspects with influences from logistics and transportation, operations management and materials and distribution management, marketing, purchasing and information technology [22]. For its measurement it is used strategic supplier partnership, it refers as a long-term relationship between the firm and its suppliers to achieve significant ongoing benefits due to take advantage of the strategic and operational capabilities of individual participating

organizations [10]. Also, it is included customer relationship that refers to practices implemented to solve customer complaints, establish long-term relationships with customers and improve customer satisfaction [10], [16].

SCR can be defined as the ability of the supply chain to react and address unexpected changes in customer demand [23]. In this work the variable SCR is measure with logistics process responsiveness and it is defined as the capacity of the transportation system, distribution and storage of a company's output to address changes in customer demand [20].

Based on the literature reviewed [4], [11], [12], [19], [24] the constructs to measure competitive advantage for this paper are: price/cost (the ability of an organization to compete against major competitors based on low price), quality (the ability of an organization to offer product quality and performance that creates higher value for its customers), reliability in delivery (capacity of a company to provide on time the products required by its customers), product innovation (the capacity of a company to create new products and introduce them to the market), and time to market (the capacity of a company to introduce new products to the market faster than other companies in its sector).

IV. METHODS

The study is carried out with the purpose to study the effect that has strategic supplier partnership, customer relationship, and logistics process responsiveness in the competitive advantage of the exporting companies of berries in Mexico. Data were collected using questionnaire survey which was administered to the managers of the exporting companies of berries. The respondents were asked to indicate on a scale of 1 (strongly disagree) to 5 (strongly agree) about the extent to which strategic supplier partnership, customer relationship, logistics process responsiveness and competitive advantage affect their company. Due to the independent variables selected in the present investigation are discrete and the relationship that is pretended to be established between the dependent variable and the independent variables, a logit model is used as follows [25]:

$$L_i = \ln \left(\frac{P_i}{1-P_i} \right) = \beta_1 + \beta_2 X_1 + u_i \quad (1)$$

where L is called logit (from it the model name logit) and refers to logarithm of the probability ratio; P_i is the probability that $Y_i = 1$ (that is, that event happens); $1 - P_i$ is the probability that $Y_i = 0$ (that is, that event does not happen); X_1 is the independent variable. The assumption of homoscedasticity states that the variance of the regression errors is constant, the presence of homoscedasticity can carry out spurious regressions [26]. To the purpose to avoid a spurious regression the White Method is applied to the regression presented for this study, this method is robust to the possible presence of heteroscedasticity. [27].

V. RESULTS

In the obtained results, hypothesis H1 affirm a positive

relationship between strategic supplier partnership and competitive advantage. At the same time hypothesis H2 affirm a positive relationship between customer relationship and competitive advantage. H1 and H2 hypothesis are accepted as it it showered in Table I. However, in the case of logistic process responsiveness is not a significant variable that affect de competitive advantage (Table I).

TABLE I
RESULTS

Variable	Coefficient	t-Statistic	Prob.
<i>SSP</i>	0.6503	4.1796	0.0013*
<i>CR</i>	0.2747	1.9641	0.0731**
<i>LPR</i>	0.0693	-0.3679	0.7193
<i>C</i>	-2.9859	-3.0093	0.0109

* Statistically significant at 5% level.

**Statistically significant at 10% level.

In this work, strategic supplier partnership and customer relationship are the constructs to measure SCM Practices. In this sense the results found a positive relationship between SCM and competitive advantage. The results suggest that the beginning (suppliers) and the end (customers) of the supply chain, both are important sources of the berries exporting companies to achieve a competitive advantage between its competitors.

Finally, in the case of this study, the logistic process responsiveness is a construct used to measure the SCR. The results for this variable indicate that SCR do not affect the competitive advantage of the exporting berries companies. This results can be due to that most of the exporting companies are not producers of berries so their inventories depend on the harvests of the producers (suppliers), at the same time the harvests depend on climatic conditions, adding that the products marketed are perishable, all this makes difficult for export companies to have control of their inventories so the response capacity of their logistics systems is limited. However, its offer usually includes events that may affect the availability of its products.

VI. CONCLUSION

In this paper, was studied the competitiveness of the berry exporting companies for the year 2017 in order to analyze the effect of SCM and SCR in the competitiveness of the sector. As a study instrument, a survey was applied. To study the obtained data, an econometric model was carried out to analyze the relationship between the variables SCM, SCR and competitive advantage. The results show that exists a positive relationship between the variables strategic supplier partnership and customer relationship with the competitive advantage of the exporting berries companies, but not the same for the case of the logistic process responsiveness. On the other words, it is concluded that SCM has a positive effect on competitive advantage while the SCR does not affect the competitive advantage. For the importance of the SCM with the competitiveness it is recommended for future works to

incorporate the study of the practices to improve the relationships between suppliers and customers with the companies' subject of study.

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