Business Competitiveness and its Association with Assertive Intrinsic Factors in Plastics Recycling Companies of the Colombian Caribbean Coast

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Abstract

A statistical association study was carried out between Business Competitiveness and the intrinsic assertive factors: Human capital and innovative strategies in plastic waste recycling companies in the Colombian Caribbean region in 2016. The population studied was 68 companies. The instrument for gathering information was the IDB’s Competitiveness Map for study factors and business competitiveness. The project was carried out in three (3) phases: In the first phase, the independent variables human capital and innovative strategies (assertive intrinsic factors) were evaluated through a survey. In the second, the dependent variable business competitiveness was evaluated and in the third, the independent variables (human capital and innovative strategies) were crossed with the dependent one, constructing the bar diagrams of the relationship analysis. The results showed significant statistical significance at a level of confidence of 95% between Business Competitiveness and the factors: human capital (p = 0.0231) and innovative strategies (p = 0.0397).

Keywords: Business Competitiveness, human capital, innovative strategies
Introduction

Dussel (2001) considers competitiveness as a dynamic integration process to international markets of products and countries depending on the conditions of supply and demand. However, Porter (1991) considers the competitiveness of a country linked to those companies that are highly productive due to the efficient use of their capital, natural and human resources [1,2]. On the other hand, Gonzalez (2013) considers that small and medium enterprises have some competitive advantages that benefit them more than large companies due to their smaller size and ease of adaptation to changes in the global economy and to the patterns in the demand of products [3]. In addition to representing more than 95% of the businesses in the world, it is one of the main sources of employment contributing greatly to the economic growth of the region, as stated by Vázquez and Arredondo (2014) [4].

On the other hand, for Baruch (2001) one of the differentiating elements among companies, is the efficiency differentials which can be explained by differences in human capital and their capacities rather than by the characteristics of equipment and infrastructure [5]. On the other hand for Gill and Olleta (2007) [6], Nelson y Phelps (1966) [7], the human capital with the highest educational level takes advantage and get better game of the technologlical resources available, making them more productive and generating greater income and production for the company. For Valencia (2005) maintaining, strengthening competitiveness and business positioning in national and international markets will depend to a large extent on the organizational ability to hire, train and conserve the best resource of available human capital. In the same way, the organization must allow the free development of human capital in the organization by providing knowledge and tools that empower their personal development in the company [8].

In this same sense Boisier (2002), considers that the human capital represents the capacity of the subjects of the organization to improve the productive systems by applying their knowledge and skills [9,10]. For Conan et al. (1990) [11], the organizational performance is determined by the development, technological capacity and innovation articulated to the competitive strategy defined in the company. Other authors such as Porter (1980), Miles and Snow (1978) [12,13], Camison (1997) [14] consider that in successful organizations are those that have a systematic approach, proactive strategic behaviors with a focus of adaptation to the environment and elements of innovation, quality, productivity and customer satisfaction. In this sense, the market is a determinant of business strategies that are defined to generate adaptation of the organization to globalized changes framed in strategic prospective orientations and analytical. Also López et. al (2003), consider that the new technological knowledge generated from the existing ones generally arise from innovation processes which can be used to obtain new goods and services [15].
In the present investigation, the association between business competitiveness with the assertive intrinsic factors: human capital and innovative strategies, in plastic waste recycling companies of the Colombian Caribbean region was evaluated.

**Materials and Methods**

**Population and sample size:** The study was carried out in a population of 68 companies that recycle plastic waste from the departments of Magdalena, Bolívar, Guajira and Atlántico. The sample was 58 companies categorized as indicated in Table 1.

The number of direct jobs of the companies participating in the study were:
- a. Microenterprise: 0 < Number of jobs ≤ 10
- b. Small company: 10 < Number of jobs ≤ 50

The previous companies surpass the 5 years of antiquity in the Market.

**Table 1. Classification of companies participating in the study**

<table>
<thead>
<tr>
<th>Department</th>
<th>Microenterprise</th>
<th>Small company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlántico</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Guajira</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Bolívar</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Magdalena</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>

| Percentage of companies participating in the study | 29.3% | 70.7% |

Note: Classification according to Zevallos 2003 [16].

To estimate the size of the sample when it comes to a finite population of less than 100,000 individuals is calculated according to Fong et al. (2017) [17] by equation (1):

\[
n = \frac{\sigma^2 Npq}{e^2(N-1)+\sigma^2 pq}
\]

\(n\): Number of sample elements; \(N\): Total number of elements of the population; \(q\): Probability that an element is not selected (\(q = p\)); \(p\): Probability that an element is selected (50%); \(\sigma\): Level of confidence chosen (95%); \(e\): Error allowed (5%)

**Variables, phases, instruments and reliability of the test:** The variables used in the research were classified into two (2) categories (independent and dependent):
- a. Independent variables: Human capital and innovative strategies (assertive intrinsic factors)
- b. Dependent variable: Business competitiveness

The research was carried out in three (3) phases: In the first, the independent variables human capital and innovative strategies (assertive intrinsic factors) were
evaluated by means of a survey applied to each of the companies participating in the study according to the classification established in Table 1. In the second, business competitiveness was evaluated according to the indicators: Competitive situation of the company with respect to the business sector of recycling of plastic waste, use of competitive strategies and innovation and business improvement. In the third, the independent variables (assertive intrinsic factors) were crossed with the dependent: business competitiveness, constructing the contingency tables and the bar diagrams of the relational analysis. The instrument was validated for its application in Latin America by the IDB [18]. The internal consistency of the test was determined by Cronbach's Alpha [19].

**Instruments:** Business competitiveness was measured according to the indicators: competitive situation, use of competitive strategies and business improvement according to Ibarra et. al (2017) [20] and the instrument designed by the IDB [18] called the IDB's Competitiveness Map [18] whose questions were modified and adapted to the case at hand. Human capital was evaluated through a survey using the indicators proposed by Hurtado and Vargas (2013) [21]. The innovation strategies were evaluated according to the instrument designed by Lopez (2015) [22] based on the green paper OECD Eurostat (2005) [23], the main global parameter for the measurement of innovation. The instruments were structured according to the Likert scale where each variable studied was assessed on a scale of 0 to 100 points with the following interpretation: Low: 0-60 points and High: 61-100. The coefficients obtained for the Cronbach's Alpha by means of equation 2 for each questionnaire were the following: For the questionnaire with the indicators of Ibarra et. al (2017) [20], competitiveness map of the IDB [18], questionnaire with the indicators proposed by Hurtado and Vargas (2013) [21] and the instrument to measure innovation strategies based on López (2015) [22] and in the Green Book OECD Eurostat (2005) [23] were 0.90, 0.88, 0.93 0.91 which are considered with high reliability.

The dependent variable Business competitiveness was classified into two categories: LBC: Low Business competitiveness (scores below 60 points (LBC <60)) and HBC: High Business competitiveness (scores equal or greater than 60 (HBC≥ 60)). The independent variables (assertive intrinsic factors) were classified into two categories: a) Low human capital (LHC <60 points) and high human capital (HHC ≥60 points) b) Low innovative strategies LIS (LIS <60 points) and high innovative strategies (HIS ≥60 points). **Statistic analysis:** Initially, business competitiveness was measured using the "IDB Competitiveness Map" instrument [18], which was classified into two (2) categories: Low (0-60 points) and high (61-100 points). The same was done with the questionnaire with the indicators of Ibarra et. al (2017) [20], questionnaire with the indicators proposed by Hurtado and Vargas (2013) [21] and the instrument to measure innovation strategies based on López (2015) [22] and in the green book OECD Eurostat (2005) [23]. Subsequently, the number of cases in low and high category was determined for each one of the variables object of the present study, constructing the contingency tables. Next, the Chi-Square test was evaluated between business competitiveness and independent variables, determining their degree of statistical association.
Results and Discussion

According to equation 1, with a confidence level of 95%, a sample size of 58 business is obtained. The instruments were applied for the companies defined in Table 1. For the analysis of the relationship between business Competitiveness and independent variables (assertive intrinsic factors), the Chi-Square test was carried out. Table 2 indicates the values of p (statistical significance) where it is observed that there is a relationship of high statistical significance between business competitiveness with human capital and innovative strategies (p <0.05).

<table>
<thead>
<tr>
<th>Variable (assertive intrinsic factors)</th>
<th>Chi-square</th>
<th>GL</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human capital</td>
<td>5.16</td>
<td>1</td>
<td>0.0231</td>
</tr>
<tr>
<td>Innovative strategies</td>
<td>4.23</td>
<td>1</td>
<td>0.0397</td>
</tr>
</tbody>
</table>

** Statistical significance at a confidence level of 95%

Figure 1 shows the bar graph between business competitiveness and human capital.

![Business Competitiveness-Human Capital](chart)

Figure 1. Bar graph business competitiveness-human capital

The 17.2% (10 cases) of the companies studied achieved high business competitiveness based on the high capacities of human capital they have. This is due to the fact that human capital constitutes one of the differentiating elements in companies, since they use more efficiently the technological resources available, generating higher income and production in the company, according to Baruch (2001), Gill and Olleta (2007), Nelson and Phelps (1966) [5, 6, 7]. 15.5% (9 cases) of the companies studied reached low levels of business competitiveness due to the low human capital capacities they have. This is because the companies studied do not have a clear organizational strategy to hire, train and select the best human resource available in the market. Likewise, these companies do not allow them the free development and neither facilitate knowledge and tools that may maximize the development so of the human capital and the company whatever significantly
affects the productive system of the organization according to the approaches of Valencia (2005) and Boisier (2002) [8, 9, 10].

20.7% (10 cases) reached high levels of business competitiveness despite having low levels of human capital. This is due to the fact that in this type of company, the organizational performance has allowed to generate development from the investment in technological infrastructure and innovative projects in association with companies of the same type, which has had an impact on increasing competitiveness neglecting the levels in the human capital of the organization as proposed by Conan et. al (1990) [11]. In the same way it was possible to identify that this type of companies have a systematic approach and proactive strategic continuously focused on customer satisfaction neglecting to human capital, as proposed by Porter (1980), Miles y Snow (1978) y Camison (1997) [12,13,14].

46.6% (27 cases) developed low levels of business competitiveness despite tell with high levels of human capital that integrate it. This is due to the fact that in these companies the free development of human capital has not been allowed, which has negatively impacted the levels of business competitiveness as it is proposed by Valencia (2005) [8].

The 13.8% (8 cases) of the companies studied reached high levels of business competitiveness by implementing of high innovative strategies in their processes. This is due to the fact that this type of companies have implemented elements of innovation, quality and productivity, which has allowed them to adapt to globalization processes according to proposed by Camison's (1997) [14]. In the same way, these companies have generated new technological knowledge of the innovation processes they have implemented allowing them to obtain new goods and services according as proposed by López et. al (2003) [15]. 19% (11 cases) of the companies studied achieved low levels of business competitiveness by using low innovative strategies in their processes. This is because in this type of companies, new technological knowledge is not being generated because they lack innovation strategies for the products they commercialize. This has not allowed them to increase their business competitiveness processes, according as proposed...
by López et. al (2003) [15]. 50% (29 cases) of the companies studied reached low levels of business competitiveness by implementing high innovative strategies in their processes. This is very likely due to the fact that the innovative strategies used are not in line with the client's needs, nor are they positively impacting the goods and services offered by the company generating decrease in their levels of competitiveness according as proposed by por Camison (1997) and López et. al (2003) [14,15]. The 17.2% (10 cases) of the companies studied reached high levels of business competitiveness by using low innovative strategies in their processes.

This is because many of the participating companies have a goodwill in the market and have a long-standing positioning in addition to the recognition they have in the sector which has prevented them from designing aggressive plans of innovative strategies, that is, in this type of companies it is necessary to implement the approaches of Conan et. al (1990) [11].

Conclusion

Based on the analysis as above, it is concluded as follow: There is a statistically significant relationship between business competitiveness and human capital (assertive intrinsic factor) at a 95% level of confidence in plastics recycling companies on the Colombian Caribbean coast. This is due to the diverse capacities that human capital possesses in this type of companies. In addition, this type of company is hiring, training and conserving the best human resources available in the market with the aim of improving current production systems. There is statistical significance at a 95% level of confidence between business competitiveness and the innovative strategies (assertive intrinsic factor) used in this type of company. This is because they are using the best technological resources available in the market to generate a competitive advantage through innovation processes. In addition, it has allowed them to position themselves effectively in national markets.

References


Received: May 26, 2018; Published: June 27, 2018