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## Organizational Culture in Brazil, Argentina and Mexico: A Comparative Study in the Automotive Industry

Cultura organizacional en Brasil, Argentina y México: un estudio comparativo en la industria automotriz

Cultura Organizacional no Brasil, Argentina e México: Um Estudo Comparativo na Indústria Automotiva

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### ABSTRACT:

This research aims to compare the cultural dimensions of the automotive industry in three countries, Brazil, Argentina, Mexico and discuss Hofstede model. We use two techniques of analysis, the first being described in the model of Hofstede and Minkov (2013) and the second using the statistical technique indicated by critics of the model (McSweeney, 2013). The results found in regions of Brazil and Mexico indicate that in the same country exist different values of cultural dimensions. Regarding the critics indicated in the literature, this study found evidence in line with the critics that the model, although pointing to cultural differences, is not supported by statistically significant differences to measure and compare cultures between countries. As a contribution, this study indicates the need for the proposed model to consider robust statistical techniques, probabilistic sampling and comparative statistical analysis techniques to prevent misdiagnosis.

**KEYWORDS:** Culture, National culture, Hofstede's Cultural dimensions.

### RESUMEN:

Esta investigación tiene como objetivo comparar las dimensiones culturales de la industria automotriz en tres países, Brasil, Argentina, México y discutir el modelo de Hofstede. Se utilizaron dos técnicas de análisis, la primera descrita en el modelo de

Hofstede y Minkov (2013) y la segunda utilizando la técnica estadística indicada por los críticos del modelo (McSweeney, 2013). Los resultados encontrados en las regiones de Brasil y México indican que en un mismo país pueden existir diferentes valores de dimensiones culturales. En cuanto a las críticas señaladas en la literatura sobre el modelo utilizado, este estudio encontró evidencia en línea con las críticas de que el modelo, aunque apunta a diferencias culturales, no se sustenta en diferencias estadísticamente significativas, para medir y comparar culturas entre países. Como contribución, este estudio indica la necesidad de que el modelo propuesto considere técnicas estadísticas robustas, muestreo probabilístico y técnicas de análisis estadístico comparativo para evitar errores de diagnóstico.

**PALABRAS CLAVE:** cultura, cultura nacional, dimensiones culturales de Hofstede.

## RESUMO:

Esta pesquisa tem como objetivo comparar as dimensões culturais da indústria automotiva em três países, Brasil, Argentina, México e discutir o modelo de Hofstede. Foram utilizadas duas técnicas de análise, a primeira sendo descrita no modelo de Hofstede e Minkov (2013) e a segunda utilizando a técnica estatística indicada pelos críticos do modelo (McSweeney, 2013). Os resultados encontrados nas regiões do Brasil e do México indicam que em um mesmo país podem existir diferentes valores das dimensões culturais. Em relação às críticas apontadas na literatura sobre o modelo utilizado, este estudo encontrou evidências em consonância com as críticas de que o modelo, embora aponte para diferenças culturais, não se apóie em diferenças estatisticamente significativas, para medir e comparar culturas entre países. Como contribuição, este estudo indica a necessidade do modelo proposto considerar técnicas estatísticas robustas, amostragem probabilística e técnicas de análise estatística comparativa para prevenir diagnósticos errados.

**PALAVRAS-CHAVE:** Cultura, Cultura nacional, Dimensões culturais de Hofstede.

## INTRODUCTION

New forms of management that characterize the current organizational setting demands a high level of responsibility and more complex tasks. From the 2000s, with increased international trade and fiercer competition, changes occurred in the hierarchy and structure of organizations (Hofstede & Minkov, 2013). Thus, there is an increasing need to deal with external changes that include the demands of customers and competitors, new technologies, government, and legislative issues. In this way, organizations are forced to constantly revise their methods and models in addition to adapting the culture and internal processes (Walker, Walker & Schmitz, 2003).

The importance of studies on culture and its impact on organizations, for both large companies and SME's, can be seen in various academic research, such as: comparing assimilations between Chinese and Indian entrepreneurs (Hamilton, Dana & Benfell, 2008), identifying factors that impact change and performance in small and medium enterprises (SME's) (St-Jean, Julien & Audet, 2008; Hundley & Hansen, 2012), with a description of the relationship between entrepreneurship intent and culture (Mueller, Zapkau & Schwens, 2014), analyzing culture as a factor of adaptation in a business model in new markets (Dalby et al., 2014; Lai & Yang, 2017) and the description of culture mechanisms in corporate entrepreneurship (Arz, 2017).

Among the research on the impact of national culture in organizations, stands Hofstede (1980), who aimed to measure cultural dimensions with an anthropological focus where all nations are holding similar problems, although react differently to each. The dimensions of the measurement system of the culture involve accepting the complexity of classifying cultures. To Silverthorne (2005), the classification methodology of cultural dimensions of Hofstede (1980), enabled the understanding of the basic values of a society and how they differ. However, several authors state that Hofstede's methodology suffers critical weaknesses in terms of the quality of analysis (Bearden, Money & Nevins, 2006; Fang, 2003; Spector, Cooper, & Sparks, 2001; McSweeney, 2013).

Extant research addresses different points of culture in relation to insertion of new employees (Bye et al., 2014), compared with cultural intelligence (Mali & Zikic, 2014; Chen, Wu & Bian, 2015; Buckner, Furrer & Lin, 2015), relationship with practices (Fisher et al., 2014; Dupuis, 2014; Galanou & Farrag, 2015; Jentjens & Brandl, 2015), culture diagnostics countries and organizations (Hill, 2014; Epaminonda, 2014; Shaw,

Erickson, & Nasirzadeh, 2015, Jönsson et al., 2015) as well as replication of Hofstede's research (Hofstede & Minkov, 2013; Mederer, Holtbrügge, & Shuster, 2014; DiRienzo & Das, 2015).

Although some researches replicate the author's model; Bearden, Money and Nevins (2006), Fang (2003), Spector, Cooper, and Sparks (2001), and McSweeney (2013) criticize it. The authors point out that the model in question ignores causal influences, other cultural factors and criticize that the form of analysis does not consider appropriate statistical techniques to calculate the scores. These authors indicate the need for appropriate statistical tests to assess the significance of differences pointed out in the Hofstede and Minkov (2013) model. This is what justifies the present research.

In view of these considerations the research aims to compare the cultural dimensions of the automotive industry in three countries, Brazil, Argentina, and Mexico, according to the model of Hofstede and Minkov (2013) and compare it with the statistical technique indicated by Bearden, Money and Nevins (2006), and McSweeney (2013).

As justification, Hofstede and Minkov (2013), Mederer et al. (2014) and DiRienzo and Das (2015) point out that the new studies on culture should be performed to assess alignment with the research of Hofstede (1980) and investigate possible discrepancies that may arise from a replication, this being the first contribution of this article. Another contribution arises due to the criticism of the creator of the model suggested as future studies indicated by McSweeney (2013). From an organizational point of view, after bibliometric research in Scopus databases, Sage and Wiley, with the descriptors: "Culture" and "Organizational Culture", there were no publications that relate this type of organization as well as any study on the automotive sector to construct culture and empirical test about the critics of Hofstede model.

The expected contributions deal with the verification of the need to improve the model proposed by Hofstede and Minkov (2013), regarding the need for statistical validation, sampling techniques and comparative analysis techniques by statistical assumptions. As described by some researchers in the field of culture, the diagnosis of culture can be of great value to managers of small, medium and large corporations in allowing appropriate changes to organizational strategies. Hamilton, Dana and Benfell (2008) state that national culture can influence significantly as the founders of small businesses and on how owners operate.

## CULTURE

As stated by Hofstede and Minkov (2013), Mahadevan (2015) and Vollmer and Wolf (2015), there is no single meaning of culture. For these authors, the unique aspect of national culture complicates the determination of a global significance.

An understanding of the interconnection of these layers allows to comprehend the primary role of culture. Taras, Kirkman and Steel (2010), emphasize the complexity of interconnections and breadth of culture in their research. Cultural differences are essential variables for the understanding of social and organizational behavior. Culture has a direct connection with internal beliefs and values of a society. Therefore, it is possible to infer that individual behaviors may vary around culture (Silverthorne, 2005).

Hofstede, Hofstede and Minkov (2010) believe that the world has several confrontations between individuals, groups and countries that think, feel and act differently. At the same time, these groups and countries face common problems that require cooperation between them in order to solve them. Therefore, comprise singularities and differences between cultures is essential.

Whereas companies aim to minimize integration costs and cultural conflicts, Kogut and Singh (1988) conducted a study with 228 entrants organizations in the US market, which reported that the entry strategy in the US market has been influenced by cultural issues, specifically the index of tolerance to uncertainty. This study was consistent with the theory of Hofstede, Hofstede and Minkov (2010), which stated that organizations should understand the cultural dimensions of the market in which they wish to join.

Silverthorne (2005) and Hofstede, Hofstede and Minkov (2010) consider cultural issues in a more general way. For these authors, with due disproportions, lie the key issues in the relationship between individuals of different countries or regions, with these questions being the solutions of common problems among these cultures.

The Hofstede (1980) research, encouraged the growth of interest in the subject and with the participation of many workers in more than fifty countries (Martin & Karen, 2002). The first Hofstede research took place between 1967 and 1973. The study compared national values and concluded that the differences between national cultures can be identified by four bipolar cultural dimensions (Martin & Karen, 2002). In the author's second study (Hofstede & Bond, 1988), the four cultural dimensions of the first survey were related to the dimensions described in a survey of Chinese culture. The research resulted in the fifth dimension, linked to Chinese cultural values that guide the long-term economy, personal responsibility, and self-respect. In 1991, the cultural dimension "long-term orientation" was inserted into Hofstede's research (Martin & Karen, 2002).

In a third study, Hofstede, Hofstede and Minkov (2010) investigated the effects of five national cultural dimensions into two periods of economic growth of a country (1965 and 1987). This work focused on economic factors (GDP and per capita income) related to culture. The research concluded that the value of national culture produced and impact on over 80% of the differences in economic growth rates (Martin & Karen, 2002). Small and medium enterprises (SMEs) are important to most economies in the world. Understanding factors that contribute to the success of organizations, is critical to the performance and sustainability of organizations (Ong & Ismail, 2012).

The dimensions of culture were defined from anthropology which states that all societies have the similar problems, but develop different answers to each of them. Therefore, the cultural dimensions are related to issues common to all societies (Hofstede, Hofstede & Minkov, 2010):

- Power distance (PDI): is deliberate as the level of inequality noticed by society;
- Uncertainty avoidance (UAI): The uncertainty avoidance is defined as the degree to which uncertainty is perceived as a threat, leading to anxiety for the future;
- Individualism versus collectivism (IDV): is defined as the degree to which priorities are given to personal interests at the expense of collective wills;
- Masculinity versus feminism (MAS): this cultural dimension determines the degree by which the priority is given to success at the expense of quality of life;
- Long term orientation (LTO) is the level of a society which prioritizes the present and the future;
- Indulgence versus restriction (IVR): is linked to companies that prefer the quality of life through a living freestyle (Hofstede, 2013).

Several studies used the Hofstede model on different problems faced by societies. Hundley and Hansen (2012) point out that national culture and performance may be correlated, although the authors may point out that causal connections are unclear. Given this aspect, diagnoses that analyze differences in national cultures can contribute to public policies regarding changes that strengthen entrepreneurship. Bye et al. (2014) investigated the effects of cultural adaptation of foreign applicants interviewed for jobs in Norway in ten different companies. The result indicated that local and foreign workers would have equal hiring chances. In expanding to new markets, considering internationalization, culture is configured as a fundamental factor of analysis to ensure competitiveness and success in expansion (Dalby et al., 2014; Lai & Yang, 2017).

Some research, such as Malik, Cooper and Zikic (2014), Chen et al. (2015) and Bucker, Furrer and Lin (2015), sought to understand the relationship between cultural intelligence and some specific variables. Malik, Cooper and Zikic (2014) investigated cultural intelligence and socialization of immigrants. Chen et al. (2015) examined the relationship between cultural intelligence and cross culture conflict management style in Asia. The results showed that cultural intelligence positively interfere in to check adjustments. On the other hand, the leadership styles can generate negative influence. Bucker, Furrer and Lin (2015) confirmed



the study by Ang et al. (2007) on cultural intelligence in a study focused on the QC scale, an instrument developed by Ang et al. (2007), consisting of four dimensions.

Mahadevan (2015) and Vollmer and Wolf (2015) focused on the relationship between culture and trading levels. The authors sought to understand how intercultural negotiations evolve as a process inserted in a social context, considering national cultures disparities. The culture study involving other constructs, such as culture are also present in the academic literature (Hill, 2014; Epaminonda, 2014; Shaw et al., 2015; Johnson et al., 2015). For Hill (2014), managers are presented as morally neutral employees and act only in the interests of the company. For Epaminonda (2014), the focus was to analyze the changes in the concept of authority relationship. Shaw et al. (2015) studied the discrepancies between the leaders of Iran, Australia, and the United States.

Fisher et al. (2014), Dupuis (2014), Galanou and Ferrag (2015), Pekerti and Thomas (2015) and Jentjens and Brandl (2015) studied the relationship between strategies and some company management tools and culture. Fisher et al. (2014) examined how employees in six different regions of Asia and Latin America perceive the organizational practices of the companies in which they work and how these perceptions converge with company profiles. Considering that only Hofstede had inserted Latin America and Asia in cross-cultural studies, the main contribution of the research consisted in inserting these two regions in a research with this typology. Dupuis (2014) conducted a research aimed at demonstrating the variety of individual perceptions from a given culture, considering management practices in another culture. Galanou and Ferrag (2015) had two objectives with their work: to test predictions regarding the individual cultural orientations; to investigate the behavior of intracultural communication versus intercultural interactions with the main one of the exploration of the behavior of adjustment of strategies in the cultural interactions. The study provided an empirical justification for the relative relationship between individual cultural factors and decision-making strategies.

Also, in the recent literature on the subject, there are the researches of Minkov and Hofstede (2014), Mederer et al. (2014), and DiRienzo and Das (2015). Minkov and Hofstede (2014) replicated Hofstede's (1980) survey using a national sample in European countries, focusing only on the cultural dimension known as "uncertainty aversion". Mederer et al. (2014) verified the relationship between multiculturalism of European football teams and professional performance. The study used secondary data from two specific websites. The websites had large databases and European league team statistics. The research results showed that high levels of multiculturalism can undermine collective performance. DiRienzo and Das (2015) focused on analyzing the relationship between three different cultures and the level of innovation and corruption in a country, and the result provided theoretical and empirical evidence that corruption and high levels of diversity in a society's impact innovation capacity of a country.

However, the Hofstede study is also criticized by scholars, especially about the generalization of the national culture through a regional sample. However, Silverthorne (2005) argues that the author's research proposed cultural generalization, but clarifies that generalizations represent the majority, not the whole. In this paper, Hofstede's model is used to analyze the multidimensionality of the construct culture (Hofstede et al., 2006; Fang, 2003; Spector, Cooper, and Sparks, 2001). They also affirm that the methodology when compared with other studies presents differences indicating the need to develop new measures to capture the perception of multidimensional culture. To them, the author's model, asked at the individual level, can present abstract values in terms of very different conceptions for everyone. Another point is the Hofstede's calculation for a culture needs to be more robust in terms of statistical analysis. This critique is deepened by McSweeney (2013), who argued that individual analysis cannot capture the effects of dimensions. Hence, the need to follow more reliable statistical parameters in the comparison of culture between countries. In the author's view, the Hofstede model suggests 50 people as sufficient to validate a culture view. In this sense, the counterpoint is the necessity of a representative sampling that cannot be left aside in the culture research.

Finally, another criticism of the work of Hofstede and Minkov (2013) refers to the fact that the calculation of the dimensions of the culture of a single subsidiary allocated in a region of the country, may be considered insufficient to classify the national culture.

## METHODOLOGY

The company object of this study is part of an industrial group with founders of the European automotive industry present in 190 countries. The survey was conducted in Brazil, the two plants are located in northeast and southeast region with 38,000 workers; Mexico, the two plants are located in north and central region, 11,800 employees; and Argentina, only one industrial plant located in the northwest region with 4,200 workers. All the productive plants of the three countries have a productive capacity of more than 200 thousand vehicles per year. The productive patterns of working hours and process of production are similar, however in the northeast region of Brazil, the Argentinean northwest and central Mexican have the production of smaller number of models (three in the first plant, one in the second plant and three in the Mexican plant). The other regions have the production of eight models (Southeastern Brazil) and six in the plant located in Southeast Mexico (O Globo, 2017).

To collect data, the 2013 questionnaire VSM (Value Survey Module), originally developed by Hofstede between 1969 and 1973 together with the IBM workers, was used. This tool is the evolution of the first questionnaire, updated in 2013 to clarify the six cultural dimensions (Hofstede & Minkov, 2013). It was sent by e-mail address to all employees of the three countries and was answered through a link to the survey monkey management platform, and it occurred between November 2016 and May 2017 at random, as it was not possible to identify the sectors and specific areas of the workers that formed the sample. Following the model of Hofstede and Minkov (2013), the ideal sample is 50 respondents in each country.

The 24 questions of the questionnaire can calculate the six-dimensional index of a national system of values: power distance (large versus small), individualism versus collectivism, masculinity versus femininity, uncertainty avoidance (strong versus weak), long-term orientation versus short-term orientation and indulgence versus resilience. All survey questions were scored on a five-point scale (1-5).

For data analysis four steps were followed. The first, as Hofstede and Minkov (2013) model, each area surveyed was analyzed within the three countries, comparing the results with previous studies followed by bivariate analysis statistics indicated in literature (Field, 2013) and proposed by model critics of Hofstede (Bearden, Money & Nevins, 2006; Fang, 2003; Spector, Cooper & Sparks, 2001; Mcsweeney, 2013).

To compare countries, we used the Mann-Whitney test when the data is collected from different respondents and are under a non-normal distribution. If bilateral  $p$  exceeds 0.05, there is no significant difference between the two samples. The effect size can be analyzed depending on the values of the correlation coefficient, where in  $0.1 \pm$  effect is small;  $\pm 0.3$ , an average effect; and  $\pm 0.5$ , a large effect. The Kruskal-Wallis test is still used when data is collected from different respondents and are in a non-normal distribution. If the  $p$ -value exceeds 0.05, no significant difference between the samples (Field, 2013).

## RESULTS AND ANALYSIS

In relation to the characterization of the respondents and the total valid questionnaires returned were 350. From these, 171 questionnaires were retrieved from Brazil: the plant in South-city received responses 115 (32.85% of overall total), and Northeast 56 (16% of the total). Already international plants totaled 179 validated questionnaires. For Mexico, 119 questionnaires were validated (33.90% of total) divided into 59 to the city of central Mexico (16.85% of the overall total) and 60 to the city of the northern region of that country (17.15% of the total). Argentina accounted for 60 valid questionnaires (17.15% of the overall total).

As for the gender of the respondents, the overall total is only 23% female compared with 77% of males, represented by 123 respondents in Brazil (Northeast, 42 and south 81), 96 Mexico (center, North 47 and 49) and 50 of the Argentina plants. The women respondents from Brazil were 48 (northeast, 14 and southeast, 34), 23 from Mexico (Centro, 12 and North 11) and 10 respondents from Argentina. At the age of respondents, in general, it was noted that 65% of employees are aged between 30 and 49 years highest average in the three countries, though the data includes the participation of the respondents aged between 21 and 59 years.

Brazil, Argentina and Mexico comparison following the methodology of Hofstede and Minkov (2013)

Comparing Brazil and Argentina (Table 1), considering the dimensions “PDI” and “IDV”, the differences between countries were not significant in relation to the adopted model. “PDI” showed an irregularity of 16 points, while the index “IDV” was 0. While the score of “MAS” showed a difference of 22 points. On the other hand, the contents of “ISU” and “IVR” have a larger gap portrayed with 91 and 31 points respectively, and the dimension “LTO” showed only 7 points. These data indicates that the organizations may have absorbed the spread of the organization’s values, even in different locations, showing an appropriate strategy in relation to the dissemination of culture and values (Mahadevan, 2015; Vollmer & Wolf, 2015).

TABLE 1.  
Indices of the cultural dimensions of Brazil and Argentina

Country	PDI	IDV	MAS	UAI	LTO	IVR
Brazil	133	136	100	57	97	148
Argentina	117	136	122	48	90	179
Mexico	107	120	125	102	103	119

Elaboración Propia

Note Power distance (PDI); Uncertainty avoidance (UAI); Individualism versus collectivism (IDV); Masculinity versus feminism (MAS); Long term orientation (LTO); Indulgence versus restriction (IVR)

Considering the size “PDI”, Brazil presented a higher level (133) than Argentina (117). Taking into account the methodology of Hofstede (2013), Brazil would have greater willingness to respect the hierarchy and greater distance between leader and follower. You can make a parallel with the comparison between Brazil and Argentina and the research of Dheer et al. (2014). This study compared the national cultures of Canada and the United States due to the business relationship and geographic closeness between the two countries. They ascertained that the cultural traits of each country are strong enough to distinguish the cultures of both countries.

Brazil and Argentina showed equal scores (136) at the level of “IDV” and both were above average. Therefore, according to the method of Hofstede and Minkov (2013), they can be considered individualistic culture of countries where the tasks and activities are more important than personal relationships. According to Billing et al. (2014), in individualistic culture's career, success and personal ambition are directly related to personal fulfillment. When the needs of the job and family conflict, members of individualist cultures tend to feel guilt for changing the time of your family to meet their own ambitions. Argentina (122) showed a higher masculinity index than Brazil (100) and very close to Mexico's (125). Both were classified as male national culture of countries which means working in a tenser atmosphere and fewer women in technical positions. In addition, there is an expectation that superiors are more decisive, firm, assertive, competitive, and fair. Brazil has achieved an intermediate score for this cultural dimension being less masculine society among the countries surveyed. This can portray a professional environment in which women are more embedded in technical activities and leadership positions, thus there is less conflict between genders.

Fisher et al. (2014) conducted a survey in six natural regions to ascertain the perception of employees regarding the organizational practices of the same company. They concluded that, although the organizational culture is the same, each region has its own perception of organizational practices. In addition, this index has a strong relationship with the leadership style because countries with high masculinity indices have managers who are heroes, and this creates an expectation of subordinates that their leaders are decisive,



firm, assertive, aggressive, competitive, and fair. Vollmer and Wolf (2015), considering only masculinity, conducted a study comparing the imbalance between two styles of leadership in a company. It was given focus on how these managers dealing with conflicts. The survey found that countries with lower rates of masculinity tend to generate more mediators and less conflicting leaders.

Brazil (57) and Argentina (48) had low scores for "IDV". To Hofstede (2013), this indicates that cope well with the unpredictability and the new. However, it should be noted that the scores show that Argentines suffer less the effect of unpredictability than the Brazilians. It notes that the original research of this author for both countries showed high levels of uncertainty avoidance, perhaps due to economic and political uncertainties in both countries have throughout history. Therefore, low rates presented in this research may indicate that the organizational cultures of the plants involved in the research inspire greater confidence in the workers and thus generate a different perspective to this dimension.

Plant in Argentina proved to be greater inclination to restriction, showing a rate of 179 points for the cultural dimension "IVR", higher than Brazil, 148. However, both countries have rates above the average of 100 points, as Hofstede method and Minkov (2013) to this cultural dimension. Therefore, according to the methodology used in this research can be classified as countries with trends restriction. Countries with this configuration could suppress the satisfaction and control behavior. In addition, individuals have a propensity to feel victims and comparing with others. Brazil (148) is a country more prone to restriction than Mexico (119), that the Brazilian possesses more controlled behavior and represses their wills. Mexico is also classified as a less forgiving country. To Alcadipani and Crubellate (2003), Brazil dominates a negative view of Brazilian culture compared with other cultures, especially with the cultures of more developed countries.

With an index of 97 points, Brazil is below the average of 100 points to the cultural dimension "LTO". However, in comparison with Argentina (90) has a higher index. So, according to Hofstede (2013), both countries can be classified as having oriented cultures for the short term, meaning that have expectations of quick results and respect the traditions.

Comparing the differences in the cultural dimensions of Brazil and Mexico, they showed considerable distances to all the cultural dimensions. Of these, the most relevant were, beginning with the greatest difference, "UAI" (45 points), "IVR" (29 points), "PDI" (26 points) and "MAS" (25 points). "IDV" and "LTO" showed smaller distances, respectively, 16 and 6 points. Compared with Brazil (133 points), Mexico presented a level of "PDI" with 107, meaning that in Mexico there is a lower power distance between leader and follower. In the comparison between Argentina and Mexico identified the discrepancy was minor. This result shows alignment with the results of Hofstede (2013) where the distance with the power in the Mexican case was evidenced. Epaminonda (2014), and DiRienzo and Das (2015) point out that one possible explanation would be the level of corruption in the countries.

Between Brazil and Mexico, Brazilians are more individualistic, as shown in the scores for these two nations: Brazil with 136 points and Mexico with 120. This indicates that Brazilians are not more likely to share information, nor value the individual efforts to give more importance to the work and the company at the expense of interpersonal relationships. Comparing Argentina and Mexico, the discrepancies between individualism-level were the same found in the comparison between Brazil and Argentina.

Compared with Brazil (57), despite being in an almost intermediate position, Mexico (102) has a less tolerant crop uncertainty. This portrays the culture of the country attaches great importance to the instructions to be followed, looking for activities with more predictable results and, consequently, to lower risks.

In the comparison between Argentina and Mexico, the discrepancy was greater, because Argentina showed lower levels of "UAI" within the three countries that were part of this research. In contrast, Mexico had the highest index. In addition to being directly linked to the level of corruption in a country, there is a strong connection between index aversion to uncertainty, corruption, and the country's level of innovation. DiRienzo and Das (2015) concluded in their research that the level of corruption of a nation has an inverse

impact on innovation capacity. According to the authors, a good level of innovation leads to economic growth and prosperity of the country.

Comparing Mexico and Argentina disparities found were not considered significant. “PDI” showed a variance of only 10 points and “IDV” demonstrated discrepancy of 16. The level of “MAS” was almost equal, with a difference of only 3 points. As for “UAI” the distances were greater and represented by 46 points. “LTO” also indicated low divergence with 13 points differences, but on the other hand, “IVR” showed a gap of 60 points.

A “little” difference score between Mexico (103 points) and Brazil (97 points) was sufficient to classify countries in opposite directions in the score of this cultural dimension. This shows that the Mexican believe in persistence and perseverance to achieve lasting results, while the Brazilian have expectations for quick results. The Mexican people adapt to the new in order to achieve better results, while the Brazilian stick to tradition.

### Brazil, Argentina and Mexico comparison with the results obtained in Hofstede and Minkov research (2013)

In the third stage of analysis, comparisons between the rates obtained in the current study with the results found in the original search Hofstede and Minkov (2013) were carried out (table 2).

TABLE 2.  
Comparison between Brazil, Argentina and Mexico with the  
results obtained in Hofstede and Minkov research (2013)

Country	PDI	IDV	MAS	UAI	LTO	IVR
Research - Brazil	133	136	100	57	97	148
Hofstede - Brazil	169	138	149	176	144	150
Research - Mexico	117	120	125	102	103	119
Hofstede - Mexico	181	100	169	182	124	197
Research - Argentina	107	136	122	48	90	179
Hofstede - Argentina	149	146	156	186	120	166

Elaboración Propia

Note Power distance (PDI); Uncertainty avoidance (UAI); Individualism versus collectivism (IDV); Masculinity versus feminism (MAS); Long term orientation (LTO); Indulgence versus restriction (IVR)

Three out of six cultural dimensions were compared between cultures positioned on opposite poles. In the level of masculinity, this research has found rates that ranked Brazil as holder of a little male national culture, while the research of Hofstede and Minkov (2013) demonstrated the opposite. Although, some authors as Davel and Vasconcelos (1997) and Bresler (2000) confirmed the statement, the data found in the study presented here do not confirm such an outcome.

Compared to Brazil, specifically for “UAI”, this research positioned the country as a culture with low tolerance for uncertainty, while the research of Hofstede and Minkov (2013) indicated a high level of tolerance for uncertainty. It is important to note that the workers of a company belong to a national culture, therefore, the sample obtained from an organization could largely reflect it. One of the many reasons for the low rate for this cultural dimension in Brazil may be the fact that, as Chu and Wood Jr. (2008), Brazilian workers have a lot of willingness to assimilate practices and foreign customs. Hence, even if unknown, these new practices are easily assimilated.

Compared the size of guidance for long-term “LTO”, the research presented here has positioned the Brazilian national culture as non-oriented long-term like Hofstede already indicated it. Hofstede and Minkov (2013) suggest that this kind of national culture is driven by expectations of quick results and to live with laws and rules can be a problem. The “Brazilian way” was an expression used by Chu and Wood Jr. (2008) to characterize the mode of Brazilian workers to find solutions to problems through unconventional means. The research of these authors concluded that this property of Brazilian culture on the one hand, let

the employee proceed with the task, but on the other, does not focus on the problem, preventing it from being effectively resolved. Such an approach is aligned with the immediacy suggested in cultures focused on the short term, in which responses should be more immediate problems.

Regarding the data, comparing the culture of Argentina aversion to uncertainty, this survey ranked the country as having a low tolerance for uncertainty, since the results of the model's authors claim that the Argentine culture has high tolerance for uncertainty. In addition, the research presented here, ranked Argentina as a non-oriented long-term culture, while the study of Hofstede positioned the culture of this country with high tendency for long-term orientation. Jentjens and Brandl (2015) conducted a study on culture based on a sample of a company with subsidiaries in France and Germany. The research focused exclusively on cultural dimension of uncertainty avoidance and objective verification of the resistance during the process of implementing a new performance evaluation system.

The perceived differences in comparing the results of the two surveys confirm what critics of the model of Hofstede and Minkov (2013) stand; depending on the form of measurement, individual characteristics and sample considered have been highlighted in the literature (Bearden, Money & Nevins, 2006; Fang, 2003; Spector, Cooper & Sparks, 2001; McSweeney, 2013). These differences indicated in the critical studies are particularly evident when the comparison adopts appropriate statistical techniques, which will be the topic of the next section.

## Hofstede and Minkov (2013) model comparison using the bivariate test aligned with the critics

The last analysis stage, sought to verify the criticisms of the model adopted in this study like the ones indicated by Bearden, Money and Nevins (2006); Fang (2003); Spector, Cooper and Sparks (2001); and Mcsweeney (2013). To test significant differences, we used the Kruskal-Wallis test (table 3).

TABLE 3.  
Comparison and effect size between Brazil, Argentina, and Mexico

Index	Comparisons	U	p bilateral	Level of Significance	Effect Size
PDI	Brazil vs Argentina	4140,0000	0.034	NS	-
	Brazil vs Mexico	7241,0000	0.000	*	-0.239
	Argentina vs Mexico	3137,0000	0.183	NS	-
IDV	Brazil vs Argentina	4793,0000	0.747	NS	-
	Brazil vs Mexico	8183,5000	0.012	*	-0.148
	Argentina vs Mexico	2950,5000	0.173	NS	-
MAS	Brazil vs Argentina	4599,5000	0.272	NS	-
	Brazil vs Mexico	7324,5000	0.000	*	-0.231
	Argentina vs Mexico	2830,0000	0.024	NS	-
UAI	Brazil vs Argentina	4416,0000	0.236	NS	-
	Brazil vs Mexico	9159,0000	0.310	NS	-
	Argentina vs Mexico	3352,5000	0.688	NS	-
LTO	Brazil vs Argentina	4689,0000	0.421	NS	-
	Brazil vs Mexico	8403,5000	0.101	NS	-
	Argentina vs Mexico	2755,0000	0.041	NS	-
IVR	Brazil vs Argentina	3474,5000	0.000	*	-0.232
	Brazil vs Mexico	6945,5000	0.000	*	-0.249
	Argentina vs Mexico	3504,5000	0.912	NS	-

NS = not significant | \* p < 0.0167 | vs Versus.

Elaboración Propia

Data analysis showed that the index "PDI" [ $U(2) = 17.4610$ ;  $p < 0.01$ ] possess significant differences between Mexico and Brazil in culture index "IDV" [ $U(2) = 6.1876$ ;  $p < 0.05$ ], "MAS" [ $U(2) = 16.0873$ ;  $p < 0.01$ ] "UAI" [ $U(2) = 1.8582$ ;  $p < 0.05$ ]. In comparing the dimensions of culture between Argentina and Brazil only index "IVR" was statistically significant [ $U(2) = 22.5639$ ;  $p < 0.01$ ].

Comparing the methodology of Hofstede and Minkov (2013) using a bivariate statistical comparison there was found a convergence dimension "PDI", both methods showed significant differences. The fact that Mexico has a more horizontal organizational structure can justify the difference in this dimension. The same happened with the dimensions "IDV", "MAS" and "IRV". For "IDV", there is a direct relationship on trust of the population in politics and in the economy with respect to this dimension. Therefore, the Mexican showed higher security of these aspects which can justify this distance. The difference in the level of dimension "MAS"

can be explained by the greater participation of women in managerial and technical positions in Brazil. The distances noted in “IRV” indicate that the Brazilian control over their wishes and desires.

Although for “ISU” and “LTO”, the methodology of Hofstede and Minkov (2013) pointed out discrepancies, they were not statistically significant. For the specific case of “UAI” the author of the model ranked cultures on opposite extremes. Therefore, it can be considered that for the UAI dimension there was no convergence between the statistical model and procedure. This point, found in relation to Hofstede’s methodology has been discussed and criticized by Bearden, Money and Nevins (2006); Fang (2003); Spector, Cooper and Sparks (2001); and Mcsweeney (2013), whom highlight the need for better statistics in the model. The results in this study also denote concerns regarding discrepancies in the diagnosis of culture without sampling depth, that are demanded in studies involving methodologies with more robust statistical requirements.

## FINAL CONSIDERATIONS

The aim of this study was to compare the cultural dimensions of the automotive industry in three countries, Brazil, Argentina, and Mexico, using two techniques of analysis, the first being described in the model of Hofstede and Minkov (2013) and the second using the statistical technique indicated by critics of the model (Bearden, Money & Nevins, 2006; McSweeney, 2013) from a quantitative descriptive survey. The company investigated is part of an industrial group with founders of the European automotive industry.

It also aimed to contribute to the literature on the subject, testing the original model and critics, involving regionality and statistical validity of the data, pointed by critics as necessary to identify the validity of the model as well as limitations in the description of culture. The results showed differences in cultural analysis confirming the critics to the Hofstede and Minkov model (2013) and the dimensions of culture.

In summary, the academic implications of this study indicate the need to improve the model proposed by Hofstede and Minkov (2013), regarding the use of a sample of at least 50 respondents as valid for this model and also to consider the use of statistical techniques for comparison. For more reliable and validated culture evaluation and comparison, data collection techniques should consider the most robust statistical methods. It is notorious that the authors’ model has an opportunity to understand cultural issues that can be used for diagnosis and actions in a particular area and organizations to implement changes. Given this opportunity and possibility, it is necessary to ensure a more reliable diagnosis in terms of probability, so that the non-use of statistical techniques does not imply unnecessary or wrong actions. For the investigated organization, the diagnosis with the use of the original model, with a sample of 50 respondents, may bring distortions and lead managers to seek changes for culture alignment, when using the comparison according to the model of Hofstede and Minkov (2013), without assessing the likelihood of this sampling representing the culture of the organization.

The fact is that the results did not show statistically significant differences between the figures of culture, but cultural differences. This can mean the need for improved the diagnostic model because cultural differences can affect perception of managers and use of internal policies. Differences in cultural aspects may have impacts on small and medium business models, in this sense, these organizations cannot risk an inaccurate diagnosis (Mueller, Zapkau & Schwens, 2014). This perception is corroborated by Lai and Yang (2017), which highlight that in the case of multinationals, cultural barriers are lower than in comparison with small and medium enterprises, and the margin of error for actions in SME’s is also lower.

The research also contributed to the better understanding of cultural issues, helping in understanding the impact of regions in the national culture. As for the impact, the results found in the regions of Brazil and Mexico indicate that regions within the same country may have different cultural dimensions. While one of Hofstede’s research features has been the generalization of national culture, the result of this research



corroborates one of the main criticisms of the author's work on the generalization of national culture through a sample of a single region of a country.

By comparing results from the study of Hofstede and Minkov (2013), differences allowed to classify the dimensions found at opposite poles. In Brazil, the dimensions “BUT”, “ISU” and “LTO” are positioned on opposite sides. For Argentina, inequalities have been described for the cultural dimensions “UAI” and “LTO” as well as Brazil. With respect to Mexico, significant differences were not described to position the cultural dimensions at opposite poles. This comparative scenario reinforces the question of regionalism where there is a variation of research and time in the context of constantly evolving.

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## ADDITIONAL INFORMATION

*Clasificación JEL:* M14, L62