Innovation Individual Characteristics: A Cross-Cultural Comparison Between Brazilians and Americans

André Luiz Mendes Athayde (UFMG) - andreluizathayde@outlook.com
Hebert Ivo Saraiva Coutinho (UFMG) - hebert.ivo@gmail.com

Abstract:
Innovation has been discussed substantially in the literature, nonetheless, it has been poorly explored through cross-cultural studies that compare individuals from developed and developing countries and the possible influence of national cultural characteristics on individual innovation characteristics. The objective of this study was to analyze differences in innovation characteristics between individuals in Brazil and in the United States and discuss these differences in light of national cultural characteristics. We analyzed data from 2,223 Americans and from 1,486 Brazilians through statistical mean comparison tests, highlighting specificities of innovation characteristics of Brazilians and Americans. Among other findings, the results of this research point out that Brazilian respondents' value new ideas and creativity more than American respondents and agree stronger than American respondents that more emphasis on technology in the near future would be a good thing. These results can be associated with the Brazilian collectivist profile that stimulates innovation through socialization and collaborative ideas. On the other hand, American respondents demonstrated to value adventure and taking risks more than Brazilian respondents, which can be associated with lower scores of the United States on the Uncertainty Avoidance cultural dimension. This study stimulates other investigations on the topic with a cross-cultural approach, shedding light on important differences between individuals of different nationalities, especially in times of raising globalization and internationalization.
Keywords: Innovation; Innovative characteristics; Cross-cultural research.

Características individuais da inovação: uma comparação transcultural entre brasileiros e americanos

Resumo: A inovação tem sido discutida substancialmente na literatura, no entanto, tem sido pouco explorada por meio de estudos transculturais que comparam indivíduos de países desenvolvidos e em desenvolvimento e a possível influência das características culturais nacionais nas características individuais de inovação. O objetivo deste estudo foi analisar as diferenças nas características de inovação entre indivíduos no Brasil e nos Estados Unidos e discutir essas diferenças à luz das características culturais nacionais. Analisamos dados de 2.223 americanos e de 1.486 brasileiros por meio de testes estatísticos de comparação de médias, destacando as especificidades das características de inovação de brasileiros e americanos. Entre outros achados, os resultados desta pesquisa apontam que os respondentes brasileiros valorizam novas ideias e criatividade mais do que os respondentes americanos e concordam mais fortemente do que os americanos que mais ênfase na tecnologia em um futuro próximo seria benéfico. Esses resultados podem ser associados ao perfil coletivista brasileiro que estimula a inovação por meio da socialização e de ideias colaborativas. Por outro lado, os entrevistados americanos demonstraram valorizar a aventura e assumir riscos mais do que os brasileiros, o que pode estar associado às pontuações mais baixas dos Estados Unidos na dimensão cultural Aversão à Incerteza. Este estudo estimula outras investigações sobre o tema com uma abordagem transcultural, lançando luz sobre diferenças importantes entre indivíduos de diferentes nacionalidades, especialmente em tempos de crescente globalização e internacionalização.
Palavras-chave: Inovação; Características inovadoras; Pesquisa transcultural.

Innovation Individual Characteristics: A Cross-Cultural Comparison Between Brazilians and Americans

1. Introduction

The study of innovation has become increasingly expressive in the academia, once it is a relevant construct, in a micro context, to the study of personal development, and, in a macro context, to the study of organizational development and country economic development (Natário & Couto, 2022; Marques, Ávila, Pereira, & Zambalde, 2022; Bevilacqua, Freitas, & Paula, 2020; Rakic, 2020; Cavazos-Arroyo, 2020; Farhana & Swietlicki, 2020). With respect to innovation, when Brazil is compared with developed countries, such as the United States of America, some differences are evident. According to Bloomberg 2021 Innovation Index (Jamrisko, Lu, & Tanzi, 2021), Brazil is only the 46th most innovative country in the world, while the largest economy in the world, the United States of America, occupies the 11th position. Moreover, out of the ten world's most innovative companies, six are American, and only one is Brazilian (Forbes, 2021). Indexes like these normally take into account macro criteria, such as research and development expenditure, manufacturing capability or concentration of high-tech public companies, but neglect innovation individual characteristics of country citizens.

This apparent disparity between Brazil and the United States in terms of national innovation naturally raises some questions: putting economic differences and innovation macro-level metrics aside, how do individuals in these two countries handle innovation in terms of values, attitudes, and behavior? What specificities in terms of individual innovation characteristics can be found when these countries are compared? How similarly or differently do Brazilians and Americans face innovation? These questions were some of the motivators for the choice of these two countries to be deeper compared in the present research with respect to innovation characteristics of their citizens at the individual level and the possible influence of national cultural characteristics on individual innovation characteristics. In addition, these two countries were chosen to be compared, once they are considered culturally distinct in a variety of cross-cultural studies (e.g., Vignoles et al., 2016; Hofstede, 2011).

It is noteworthy that the comparison between a developed and a developing one was also motivated by the lack of studies that deal with this topic through a cross-cultural approach. Innovation has been explored considerably in the literature (e.g., Yoshikuni, Favaretto, Albertin, & Meirelles, 2022; Rodrigues & Féres, 2022; López, Alcoforado, Saborido, & Seijo, 2022; Mikhailov, Puffal, & Santini, 2020), nonetheless, it has not been explored, in the same frequency, with a cross-cultural approach, that is, a perspective that takes into account the possible influence of national cultural characteristics on individuals' values, attitudes, and behaviors (e.g., Borsatto, Bazani, & Amui, 2020). In this sense, the present study was guided by the following research question: *are there statistically significant differences between Brazilians and Americans with respect to innovation individual characteristics?*

The main objective of the present research, therefore, was to analyze differences in innovation characteristics between individuals in Brazil and in the United States, discussing these differences in light of national cultural characteristics. Strong literature evidence has shown that culture can influence individual's values, attitudes, and behaviors (e.g., Motta & Gomes, 2019; Gomes et al., 2016; Oliveira & Alves, 2015; Andery, 2011), and this study explores how compatible national cultural characteristics can be with innovation characteristics of individuals in these two countries. The purpose of this study was to explore individual innovation differences in further detail instead of emphasizing differences between

organizations (e.g., Rauta, 2020; Silva, Leite, & Oliveira, 2016) or between countries in a macro level as most public data commonly announced in the media do (e.g., Galvão et al., 2017). More importantly, it is necessary to reflect about the benefits of developing comparisons like this one. In times of growing internationalization and increasing number of multinational companies, and in times of global exchange not only of products, but also people between companies (Athayde et al., 2019), this research highlights the importance of studying innovation and its specificities between individuals from different nationalities.

To this end, we adopted the World Values Survey (WVS) database, which is a worldwide investigation about political and socio-cultural views of individuals. Four variables were chosen to represent individual innovation characteristics, namely: (1) Importance given by respondents to thinking up new ideas and being creative; (2) Importance given by respondents to adventure and taking risks; (3) Respondents' agreement with the statement "in future changes, more emphasis should be put on technology"; and (4) Respondents' agreement with the statement "science and technology are making our lives healthier, easier, and more comfortable". Additionally, American and Brazilian national cultures were characterized by four of Hofstede's (2011) cultural dimensions, widely adopted in cross-cultural studies, both nationally and internationally: (1) Power Distance; (2) Uncertainty Avoidance; (3) Individualism versus Collectivism; and (4) Masculinity versus Femininity.

The four variables that were chosen to represent individual innovation characteristics are the only four variables related to innovation in the WVS database. Moreover, it is important to observe that, even though Hofstede later proposed two other cultural dimensions (Long-term Orientation and Indulgence vs. Restraint) (Hofstede, 2011), he originally proposed four cultural dimensions (Hofstede, 1980), which were adopted in the present investigation, once they have been the most used ones in cross-cultural research over the years.

Next, the literature review will be presented, highlighting general characteristics of innovative individuals and the national cultural characteristics of Brazil and the United States. Subsequently, the methodological procedures of the research will be addressed, followed by the presentation and discussion of results. At last, final considerations will be made, highlighting the study implications.

2. Theoretical Framework

2.1. General characteristics of innovative individuals

The purpose of this subsection is to describe some general features of innovative individuals as well as previous studies on this topic. First, it is important to point out that creativity is a fundamental characteristic of innovation. Innovative individuals develop their creativity, which helps them to deal with situations and challenges in a different way with new mental patterns and individual skills (Guimarães & Mattos, 2012). Most successful innovators are driven by curiosity: they are used to learning new things, questioning, and listening with an insatiable search for the unknown. Innovative individuals tend to have perceptions, both from what they see in other people and from what they see in data. Based on their analysis, they look for some way to create opportunities. Innovative individuals are prone to taking risks and seek to identify, measure, and minimize risks in each decision (Drucker, 2016).

Innovative individuals tirelessly seek new opportunities as well as search for information in order to make decisions. They are characterized by avoiding processes and content that do not contribute to their personal development. Creativity is not exclusive to innovative individuals, nonetheless, what makes them different from others is that they are able to express themselves differently and are always looking for new things. Another feature of

innovative individuals is that they are committed to performing in a different way, that is, they are always looking for a disruptive way to solve problems and difficulties (Bessant & Tidd, 2019). According to Cassiolato and Lastres (1999), innovation involves, in essence, learning and creation of knowledge, yielding new and different competences related to the development and implementation of products and processes.

Costa et al. (2014) carried out a study whose objective was to understand individuals' affinity with innovation within the organizational environment. The results pointed out characteristics that an organizational environment should have to foster employees' innovation, such as flexibility, which allows people to express themselves freely, and disruption with hierarchy, which reduces the rigid structure of command and allows the creation of moments or events that stimulate the emergence of employees' ideas. In the referred study, creativity, proactivity, and higher propensity to take risks were highlighted by respondents as the main characteristics of innovative individuals.

Almeida, Nogueira, and Silva (2008), in turn, developed a research whose objective was to characterize individuals' propensity to innovate within the organizational context and its relationships with age, sex, and education level. The findings showed that individuals within the age range between 25 and 44 years old presented higher levels of creativity. Regarding sex, the results showed that men presented higher levels of creativity and propensity to innovate than women. At last, with respect to education level, individuals with higher education levels were found to be more likely to innovate.

Rodrigues and Marchetti (2008) investigated personal, psychological, and social factors associated with innovative behavior. According to the findings, the psychological characteristic that is most related to individuals' innovative behavior is socialization. Self-confidence and openness to change were also found to be correlated with innovative behavior. In addition, results pointed out that innovative individuals are more prone to experimenting innovations in the market and more familiar with technology.

Patterson, Kerrin, and Gatto-Roissard (2009) investigated characteristics and behaviors of innovative individuals within organizations. One of the findings was that knowledge and intelligence are important features for innovation. Nonetheless, according to the authors, although intelligence is a necessary attribute, it is not enough to be innovative.

Nager, Hart, Ezell, and Atkinson (2016) developed a study with 6,418 Americans who drive some of the most important innovations in the country. The results showed that the average age of innovators is 47 years old, ranging between 36 and 55 years old. There was also a low predominance of females, corresponding to only 12% of respondents. Regarding education level, more than half of respondents had, at least, a higher education diploma, and 55% of them had a Ph.D. degree in Science or Technology. Similar results were found by other studies carried out in the United States (e.g., Kotzé, Anderson, & Summerfield, 2016; Kupangwa & Dubihlela, 2016).

According to Chiavenato (2008), entrepreneurs present innovation as an essential characteristic, among other features, such as creativity, optimism, proactivity, and courage to take risks. Entrepreneurs encourage economic growth and introduce innovations. According to the author, the essence of entrepreneurship is the use of innovation to create, renew, or redefine products, processes, and markets. An innovative individual is not always the one who creates new technologies but also the one who makes use of existing technologies to innovate.

Given the intimate connection between entrepreneurship and innovation, it is worth highlighting sociodemographic characteristics associated with entrepreneurship, which can be ultimately assumed as possibly associated with innovation. The Global Entrepreneurship

Monitor Research Program (GEM, 2019) developed a study in Brazil with the objective of evaluating characteristics, motivations, ambitions, and attitudes associated with entrepreneurship. According to the results, men are more active in terms of involvement with entrepreneurship. In absolute terms, it is estimated that there are almost three million more male entrepreneurs than female entrepreneurs. Regarding age, Brazilians aged from 45 to 54 are considered the most active entrepreneurs. With respect to education level, Brazilians with higher education degrees are considered the most active entrepreneurs.

Having described some general features of innovative individuals as well as previous studies on this topic, the characteristics of the American and Brazilian national cultures will be presented hereafter, once they will be used to discuss differences in innovation characteristics between individuals in Brazil and the United States.

2.2. Characteristics of the American and Brazilian national cultures

Researchers have frequently used Hofstede's (2011) well-known cultural dimensions to discuss cultural differences in leadership, communication, job performance, attitudes at work, sources of guidance, and other aspects of organizational behavior (e.g., Athayde & Rocha, 2021; Athayde & Torres, 2020). When learning about national culture, it is fundamental to understand that culture describes a central tendency in society. Everybody is unique, yet social control ensures that most people will not deviate too much from the norm (Smith et al., 2011; Kirkman, Lowe, & Gibson, 2006).

Once this research aims to analyze differences in innovation characteristics in light of national cultural characteristics, the Brazilian and American national cultures will be described, taking, as reference, four of Hofstede's (2011) national cultural dimensions widely adopted in cross-cultural studies, both nationally and internationally. These scores are assigned on a scale from 0 to 100 and are based on the Country Comparison Tool – Hofstede Insights (2021). They will be presented in further detail hereafter.

Power Distance: this cultural dimension refers to the degree of inequality within a society. This means that power is naturally distributed unevenly, as each person is unique. In addition, this dimension shows how the less powerful people expect and accept that this power is unequal. With a score of 69, Brazil reflects a society that believes that hierarchy must be respected and inequalities between people are acceptable. With a score of 40, the United States has a low level for this cultural dimension. In American organizations, hierarchy is established for convenience, superiors are accessible, and managers trust the experience of employees and teams. Moreover, communication is relatively informal, direct, and participatory.

Uncertainty Avoidance: this cultural dimension refers to how uncertainties and unpredictability are interpreted by members of a society. This means that there are cultures that deal with greater or lesser comfort with the uncertain future. In addition, societies protect themselves from uncertainty by creating rules and institutions to reduce the anxiety and stress that the unpredictable future generates. Brazil has a high score for this cultural dimension (76), as do most Latin American countries. These societies show a strong need for rules and legal systems, with bureaucracy, laws, and rules being very important in making the world a safer place to live. The United States, on the other hand, scores below the average for this cultural dimension (46). In the United States, there is a good degree of acceptance of new ideas, innovative products, and a willingness to try something new or different.

Individualism versus Collectivism: this cultural dimension concerns how people are inserted in social groups. Societies based on individualism tend to lead people to behavior restricted to themselves, where people look at themselves and their family. Collectivist

societies, on the other hand, are guided by the relationships of fidelity exercised by people as a result of behaviors within cohesive and united social groups. Brazil has a 38 score on this cultural dimension, which means that, in business, it is important for Brazilians to build trust and lasting relationships. With 91 points, the United States is one of the most individualistic cultures worldwide. People are expected to take care of themselves and their families without the support of others. In the business world, employees are expected to be proactive, and decisions are based on merit.

Masculinity versus Femininity: this cultural dimension is related to the values permeated by the sexes in society. Masculinity-based societies tend to have more competitive and assertive values. In turn, societies based on Femininity aim for more collaborative values and are focused on quality of life. Brazil presents an intermediate score in this cultural dimension (49). The United States, in turn, scores high (62).

The scores of Brazil and the United States regarding the dimensions of national culture are summarized in Table 1.

Table 1. Dimensions of national culture

Cultural Dimension	Brazil	United States
Power Distance	High	Low
Unvertainty Avoidance	High	Intermmediate
Individualism	Low	High
Masculinity	Intermmediate	High

Source: Adapted from Hofstede Insights (2021).

Next, the methodological procedures adopted in the study will be presented.

3. Method

To accomplish the main objective of this study, we obtained secondary data from the sixth edition of the World Values Survey (WVS) database. At the time data was extracted from the WVS database, in 2020, the sixth edition was the most recent one, once the seventh edition had not been released yet. The WVS is a survey that has been conducted since 1981 by a group of social scientists at leading universities around the world and investigates individuals' political and socio-cultural views. The questionnaires used in the WVS contain a large set of questions about social, economic, and political values, in addition to socioeconomic and demographic data, and follow rigorous scientific sampling procedures (WVS, 2021).

The WVS seeks to help scientists and policy makers understand changes in beliefs, values, and motivations of individuals worldwide. Thousands of political scientists, sociologists, administrators, social psychologists, anthropologists, and economists have used this data to analyze topics, such as economic development, democratization, religion, gender equality, social capital, subjective well-being, and trust in large companies (e.g., Athayde, Coura, & Dias, 2019). The main method of data collection in the WVS is the application of face-to-face questionnaires at the respondents' house, with anonymity guaranteed. The responses are registered in a traditional paper-and-pen questionnaire or through a Computer-Assisted Personal Interview – CAPI (WVS, 2021). In the WVS edition taken as data source in this study, the Brazilian sample was comprised of 1,486 participants, and the American sample was comprised of 2,232 participants.

The following variables were chosen to represent innovation individual characteristics: (1) Importance given by respondents to thinking up new ideas and being creative, (2)

Importance given by respondents to adventure and taking risks, (3) Respondents' agreement with the statement "in future changes, more emphasis should be put on technology", and (4) Respondents' agreement with the statement "science and technology are making our lives healthier, easier, and more comfortable".

The statistical analyses carried out in this study were performed with the IBM® SPSS® 20.0 software – Statistical Package for the Social Sciences. Following recommendations by Tabachnick and Fidell (2013) and Miles and Shevlin (2001), the variables chosen for analysis were checked for their normal distribution. The normality of data distribution was verified by carrying out the Kolmogorov-Smirnov test and the Shapiro-Wilk test (Field, 2013). The normality tests showed that data from the Brazilian sample and the American sample presented a non-normal distribution, a result that, beforehand, pointed to the need of applying a non-parametric mean comparison test that, in this study, was the Mann-Whitney test for independent samples. The statistically significant differences ($p < 0.001$) between Brazil and the United States in innovation individual characteristics were, then, analyzed in light of national cultural characteristics. In the subsequent section, results will be presented and discussed.

4. Results and Discussion

4.1. Sample characterization

With respect to sociodemographic variables, the Brazilian sample (1,486 participants) and the American sample (2,232 participants) were comprised of a balanced number of men and women, with a slight superiority of female participants both in Brazil (52.3%) and in the United States (51.5%). Regarding age, the majority of participants fit in the age range 30-49 years, in Brazil (38.8%), and in the age range above 50 years, in the United States (44.7%). Moreover, most respondents had one or two children, both in Brazil (43.8%) and in the United States (41.8%).

Concerning education level, most respondents in Brazil had not completed elementary school (31.9%), followed by participants who had completed high school (25.9%). In contrast, in the United States, most respondents had completed high school (36.1%). Regarding income level, most respondents, both in Brazil (25.3%) and in the United States (20.8%), fell into the intermediate range (5), among the ten income ranges presented in the questionnaire.

With respect to nature of work – manual vs intellectual –, most Brazilian respondents deal with manual tasks at work (45%), and most American respondents deal with intermediate tasks between manual and intellectual ones (15.2%). Concerning nature of work – routine vs creative –, most Brazilian respondents deal with routine tasks at work (47%), while most American respondents deal with intermediate tasks between routine and creative ones (15,8%). At last, regarding nature of work – independence level –, most respondents deal with tasks with high independence at work both in Brazil (28.8%) and the United States (14.7%).

Having described respondents' sociodemographic characteristics, innovation characteristics will be presented hereafter. First, regarding the importance given by respondents to thinking up new ideas and being creative, it was described to them a person for whom it is important to think up new ideas and be creative. Respondents should indicate their similarity in relation to the person described on a scale of six points, ranging from 1 = "does not look anything like me" to 6 = "looks a lot like me". Most Brazilians (38.4%) considered that the person described looks like them, and most Americans (31.8%) considered that the person described looks moderately like them.

Second, regarding the importance given by respondents to adventure and taking risks, a person was described to them for whom it is important to experience adventures and to take

risks. Respondents should indicate their similarity concerning the person described on a scale of six points, ranging from 1 = "does not look anything like me" to 6 = "looks a lot like me". Most Brazilians (35.3%) and most Americans (26.9%) considered that the person described does not look like them.

Third, with respect to the variable "emphasis on technology", respondents were presented with a change in the way of life that might take place in the near future: more emphasis on technology. They were asked to indicate whether they think it would be a good thing, a bad thing, or if they did not mind. Most Brazilian respondents (70.9%) and most American respondents (48.9%) indicated that this future change would be a good thing.

At last, on a 10-point scale, where 1 represented "totally disagree" and 10 "totally agree", participants were asked to indicate their agreement with the following statement: "Science and technology are making our lives healthier, easier, and more comfortable". In Brazil, the majority of responses (30.7%) fell on the maximum rate (10), indicating total agreement. In the United States, the majority of responses (23.7%) fell on rate 8, indicating a high agreement.

Table 2 summarizes the means and standard deviations for the innovation individual characteristics in Brazil and the United States.

Table 2. Innovation individual characteristics in Brazil and in the United States

Variable	Brazil		United States	
	Mean	SD	Mean	SD
Importance given by respondents to thinking up new ideas and being creative.	3.02	1.28	2.61	1.32
Importance given by respondents to adventure and taking risks.	3.93	1.35	4.24	1.52
Respondents' agreement with the statement "in future changes, more emphasis should be put on technology".	1.56	0.013	1.38	0.018
Respondents' agreement with the statement "science and technology are making our lives healthier, easier, and more comfortable".	7.01	2.84	7.19	1.99

Source: Research data.

Having described the characteristics of the Brazilian and American samples, the results concerning innovation characteristics will be confronted through mean comparison tests to identify statistically significant differences between Brazilians and Americans.

4.2. Mean comparison tests: Brazil vs United States

Mean comparison tests were performed to identify possible statistically significant differences between Brazilians and Americans when it comes to innovation individual characteristics. Table 3 summarizes the results.

Table 3. Mean comparison tests between Brazil and the United States

Variable	Sig
Importance given by respondents to thinking up new ideas and being creative.	0.000*
Importance given by respondents to adventure and taking risks.	0.000*
Respondents' agreement with the statement "in future changes, more emphasis should be put on technology".	0.000*
Respondents' agreement with the statement "science and technology are making our lives healthier, easier, and more comfortable".	0.804

Note. *p<0.001

Source: Research data.

First, statistically significant mean difference ($p < 0.001$) was identified between Brazil and the United States on the variable "Importance given to thinking up new ideas and being creative", showing that Brazilian respondents value new ideas and creativity more than American respondents. Second, statistically significant mean difference ($p < 0.001$) was identified between Brazil and the United States on the variable "Importance given to adventure and taking risks" and, for this case, the results show that American respondents value adventure and taking risks more than Brazilian respondents. Third, statistically significant mean difference ($p < 0.001$) was identified between Brazil and the United States on the variable "Future changes: more emphasis on technology". Brazilian respondents agree stronger than American respondents that more emphasis on technology in the near future would be a good thing. At last, no statistically significant mean difference was identified on the variable "Impact of science and technology on people's lives". For this specific variable, the means for both countries are very close and indicate that both Brazilians and Americans agree that science and technology are making their lives healthier, easier, and more comfortable (level of agreement between 7 and 8, on a scale from 1 to 10).

Hence, out of the four variables taken in the present research to represent innovation individual characteristics, the means for three of them presented statistically significant differences ($p < 0.001$) between Brazil and the United States. Out of these three variables, Brazilian respondents demonstrated to be more innovative than American respondents in two variables.

First, based on the *Power Distance* cultural dimension, it could be expected that, in general, Americans would be more innovative than Brazilians. The lower adherence of Americans to hierarchy, when compared to Brazilians, would facilitate the information flow among individuals, including coworkers and their superiors, making communication easier, informal, direct, and participatory, which represent an environment with higher propensity to innovation. Costa et al. (2014) highlight that flexibility and less hierarchy stimulate innovation. Rodrigues and Marchetti (2008), in turn, corroborate this idea, indicating that socialization is one of the main stimulators of innovation.

Second, based on the *Uncertainty Avoidance* cultural dimension, it could also be expected that, in general, Americans would be more innovative than Brazilians. The lower score of the United States on this dimension, when compared to Brazil, indicates that, in the United States, there is a good degree of acceptance of new ideas, innovative products, and willingness to try something new or different. It is important to highlight that innovative individuals are prone to taking risks (Drucker, 2016; Costa et al., 2014; Chiavenato, 2008; Rodrigues and Marchetti, 2008).

Third, based on the *Individualism versus Collectivism* cultural dimension, some characteristics indicate that Brazilians would be more innovative while other characteristics indicate that Americans would be more innovative. The collectivist profile of Brazilians could be associated with socialization, which is one of the characteristics of innovative individuals (Rodrigues & Marchetti, 2008). On the other hand, a higher score of the United States on individualism, when compared to Brazil, indicates that Americans could be expected to be proactive and to make decisions based on merit (Hofstede Insights, 2021). It is noteworthy that proactivity is also among the most relevant characteristics of innovative individuals (Costa et al., 2014; Chiavenato, 2008).

Similarly, based on the *Masculinity versus Femininity* cultural dimension, some characteristics indicate that Brazilians would be more innovative while other characteristics indicate that Americans would be more innovative. Brazil is characterized by collaborative values – linked to Femininity –, which can be associated with innovation. Rodrigues and Marchetti (2008) point out that collaborative values – socialization – is one of the main characteristics of innovative individuals. On the other hand, the United States is characterized by competitive and assertive values – linked to Masculinity –, which can also be associated with innovation. Chiavenato (2008) highlight that competitive and assertive values are intimately connected to entrepreneurship and innovation.

5. Conclusion

The main objective of the present study was achieved: to analyze differences in innovation characteristics between individuals in Brazil and in the United States and discuss these differences in light of national cultural characteristics. It is interesting to observe that, despite previous research that points out that the United States is more innovative than Brazil at the macro-level (e.g., Jamrisko, Lu, & Tanzi, 2021; Forbes, 2021), Brazilian respondents demonstrated to be more innovative than American respondents at the individual level. Nonetheless, it is fundamental to point out that this conclusion is restricted to the variables chosen in this research to represent innovative individual characteristics.

This study identified specificities of innovation characteristics of Brazilians and Americans, exploring details of innovation at the individual level, normally neglected by indexes that take into account only macro criteria, such as research and development expenditure, manufacturing capability, or concentration of high-tech public companies. The results of this research identified that Brazilian respondents value new ideas and creativity more than American respondents and agree stronger than American respondents that more emphasis on technology in the near future would be a good thing. These results can be associated with the Brazilian collectivist profile that stimulates innovation through collaborative ideas. On the other hand, American respondents demonstrated to value adventure and taking risks more than Brazilian respondents, which can be associated with the lower score of the United States on the Uncertainty Avoidance cultural dimension. In turn, no statistically significant mean difference was identified on the variable "Impact of science and technology on people's lives". For this specific variable, the means for both countries were very close and indicated that both Brazilians and Americans agree that science and technology are making their lives healthier, easier, and more comfortable.

By analyzing the similarities and differences between these two countries, an emerging one, and the largest economy in the world, it is possible to reflect on significant implications raised by this study. The findings have practical and managerial implications for administrators, human resource professionals, and psychologists. The development of human resources

policies, for instance, can benefit from knowledge about country-wise innovation specificities at the individual level, especially in multinational companies that hire individuals from different nationalities.

The study of innovation has been an increasingly frequent topic of discussion, which highlights its academic, professional, and economic relevance, however, few studies explore and discuss it with a cross-cultural approach, as was done in the present investigation between Brazil and the United States. Discussions focused on the specificities of each country can generate more accurate and contextualized results, once innovation-related variables are not standardized globally, in the sense that they can vary, among other factors, according to national cultural characteristics. Given the relevance of the topic, it is suggested that future studies compare Brazil with countries of even greater reference in innovation, such as South Korea, Singapore, and Switzerland, whose results can be discussed with the findings of the present investigation. Moreover, future studies could contribute to this field by exploring correlations between the variables, besides analyzing mean differences.
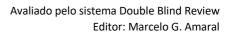
References

Almeida, L., Nogueira, S. I., & Silva, J. M. (2008). Propensão para inovar e criatividade: um estudo com adultos trabalhadores portugueses. *Revista de Psicologia da Vetor Editora*, 9(2), 183-196. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1676-73142008000200007

Andery, M. A. P. A. (2011). Comportamento e cultura na perspectiva da análise do comportamento. *Revista Perspectivas*, 2(2), 203-217. http://pepsic.bvsalud.org/pdf/pac/v2n2/v2n2a06.pdf

Athayde, A. L. M., & Torres, C. V. (2020). Guidance sources at work: Let's look inside us? *International Journal of Social Science Studies*, 6, 14–22. https://www.researchgate.net/publication/349117407_Guidance_sources_at_work_Let's_look_inside_us

Athayde, A. L. M., & Rocha, G. A. de F. (2021). The influence of sociodemographic characteristics on personal finance: a cross-cultural comparison between the United States and Brazil. *Revista Eletrônica de Administração e Turismo – ReAT*, 15(2), 40-64. https://periodicos.ufpel.edu.br/ojs2/index.php/AT/article/view/21128

Athayde, A. L. M., Santos, C. L. T., Fiuza, G. D., & Costa, A. C. R. (2019). Gestão Internacional de Pessoas: Novas Possibilidades de Pesquisa. *Revista PRETEXTO*, 20(2), 67-86. http://revista.fumec.br/index.php/pretexto/article/view/5971

Athayde, A. L. M., Coura, K. V., & Dias, G. P. F. (2019). Confiança em grandes empresas: uma comparação entre Brasil e Estados Unidos. *Revista de Administração da UEG*, 10(1), 6-20. https://www.revista.ueg.br/index.php/revista_administracao/article/view/8497

Bessant, J, & Tidd, J. (2019). *Inovação e Empreendedorismo*. Porto Alegre-RS: Bookman.

Bevilacqua, R., Freitas, V., & Paula, V. A. F. de. (2020). Innovation and Brands: The managers' perspective in a multiple case study in a Brazilian region. *Brazilian Business Review – BBR*, 17(6), 686-705. https://www.scielo.br/scielo.php?pid=S1808-23862020000600686&script=sci_arttext

Borsatto, J. M. L. S., Bazani, C., & Amui, L. (2020). Environmental regulations, green innovation and performance: An analysis of industrial sector companies from developed countries and emerging countries. *Brazilian Business Review – BBR*, 17(5), 559-578. https://www.scielo.br/scielo.php?script=sci_arttext&pid=S1808-23862020000500559&lang=pt

Cassiolato, J. E., & Lastres, H. (1999). Inovação, globalização e as novas políticas de desenvolvimento industrial e tecnológico. *In*: *Cluster e sistemas locais de inovação: estudos de caso e avaliação da região de Campinas*. Campinas, Unicamp – Instituto de Economia. https://iedi.org.br/anexos_legado/4cfe53e10f04de51.pdf

Cavazos-Arroyo, J. (2020). An exploration of some effects of social innovation capability in social enterprises in Mexico. *Journal of Technology Management & Innovation*, 15(4), 63-70. https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-27242020000400063&lang=pt

Chiavenato, I. (2008). *Gestão de Pessoas*. Rio de Janeiro: Elsevier.

Costa, R. N. R, Uveda, V. P., Nodari, C. H., Ganzer, P. P., Tomazzoni, D., Veiga-Neto, A. R., Prodanov, C. C., Olea, P. M., & Dorion, E. C. H. (2014). *Inovação e Pessoas: Agentes ou Restrições à Inovação*. Retrieved from: https://www.researchgate.net/publication/323740564_Inovacao_e_Pessoas_Agentes_ou_Restricoes_a_Inovacao. Access on 20 apr. 2021.

Drucker, P. F. (2016). *Inovação e espírito empreendedor: Prática e princípios.* São Paulo-SP: Cengage Learning.

Farhana, M., & Swietlicki, D. (2020). Dynamic capabilities impact on innovation: Niche market and startups. *Journal of Technology & Innovation*, 15(3), 83-96. https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-27242020000300083&lang=pt

Field, A. (2013*). Discovering Statistics Using IBM SPSS Statistics* (4 edition). London: Sage Publications.

Forbes. (2021). *The world's most innovative companies*. Retrieved from: https://www.forbes.com/special-features/innovative-companies-list.html . Access on: 19 apr. 2021.

Galvão, C. B., Tei, A., Everett, S., Robles, L. T., Ferrari, C., Guerise, L., & Robinson, R. (2017). National port developtment policies: same problems, different solutions? *Revista de Administração, Sociedade e Inovação*, 3(2), p. 103-124. https://www.rasi.vr.uff.br/index.php/rasi/article/view/175/45

Global Entrepreneurship Monitor Research Program – GEM. (2019). *2018/2019 Global Report*. Retrieved from: https://www.gemconsortium.org/file/open?fileId=50213. Access on: 20 apr. 2021.

Gomes, I. D., Silva, L. B., Silva, A. M. S., Pascual, J. G., Colaço, V. de F. R., & Ximenes, V. M. (2016). O social e o cultural na perspectiva histórico-cultural: tendências conceituais contemporâneas. *Psicologia em Revista*, 22(3), 814-831. http://pepsic.bvsalud.org/pdf/per/v22n3/v22n3a16.pdf

Guimarães, L. S, & Mattos, J. R. L. (2012). *Gestão da tecnologia e inovação: uma abordagem prática*. São Paulo-SP: Saraiva.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Sage, Beverly Hills, United States.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, 2(1), 1-26. https://scholarworks.gvsu.edu/orpc/vol2/iss1/8/

Hofstede Insights (2021). *Country Comparison Tool*. Retrieved 31 March 2021, from https://www.hofstede-insights.com/country-comparison/brazil,the-usa/

Jamrisko, M., Lu, W., & Tanzi, A. (2021). *South Korea leads world innovation as U.S. exits top ten*. Retrieved from: https://www.bloomberg.com/news/articles/2021-02-03/south-korea-leads-world-in-innovation-u-s-drops-out-of-top-10 . Access on: 19 apr. 2021

Kotzé, T. G., Anderson, O., & Summerfield, K. (2016). Summerfield, K. Technophobia: Gender differences in the adoption of high-technology consumer products. *South African Journal of Business Management*, 47(1), 21-28. https://journals.co.za/doi/10.10520/EJC188606

Kupangwa, W., & Dubihlela, J. (2016). Influence of selected demographic variables on the adoption and use of electronic business technologies by small and medium-sized retailers. *International Journal of eBusiness and eGovernment Studies*, 8(1), 40-56. https://dergipark.org.tr/tr/pub/ijebeg/issue/26190/275811

López, C. M., Alcoforado, J. L. M., Saborido, D. M., & Seijo, J. C. T. (2022). Fatores de inovação docente em Portugal segundo os professores. *Revista Brasileira de Educação*, 27, 1-23. https://www.scielo.br/j/rbedu/a/WHBrLwBVr5J6qhpQ7MGS3sM/abstract/?lang=pt

Mikhailov, A., Puffal, D., & Santini, M. (2020). University-Industry relations and industrial innovation: Evidence from Brazil. *Journal of Technology Management & Innovatio*n, 15(3), 6-16. https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-27242020000300006&lang=pt

Marques, H., Ávila, E., Pereira, R., & Zambalde, A. (2022). Open Innovation and Implementation of Different Types of Innovation: An Analysis Based on Panel Data. *Brazilian Business Review*, 19(1), 39–58. https://bbronline.com.br/index.php/bbr/article/view/686/1036

Miles, J., & Shevlin, M. (2001). Applying regression and correlation (1 edition). London: Sage.

Motta, L. A. S., & Gomes, J. S. (2019). Interações entre cultura nacional, cultura organizacional e gestão pública. *Contabilidad y Negocios*, 14(27), 89-103. https://revistas.pucp.edu.pe/index.php/contabilidadyNegocios/article/view/21369

Nager, A., Hart, D. M., Ezell, S. J., & Atkinson, R. D. (2016). The demographics of innovation in the United States. *SSRN Electronic Journal,* 1-87. http://www2.itif.org/2016-demographics-of-innovation.pdf

Natário, M. M., & Couto, J. (2022). Drivers, Enablers, and Conditions for Public Sector Innovation in European Countries. *Innovar,* 32(83), 5-16. http://www.scielo.org.co/pdf/inno/v32n83/0121-5051-inno-32-83-5.pdf

Oliveira, E., & Alves, A. F. (2015). Uma análise literária sobre o conceito de cultura. *Revista Brasileira de Educação e Cultura*, 11, 1-18. https://periodicos.cesg.edu.br/index.php/educacaoecultura/article/view/200

Patterson, F., Kerrin, M., & Gatto-Roissard, G. (2009). Characteristics & behaviors of innovative people in organizations. *NESTA Policy and Research Unit (NPRU)*, 1-64. https://www.researchgate.net/publication/242102530_Characteristics_Behaviours_of_Innovative_People_in_Organisations

Rauta, J. (2020). Ciência, Evolução e Movimento da Inovação Organizacional: Uma Estrutura Conceitual para Diagnóstico. *Revista de Administração, Sociedade e Inovação – RASI,* 6(2), 25-51. https://www.rasi.vr.uff.br/index.php/rasi/article/view/395/111

Rakic, K. (2020). Breakthrough and disruptive innovation: A theoretical reflection. *Journal of Technology Management & Innovation*, 15(4), 93-104. https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-27242020000400093&lang=pt

Rodrigues, A. F. B. B., & Marchetti, R. Z. (2008). Fatores explicativos do comportamento inovador entre internautas na idade madura. *Proceedings of Encontro da ANPAD – EnANPAD,* Rio de Janeiro-RJ, September, 32º. http://www.anpad.org.br/diversos/down_zips/38/MKT-B1038.pdf

Rodrigues, L. A., & Féres, J. G. (2022). Inovação no setor de biodiesel dos principais países produtores: o papel da demanda induzida entre 2000 e 2011. *Revista de Economia e Sociologia Rural*, 60(3), 1-24. https://www.scielo.br/j/resr/a/CsQnPxrzrmYH6yY8kwRZWXp/?lang=pt

Silva, J. C., Leite, R. T., & Oliveira, M. A. (2016). Capacidades de Inovação e Indicadores Não Convencionais: um estudo exploratório. *Revista de Administração, Sociedade e Inovação*, 2(2), 167-186. https://www.rasi.vr.uff.br/index.php/rasi/article/view/22/pdf

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6 edition). New York, USA: Harper Collins.

Vignoles, V. L. et al. (2016). Beyond the "East-West" Dichotomy: Global Variation in Cultural Models of Selfhood. *Journal of Experimental Psychology: General*, 145(8), 966-1000. https://psycnet.apa.org/record/2016-32083-001

World Values Survey – WVS (2021). *What we do*. http://www.worldvaluessurvey.org/WVSContents.jsp. Access on 20 apr. 2020.

Yoshikuni, A. C., Favaretto, J. E. R., Albertin, A. L., & Meirelles, F. S. (2022). How can Strategy-as-Practice Enable Innovation under the Influence of Environmental Dynamism? *Revista de Administração Contemporânea*, 26(1), 1-19. https://www.scielo.br/j/rac/a/RSvF8dgBM3d4xRXJKTt3mGp/?lang=en