ENVIRONMENTAL SUSTAINABILITY AND SUSTAINABLE CONSUMPTION: THE PERCEPTION OF BABY BOOMERS, GENERATION X AND Y IN BRAZIL

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ABSTRACT

Generations types – Baby Boomers, X and Y – are inserted in society, consuming natural resources and impacting the environment. This study aims to analyze the perception of generations on the relationship of environmental sustainability, environmental practices and sustainable consumption, through the analysis of 824 respondents from different regions of Brazil. The methodology is quantitative and descriptive, through survey and evaluated by the exploratory factor analysis and multiple linear regressions, in order to determine the relationship between constructs. The results highlight that generations have different perceptions of environmental issues. Baby Boomers presented greater awareness of environmental sustainability in relation to sustainable consumption, as well as generation Y about environmental practices with sustainable consumption. Based on the results of this research, we suggest that companies and institutions invest in education and environmental awareness actions, to improve the quality of life and minimize environmental impact.

Keywords: Environmental sustainability; Environmental practices; Sustainable consumption; Generations.

SUSTENTABILIDADE AMBIENTAL E CONSUMO SUSTENTÁVEL: PERCEPÇÃO DE BEBÉS, GERAÇÃO X E Y NO BRASIL

RESUMO

As diferentes gerações - Baby Boomers, X e Y - são inseridas na sociedade, consumindo recursos naturais e impactando o meio ambiente. Este estudo tem como objetivo analisar a percepção das gerações sobre a relação de sustentabilidade ambiental, práticas ambientais e consumo sustentável, através da análise de 824 entrevistados de diferentes regiões do Brasil. A metodologia que utilizamos na pesquisa é quantitativa e descritiva, através de pesquisa e avaliada pela análise fatorial exploratória e regressão linear múltipla, a fim de determinar a relação entre construções. Os resultados destacam que as gerações têm percepções diferentes de questões ambientais. Os Baby Boomers apresentaram maior conscientização sobre a sustentabilidade ambiental em relação ao consumo sustentável, bem como a geração Y de práticas ambientais com consumo sustentável. Com base nos resultados da pesquisa, sugerimos que empresas e instituições devem investir em ações de conscientização ambiental e educacional, melhorar a qualidade de vida e minimizar o impacto ambiental.

Palavras-chave: Sustentabilidade ambiental; Práticas ambientais; Consumo sustentável; Gerações.

1 INTRODUCTION

Environmental sustainability has been discussed in society and in the context of organizations, more specifically in the 20th century. In the 1970s and 1980s, companies thought excessively on profitability and earnings, no matter what consequences came from its environmental impact, until the moment that they felt affected by environmental problems, such as the contamination of water, food and air, as well as by environmental law enforcements.

In this scenario, given the environmental problems, companies began being aware and acknowledging the issue, by avoiding wastage, optimizing the use of natural resources, capacitating their teams and training its management with environmental consciousness, given that the future of generations depends on current decisions to provide improved quality of life for the population and a sustainable planet.

For Strieder, Deluque and Shadeck (2012), the current development model has generated economic and social differences, i.e., the rising economic growth and increasing global poverty, pollution and degradation of the environment. Environmental sustainability can be defined as an evaluation process between the economy, society and nature. According to Severo and Guimarães (2015), environmental sustainability became a socioeconomic matter, due to the need to preserve life, since the contemporary lifestyle causes damages to the planet. In this context, environmental practices emerge as a way of mitigating the harmful effects on the environment, minimizing impacts and improving the population's quality of life (Garg, 2014; Guimarães, Severo, Vieira, 2016).

Consequently, environmental practices therefore contribute to better quality and lower production costs, as well as lower pollution levels (Sharma and Vredenberg, 1998; Sindig, 2000). In this scenario, companies, society and people can make use of these environmental practices. However, it is also important to highlight, the difference between the generations that are in society and are the makers of personal and organizational decisions. Such generations are known as Baby Boomers, X and Y and they present numerous differences among themselves.

The generation is classified as a group of people born in a time interval, and when it comes to several generations this period lasts the same interval of years, generally ten years (Rindfleisch, 1994). This time interval, however, is controversial in the literature; European sociologists who were the first to study the generation concept employed measurement units of thirty years (Mannheim, 1952). Strauss and Howe (1991) estimate the duration between 15 and 33 years. Tapscott (1999) uses twenty year units.

In this context, it is important to highlight the various characteristics of generations, as they influence the decision making in organizations, as well as sustainable consumption. These generations have different personal, cultural and historical characteristics. Generation X underwent through various historical and cultural facts and various economic plans, formed by children who spent hours at home alone, children of divorces and who were educated in kindergartens (Ikeda, Campomar, Pereira, 2008), it is a generation that consumes in a balanced manner, is concerned with life and financial quality, as well as being concerned with economic stability.

However, generation Y is made up of young people seeking innovations, they were born amidst the technological evolution and represent a major segment of the market (Zopiaris, Krambia-Kapardis, Varnavas, 2012; Gardiner, Grace, King, 2015; Kruger and Saayman, 2015).

Therefore, it is relevant for companies to understand the perceptions of generations with respect to environmental sustainability, which influences both their professional and personal trajectory, as well as in the development of new products and services. Coherently, the perception and consciousness of these generations, as well as environmental practices that contribute to the reduction of environmental problems are relevant within the academic and managerial context. In this study, for each generation, we will use the year of birth as criterion, with Baby Boomers having been born before 1965, generation X for those people born in-between 1965 and 1981, and Y for those born from 1981 onwards (Strauss and Howe, 1991).

In view of the above, the research question of this study is: what is the relationship between environmental sustainability awareness, environmental practices and sustainable consumption for different generations? For this study aims to analyze the perceptions of Baby Boomers, generations X and Y, regarding environmental sustainability awareness, environmental practices and sustainable consumption. The survey was conducted with 824 respondents from different regions of Brazil, with multivariate data analysis to determine the measurement of the relationship between the constructs. In addition to this introduction, the article presents the theoretical reference on environmental sustainability, environmental practices, sustainable consumption and generations, methodology used, results and discussions and final considerations.

2 LITERATURE REVIEW

2.1 Environmental Sustainability and Environmental Practices

Global challenges associated with industrial production are constant, involving economic, social and environmental issues (Hart and Milstein, 2003; Heikkurinen and Bonnedahl, 2013). The environmental issue, incorporated into markets and the regulatory structures of society, is now seen as an essential element to be considered in the management process (Makkonen and Repka, 2016).

According to Travassos (2012) and Argyrou, Lambooi, Blomme, Kievit (2016), we should understand that actions in favor of the environment are not only social or urban, but rather ecological. After the 1960's, theories on scientific knowledge began being confronted, based on the assumption that the impacts that productive processes caused to the environment could not be considered to be lesser than scientific and technological growth (Dutra, Mazza, Menezes, 2014), representing an essential factor for the change in the productive processes of companies and the consumption of the population.

Studies by Walley and Whitehead (1994) and Palmer et al. (2004), highlight that sustainability strategies result in an increase of costs and decrease in profits due to higher environmental investments, especially in industries that make intensive use of natural resources. However, for Sharma, Iyer, Mehrotra and Krishnan (2010), there is a strong link between business and sustainability, highlighting the possibility of aligning conservation goals and environmental profitability.

According to Scott (2014), addressing environmental sustainability requires changes in the institutional systems of organizations, including values, beliefs, rules and regulations. This demands a new way of listing the environmental sustainability, taking into account institutional, legal, economic and philanthropic issues, for an efficient management within the organization, the environment and society (Kruter, Barcellos, Silva, 2012; Severo & Guimarães, 2015).

In view of the above, environmental practices are being used by different companies. According to So and Sun (2015) developing countries can also move towards the adoption of sustainability to improve the chance of organizational success, because in order to protect the environment, there is an urgent need to develop a technology to deal with the increase of urban solid waste and improve the recovery of environmental resources (Garg, 2014). Environmental practices include segregation, collection and proper treatment of waste (Roy, Boiral, Lagacé, 2001; Boateng, Apriah, Afriyie, 2014; Garg, 2014; Tikam, 2014), and the balanced use of natural resources (Sindig, 2000; Neši, Rizzoli, Athanasiadis, 2012).

However, through environmental practices, organizations can also establish cooperative partnerships (Beškovnik and Jakomin, 2010; Lai and Wong, 2012), to prevent environmental accidents (Cassidy, 1996; Tissayakorn and Akagi, 2014; López-Navarro, Tortosa-Edo, Llorens-Monzonís, 2015), which cause vertiginous environmental impacts (Boubaker, Djebabra, Chaabane, Leal, 2011; Osinibi, 2014; Eshet, 2017). Boubaker et al. (2011), approach two field realities that industrial companies face: the first reality concerns the deficiency of the ISO 14000

certification, in particular when it is in its continuous improvement stage, and the second one concerns the corrective actions which dominate those of regulation and prevention.

In this scenario, organizations must have a department responsible for environmental issues (Lai and Wong, 2012; Martinsen and Huge-Brodin, 2014), invest in the development of green technologies (Pontes and Giordano, 2015), rely on the capture and use of rainwater (El Tugoz, Bertolini, Brandalise, 2017), develop green logistic practices (Engelage, Borgert, Souza, 2016). It may also evaluate employees on the basis of environmental criteria (Pazirandeh and Jafari, 2013).

Addressing environmental problems, both locally and globally, will occur through practices in education and environmental sustainability (Sund, 2016), and these actions seek to improve sustainable development. Environmental education and awareness training can help to develop and encourage a transition to a greener corporate culture (Lau et al., 2017).

2.2 Sustainable Consumption

Various research were presented at the second Global Research Forum on Sustainable Production and Consumption conference (GRF-SPAC), in Shanghai, June 2014 (Vergragt, Dendler, Jong & Matus, 2016). The theme is constantly being discussed, so managers must be aware of the changes and demands that involve the consumer, environmental legislation (Brasil, 1998), so not to incur with risks and losses related to business growth. Thus, society and consumers are becoming more demanding, therefore, organizations are having to adapt and act in a more sustainable way.

For Schäfer, Jaeger-Erben and Santos (2011) and Tseng, Tan, Geng and Govindan (2016), in current political and scientific debates on sustainable consumption, the low- and middle-income classes of emerging countries are drawing attention, one common feature of such debates is the idea that these emerging consumer classes could be motivated to leapfrog directly to environmentally and socially aware consumption patterns and, thereby, avoid adopting the resource-intensive consumption styles of populations in industrialized countries. However, the discursive confusion arises from a simultaneous existence of multiple, continuously changing and partly clashing discourses of sustainable consumption, as well as the associated discursive struggle that consumers need to deal with when trying to make sense of their roles and responsibilities in sustainable development (Markkula and Moisander, 2012).

According to Clark (2007), the current modes of production and consumption have led to unsustainable economic, social and environmental results. In accordance with Vergragt et al. (2016), more than 50% of the growth of the world population now lives in cities, in the face of constant technological innovations, high food and energy consumption, large production of waste, and unsustainable lifestyles. According to Luthra, Mangla, Xu and Diabat (2016), the category of barriers related to Government support and policies was attributed greater importance among other barriers in adopting sustainable consumption initiatives.

The study by Wuang and Wu (2016) confirms that the four emotions can take active roles in promoting sustainable consumption: i) respect and anger can affect the choices of sustainable consumption in a significant way; ii) the impact of a specific positive emotion regarding the intention of sustainable consumption choices cannot be stronger than a specific negative emotion; and, iii) the internal structure of durable consumption options. In this context, it is relevant to plan an option to consider a fund of environmental and social responsibility from the price given to consumers (Sudarto, Takahashib, Morikawab and Nagasawa, 2016). However, these emotions influence the promotion of sustainable consumption. Wang and Wu (2016) point out that by provoking the emotions of pride, guilt, respect and anger, consumers can be influenced by sustainable consumption choices.

For Bakamitsos (2006) the consumer formulates a set of considerations about the product before deciding, using the information available on it. The transformation to sustainable consumption depends on fundamental changes in the world view, breaking paradigms of economic, social, environmental, and ethical dimensions, focused towards a new ecological system (Tseng et

al., 2016; Lim, 2017). Thus, it is necessary that culture and personal values are aligned with sustainable consumption behavior (Sharma and Jha, 2017), so that these changes in consumption may produce improvements in the quality of the environment and in the lives of the population.

However, the transitions that are necessary to achieve more sustainable production and consumption systems should advance in all themes including the technological, managerial, organizational and behavioral aspects (Roberts and Bacon, 1997; Homburg, Koschate and Hoyer, 2005; Blok et al., 2015).

Fuchs and Lorek (2005) point out that in terms of necessary changes in consumption levels and standards, little progress has been made since the Rio Summit in order to build a sustainable future. According to Schrader (2007) and Thøgersen and Schrader (2012), a sufficient implementation of consumer rights, especially of the right to choose and the right to be informed, is a prerequisite for knowledge about environmental sustainability.

Based on the assumptions that Consciousness of Environmental Sustainability and Environmental Practices influence a Sustainable Consumption behavior, the following research hypotheses were developed:

H1: Environmental Sustainability Awareness is positively related to Sustainable Consumption;

H2: Environmental Practices are positively related to Sustainable Consumption.

2.3 Generations

Different characteristics are linked to the generations. In the literature, generations present divergent approaches, normally a period of years of birth is used. Appelbaum, Serena and Shapiro (2000), highlight that Baby Boomers are people born between 1943 and 1960, whereas generation X is for those born in-between 1961 and 1981. For Sirias, Karp and Brotherton (2007), Baby Boomers comprise those born between 1945 and 1962 and generation X are those born in-between 1963 and 1982. In this context, Strauss and Howe (1991) highlight that generation Y is characterized by those born from 1982 onwards.

In this sense, Severo, Ceolin, Guimarães, Souza and Decesaro (2017) point out that there are differences between generations, but that many of the characteristics described for one generation can be found in another generation, since all work efficiently and effectively, considering the importance of being inserted in the labor market. According to research by Appelbaum et al. (2000), Baby Boomers and generation X are not different as employees, they have more similarities than differences. According to Lancaster and Stilman (2002) generation X have excessive respect for their beliefs, which leads them to live a more balanced life; generation Y however, since it is comprised of younger people, do not follow beliefs and act in pursuit of status.

For Zopiaris et al. (2012), generation Y favors immediate action, they present excessive self-confidence and aim at rapid growth in the labor market. The young people of this generation prefer challenges and are overly worried about remuneration (Kruger and Saayman, 2015).

According to Carter and Kelly (2013), generation X is concerned about health status and eating habits, however, Baby Boomers also engage in weekly physical activity, as they present greater risk of obesity and being overweight. According to the authors, it is necessary to consider the differences between generations in the development of health promotion programs.

However, generation Y draws researchers' attention due to the size of this segment of consumers and also their significant purchasing power (Kruger and Saayman, 2015). For the authors, it is evident that the generation theory needs to take into account the needs of this generation, which can be a useful tool to segment markets.

Another important issue regards the way generations understand environmental sustainability. According to Wright, Caserta and Lund (2003) despite a personal desire to protect the environment, most of Baby Boomers do not often get involved in environmental protection actions, however, they feature high levels of social concerns. Still according to the authors, the

status of residence and religious affiliation emerged as the strongest relationships with measures of attitudes and concerns, and availability to support the environment. Consequently, generation Y is aware of environmental impacts, being careful in the decisions taken, as well as the benefits that products are offering (Williams and Turnbull, 2015). Generation X however, takes into account aspects such as product quality, price, opinions about the product, as well as the service provided and the environmental issues (Strauss and Howe, 1991; Appelbaum et al., 2000).

For Pomarici and Vecchio (2014) and Pallaro et al. (2015), although a lot has been written in recent decades on sustainable consumption, it is a difficult task to obtain information about consumers' preferences for new products with environmental and social precepts. However, recent studies show that consumers have increasing concerns regarding environmental and social impacts of products within their consumption patterns. Nonetheless, insufficient information makes them unable to conduct sustainable consumption (Shao, 2016), since this society is composed of the different generations (Parry and Urwin, 2011; Rocha-de-Oliveira, Piccinini, Bitencourt, 2012; Severo et al., 2017).

In this scenario, the interest of various stakeholders in environmental issues forces firms, especially those operating in environmentally risky sectors, to undertake certain environmental practices to build an environmentally friendly profile either at their operational or production level (Nikolaou and Kazantzidis, 2016).

However, organizational performance and information related to environmental issues can influence environmental awareness (Heiskanen, 2005; Csutora, 2012; Perdan, Jones, Azapagic, 2017) and sustainable consumption (Schäfer et al., 2011; Lim, 2017) of different generations (Strauss and Howe, 2001; Parry and Urwin, 2011; Gursoy, Chi, Karadag, 2013; Chakraborty and Balakrishnan, 2017).

In view of the above, the following hypotheses were elaborated:

H3a – There is a difference in the perception of the Baby Boomers, X and Y generations in the relationship between Environmental Sustainability Awareness and Sustainable Consumption; and,

H3b – There is difference in the perception of the generations Baby Boomers, X and Y in the relationship of Environmental Practices with Sustainable Consumption.

3 METHOD

The methodology we used in this study is the quantitative and descriptive research. According to Hair, Black, Bardin and Anderson (2007) quantitative research presents greater benefits, it allows measuring variations of different relationships, to positively confirm the results. Quantitative research presents a multiple and statistical view, due to its complexity in evaluations and analyzes of data presentation (Malhotra, 2010).

Malhotra (2010), states that descriptive research needs to clearly present its results, for the coherent detailing of related facts. Descriptive research is not easy to understand, it requires attention when determining the facts, to reach a broad overview of the topics.

For the collection of data we used a survey by through questionnaires. According to Malhotra (2010), the survey seeks to analyze high numbers of knowledge and also to bring constructive opinions to the research objective. This technique is used in quantitative research, where the objectives are to raise the maximum numbers of respondents for the identification and definition of the causes of the problems (Hair et al., 2007).

The questionnaire features 8 questions that characterize the respondent profile, as well as 18 questions with a 5-point Likert scale, which ranges from totally agree to totally disagree, which is adapted from the study by Strauss and Howe (1991) to define generations, with Baby Boomers being those born before 1965, generation X those born between the years of 1965 and 1981 and generation Y for those born after 1981. Table 1 presents the other constructs of the research. Coherently, for environmental sustainability awareness (ESA) we used the theoretical assumptions

by Kruter et al. (2012) and Severo and Guimarães (2015), for environmental practices (EP) we used the studies by Sinding (2000), Rauta, Fagundes and Sehnem (2014) and Severo, Guimarães, Dorin and Nodari (2015), and for the sustainable consumption construct (SC) we used the research by Roberts and Bacon (1997), Homburg et al. (2005) and Kruter et al. (2012).

In this context, the questionnaire was validated by two experts in the thematic area of studies, with a pretest being performed with twenty respondents to verify the understanding of the questions and the running time. The questionnaires were applied online via the Google Docs form, and social networks, due to the great change in the consumption of technology, thus relying on more respondents. These were sent to the authors between June 06 and July 19 2016, following the snowball method. Coherently, the choice of respondents was non-probabilistic, by convenience.

According to Hair et al. (2007) and Malhotra (2010), the non-probabilistic sample is used when the response is not clearly defined by a sample calculation. A total of 845 questionnaires were answered, of which 21 questionnaires were excluded, as they were considered outliers, for they presented answers concentrated on a single Likert alternative. In this context, we selected a sample of 824 valid cases (respondents).

Table 1. Variable – Varimax Rotation

Observable Variables *	Factorial Loads	Commonality
Environmental Sustainability Awareness (ESA)		
ESA1) Environmental sustainability is concerned with the maintenance of natural resources for future generations.	0.488	0.289
ESA2) Unbalanced climate changes have occurred in recent decades.	0.594	0.360
ESA3) The tributaries (rivers) are being contaminated by industrial and human action.	0.763	0.614
ESA4) Air pollution is damaging the quality of life of generations.	0.709	0.518
ESA5) To maintain a sustainable economy, we will have to develop it, so that the industrial growth is controlled.	0.470	0.258
ESA6) The awareness of generations on environmental sustainability can minimize environmental impacts.	0.612	0.429
Mean 4.5; Standard Deviation 0.792; Cronbach's Alpha 0.659; KMO 0.757		
Environmental Practices (EP)		
EP1) At home I separate recyclable and organic waste.	0.696	0.529
EP2) At the company where I work, recyclable and organic waste are separated.	0.517	0.331
EP3) Whilst I shower, I use the water aiming at minimizing consumption.	0.415	0.347
EP4) I allocate electronic waste (Batteries, Lamps, Cell Phones) to collection points suitable for the collection and treatment of this waste.	0.765	0.602
EP5) I use environmental practices aiming at a better quality of life.	0.660	0.629
Mean 3.6; Standard Deviation 1.383; Cronbach's Alpha 0.700; KMO 0.741		
Sustainable Consumption (SC)		
SC1) I believe I am helping the environment by purchasing a green plastic product.	0.486	0.277
SC2) I do not buy products manufactured or sold by companies that harm or disrespect the environment.	0.722	0.556
SC3) I would pay more for a product that is environmentally friendly.	0.674	0.533
SC4) I have already convinced friends or relatives not to buy products that harm the environment.	0.778	0.650
SC5) Whenever possible, I try to buy products with reusable packaging.	0.656	0.591
SC6) I always make an effort to reduce the use of products made of scarce natural resources.	0.692	0.641
SC7) When I have to choose between two equal products, I always choose what is least harmful to the environment.	0.743	0.630
Mean 3.3; Standard Deviation 1.323; Cronbach's Alpha 0.858; KMO 0.897		
* Use of five-point Likert scale: 1 – Totally Disagree; 2 – Partially Disagree; 3 – Neither do I agree nor Disagree; 4 – I Partially Agree; 5 – Totally Agree.		

Source: Developed by the Authors (2016)

To analyze the data, we used descriptive statistics with the aid of the SPSS software, as well as the technique of exploratory factorial analysis (EFA), multiple linear regression and the analysis of variances (ANOVA) to verify the moderating effect between generations and whether there were differences between respondents from the five regions of Brazil.

The EFA aims to verify the relationship between the observable variables, grouping observable variables correlated with each other in factors (Hair et al., 2007). According to Malhotra (2010), the exploratory factorial analysis is a study that verifies the variance, which allows the comparisons of effects. It is a statistic that measures the information of certain groups, defining the patterns (Hair et al., 2007).

For Hair et al. (2007), the multiple linear regression is a suitable method of analysis, when the research problem involves a single dependent variable, which is considered as related to two or more independent variables. Multiple linear regression uses measures that seek to explore the relationship between the variables of the study (Hair et al., 2007; Pestana and Gageiro, 2014).

4 RESULTS AND DISCUSSIONS

The sample is composed of 824 respondents, 70 (8.5%) Baby Boomers, 194 (23.5%) generation X and the largest number of respondents, 560 (68%) generation Y, which demonstrates that this generation is accustomed technologies and social networks, which is recommended by Kruger and Saayman (2015). With regards to the gender of respondents, 298 (36.2%) were male and 526 (63.8%) were female. Regarding profession, respondents work in several different sectors i) assistant: 98 (11.9%); ii) analyst/technician: 201 (24.4%) manager: 146 (17.7%); iv) professor: 158 (19.2%); v) student: 220 (26.7%). As for the family income of respondents, it should be noted that the highest percentage, 322 (39.1%), of respondents had a monthly family income ranging from 10 to 20 minimal wages. The most expressive level of education was specialist (Postgraduate), with 166 (20.1%) respondents, followed by incomplete university education (undergraduate student) 162 (19.7%).

A relevant data is regarding the region of Brazil, where the respondents of the survey are located, the South region is highlighted with 550 (66.7%) and the Northeast 144 (17.5%), this fact occurs due to the geographical location of the researchers, since convenience sampling was used, with 3 researchers being from the South and 1 from the Northeast.

4.1 Exploratory Factor Analysis

The first stage consisted in performing the EFA with the support of the SPSS 20.0 software, from the following parameters: i) using 18 variables (Table 1); ii) extraction through the Principal Component Analysis, based on eigenvalues; iii) Varimax rotation; and iv) displaying all the coefficients, in order to have a general view of the indicators, which Hair et al. (2007) indicate that the coefficients below 0.4 are not significant and therefore should be eliminated, resulting in latent variables termed as constructs.

In the cluster analysis of observable variables, we used the EFA, which were grouped into three constructs (factors): i) environmental sustainability awareness (ESA); ii) environmental practices (EP); and, iii) sustainable consumption (SC). Table 1 presents the results of the Principal Component Analysis, displaying the mean, standard deviation, observable variables (questions) and their respective factorial loads.

In order to verify the simple reliability of the observable variables we calculated the Cronbach's alpha, which must be above 0.7 (Lee and Hooley, 2005; Hair et al., 2007), the results of data were superior to 0.7 for the three constructs (Table 1) and 0.862 in the calculation with all the data together. Accordingly, in the data preparation, they were submitted to Bartlett's test of Sphericity ($p < 0.05$), which appeared as significant, and to assess the homogeneity of variances and

the measure of adequacy by Kaiser, Meyer and Olkin (KMO), which must be above 0.5 (Pestana and Gageiro, 2014). Barlett's test of Sphericity was significant ($p < 0.001$) for the data set and for the three individually calculated constructs, as for the KMO with a value of 0.896 for the data set, which highlights the normality of the data.

We verified that the factorial loads (Table 1) are above 0.4, which according to Hair et al. (2007) is acceptable for data analysis, without the need to exclude any variable. In this context, we also evaluated Commonality, as a parameter of scale analysis, which refers to the total variance that an original variable shares with all other variables of the research (Hair et al., 2007), in which values should be above 0.5. In Table 1, we present the Commonality of the variables, however, questions ESA1, ESA2, ESA4, ESA5, EP1, EP2 and SC1 presented low Commonality, but were kept in the research because they are fundamental for the understanding of the constructs.

Once we verified the adequacy of the EFA for the statistical treatment of research data, we identified the factors through the method of Principal Component Analysis, which transforms a set of variables into a new set of variables that is compound, linear nor correlated with each other (Hair et al., 2007). For this purpose, the number of factors was not previously defined and we only considered those that presented eigenvalue greater than 1 (Hair et al., 2007). In this sense, we considered three factors (constructs), which explain 48.80% of the data variance.

4.2 Multiple Linear Regression

The analysis of relationships consisted of the Multiple Linear Regression between the: i) environmental sustainability awareness (ESA); ii) environmental practices (EP); and, iii) sustainable consumption (SC).

The first model was generated with the mean of the SC construct as the dependent variable and the ESA (ESA1, ESA2, ESA3, ESA4, ESA5, ESA6 – Table 1), as the independent variable. The second model was generated by using the mean of the SC construct, as the dependent variable and the EP (EP1, EP2, EP3, EP4, EP5 – Table 1) as the independent variable.

In this context, the Multiple Linear Regression indicates the cumulative effects of a group of explanatory variables (X_1, X_2, X_3 , etc.) in a dependent variable (Y), as well as the separate effects of these explanatory variables ($Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_0$).

Initially, we performed the Pearson's correlation matrix analysis to identify the multicollinearity before the process of multiple regression. This analysis aims to find out whether some independent variables are highly correlated, and this occurs when correlations between the variables are above 0.8 (Wooldridge, 2006). In the analyzed data set, the highest correlation is $SC_6 \leftrightarrow SC_7$ (0.632), thus, no evidence of multicollinearity is found.

The regression results for the ESA are presented in Table 2, which presents an explanation index of 16.2% (R^2), from the analyzed variables, which represents a low explanatory power. The significance test presented a value of $p > 0.001$, indicating that the estimated regression model is suitable, to present the relationship between environmental sustainability awareness and sustainable consumption. Based on the results of R^2 (16.2%) Hypothesis H1 is confirmed (Environmental Sustainability Awareness is positively related to Sustainable Consumption). These results corroborate with the Bakamitsos (2006), Schrader (2007), Thøgersen and Schrader (2012) and Wang and Wu (2016), because consumers want to have the right to choose what they will acquire, and these consumers have begun to consider ethical and environmental aspects. However, Environmental Sustainability Awareness is not yet widespread among consumers, so that it has a greater influence on the behavior of Sustainable Consumption.

It should be noted that there is a low intensity of ESA in SC. With the result of the regression (Table 2) we notice that for these respondents, the ESA is not a determinant factor of sustainable consumption behavior, which indicates a need to further develop the awareness of the different institutions of society.

Table 2. Model summary

Model	R	R ²	R ² adjusted	Standard error of estimate
ESA-->SC Predictors (Constant ESA6, ESA2, ESA1, ESA5, ESA4, ESA3) and Dependent variable (Mean SC)	0.403	0.162	0.156	0.86438
EP-->SC Predictors (Constant EP5, EP2, EP3, EP4, EP1) and Dependent variable (Mean SC)	0.655	0.429	0.425	0.71327

Source: Data from quantitative research (2016).

Table 2 presents the results of the regression for EP, which represents an explanation index of 42.9% (R^2), from the analyzed variables. The test of significance presented value of 0.000, indicating that the estimated regression model is adequate to present the relationship between EP and SC. This result confirms the hypothesis H2 (Environmental Practices are positively related to Sustainable Consumption), indicating that a high intensity occurs ($R^2=42.9\%$) in the relation of EP and SC. These results are in line with the studies by Scott (2014), Severo and Guimarães (2015) and Sund (2016), which highlight the role of organizations in the formation of a Sustainable Consumption behavior through the use of Environmental Practices in the daily life of organizations. Public organizations and policies are those responsible for increasing people's awareness of the impact of individual behavior on environmental sustainability and environmental development, which is corroborated by Boateng et al. (2014), Garg (2014) Scott (2014), Sun (2015), Engelage et al. (2016) and Lau et al. (2017).

In this context, we examined whether the perception of different generations (Figure 1) in face of the three constructs surveyed using ANOVA (Table 3), which indicated that there is a significant difference between the three generations within each construct ($p>0.001$). Accordingly, in the calculation of the individual regression of generations (Figure 1), we verified that Baby Boomers presented a higher ESA in the relationship with SC (ESA-->SC), with $R^2=0.271$, which is aligned to the reflexive behavior of this generation. This result runs counter to the research findings by Wright et al. (2003), in which Baby Boomers had higher levels of social and religious concerns. Generation X presents $R^2=0.158$, very close to generation Y ($R^2=0.160$), but with statistical difference, highlighting a less reflective and more pragmatic behavior of these two generations.

The results confirm hypothesis H3a (there is a difference in the perception of Baby Boomers and generations X and Y in the relationship between the Environmental Sustainability Awareness and Sustainable Consumption). These results are supported by Pomarici and Vecchio (2014), Pallaro et al. (2015), (Shao, 2016) and Severo et al. (2017), which evidence the existence of differences in the characteristics and behaviors of consumption between the generations.

Table 3. ANOVA (analysis of variance) – different generations (Baby Boomers, Generation X and Y)

Construct	Different Generations	Sum of Squares	df.	Mean Square	F	Sig.
Environmental Sustainability Awareness (ESA)	Between Groups	7.782	2	3.891	16.977	0.000 ^a
	Within Groups	171.967	821	0.209		
	Total	179.749	823			
Environmental Practices (EP)	Between Groups	75.310	2	37.655	1.688	0.000 ^a
	Within Groups	610.321	821	0.743		
	Total	685.631	823			
Sustainable Consumption (SC)	Between Groups	84.443	2	42.221	15.604	0.000 ^a
	Within Groups	644.261	821	0.785		
	Total	728.703	823			

^a There is significant difference between respondents (significance level $p<0.001$).

Source: Developed by the Authors (2016)

These results corroborate with the premises of Carter and Kelly (2013) since generation X is concerned with health and life quality issues, as well as for Strauss and Howe (1991) and Appelbaum et al. (2000) the quality of the product, the price and the service provided.

We can observe that the results show that the exercise of environmental actions, manifested through the EP have a significant positive effect on the behavior of SC, showing that respondents, of which the majority are generation Y (68%), are more interested in applications than in concepts of ESA. This is most evident in the results of individual regression of generations (Figure 1), in which $R^2=0.407$ is made evident for generation Y in the relationship between EP and SC (EP-->SC). This result is relevant as according to Kruger and Saayman (2015), it is the largest group of segment of consumers, which has significant purchasing power, and as according to William and Turnbull (2015), are concerned about environmental issues.

In this relationship EP-->SC (Figure 1), the Baby Boomer respondents feature positive influence ($R^2=0.377$), as for generation X ($R^2=0.357$), although they are less intense in comparison with generation Y, and this shows the differences between the generations, although the three generations have shown that the EP, whilst it is a daily exercise, has a more direct effect on the SC behavior. These results support the research by Appelbaum et al. (2000), in which these two generations have more similarities than differences.

The results confirm hypothesis H3b (There is difference in the perception of the generations Baby Boomers, X and Y in the relationship of the Environmental Practices with Sustainable Consumption.). Environmental Practices are promoted by public organizations and policies, so the internal incentive in organizations and institutional campaigns influence people to adopt a behavior of Sustainable Consumption, however each generation will have a different exposure to these communication forms, since Baby Boomer and Generation X are in the labor market, they receive stimuli from companies and other institutions, while generation Y is very tied to educational institutions and use the Internet and virtual social networks more intensely. This finding of research is in line with the studies by Parry and Urwin (2011), Rocha-de-Oliveira et al. (2012), Pomarici and Vecchio (2014), Pallaro et al. (2015) and Severo et al., (2017), which show different habits and consumption behavior among the generations.

Figure 1. Perception of generations
Source: Developed by the Authors (2016)

Another analysis of this research was the evaluation of consumer responses, considering the five regions of Brazil, by using ANOVA (Table 4), which showed the existence of differences

between the regions, such as $p > 0.01$ in the data of the constructs of ESA, EP and SC. Table 5 shows the means and standard deviation of the responses, as well as the number of respondents (N). It should be emphasized that the mean of responses of the North and Center-West regions are significantly different among the other regions, but we opted not to analyze these differences, as the number of respondents is small, which can distort and only scrape the surface of the data analysis.

Table 4. ANOVA (analysis of variance) – differences in responses between the regions of Brazil

Construct	Different Generations	Sum of Squares	df.	Mean Square	F	Sig.
Environmental Sustainability Awareness (ESA)	Between Groups	3.795	4	0.949	4.416	0.002 ^b
	Within Groups	175.954	819	0.215		
	Total	179.749	823			
Environmental Practices (EP)	Between Groups	13.583	4	3.396	4.138	0.003 ^b
	Within Groups	672.048	819	0.821		
	Total	685.631	823			
Sustainable Consumption (SC)	Between Groups	18.837	4	4.709	5.433	0.000 ^a
	Within Groups	709.866	819	0.867		
	Total	728.703	823			

^a There is significant difference between respondents (significance level $p < 0.001$).

^b There is no significant difference between respondents (significance level $p < 0.01$).

Source: Developed by the Authors (2016)

We highlight that the mean of ESA (4.64) for respondents from the Northeast is higher than the Southeast and South, just as there is a high correlation of respondents, with low amplitude, made evident in the standard deviation of 0.379. This result shows that respondents from the Northeast expressed a high awareness of environmental sustainability, within the precepts of conservation of natural resources, understanding climate change, pollution of tributaries and sustainable economy, to minimize environmental impacts. According to Scott (2014), environmental sustainability lists changes that include values, beliefs, rules and regulations, which can be perceived in these respondents, since they are ecological actions (Travassos; 2012; Argyrou et al., 2016). We can observe that the South and Southeast regions also present important means of the answers, with 4.51 and 4.47 respectively, therefore it is evident the high awareness of respondents from these regions, although statistically speaking there are significant differences.

The means of EP, are low in relation to ESA, as they are too close to the median (3.0). These results show that respondents affirm performing environmental practices related to waste segregation, recycling and quality of life. In this scenario, the South region stands out with a mean of 3.69, which is understandable by the large number of cities that separate and recycle waste, but even so the means of the Northeast (3.58) and Southeast (3.33) are close to that of the South, showing that respondents expressed an attitude of application of the precepts of sustainability. According to Garg (2014), the development of technology is needed to cope with the increase of urban solid waste and improving the recovery of environmental resources and environmental practices can benefit the process of segregation and treatment of waste (Boateng et al., 2014; Tikam, 2014).

The SC construct also presents low mean in the Northeast (3.49), South (3.26) and Southeast (3.20), very close to the median (3.0), which opens the possibility for the various institutions and companies to assist in the construction of an environmentally responsible consumer profile. We can observe that there is an overall mean of ESA (3.51) and EP (3.63) that can still improve the influence on SC, whose overall mean is 3.31. These data and the analysis are reinforced by the regression analysis $ESA \rightarrow SC$ ($R^2 = 0.162$) and $EP \rightarrow SC$ ($R^2 = 0.429$).

Table 5. Differences in responses between the regions of Brazil

Region		Environmental Sustainability Awareness (ESA)	Environmental Practices (EP)	Sustainable Consumption (SC)
South	Mean	4.47	3.69	3.26
	N	550	550	550
	Standard Deviation	0.479	0.924	0.937
Southeast	Mean	4.51	3.33	3.20
	N	108	108	108
	Standard Deviation	0.508	0.911	0.996
Northeast	Mean	4.64	3.58	3.49
	N	144	144	144
	Standard Deviation	0.379	0.874	0.868
Center west	Mean	4.67	3.89	3.86
	N	14	14	14
	Standard Deviation	0.333	0.442	1.036
North	Mean	4.65	3.95	4.25
	N	8	8	8
	Standard Deviation	0.264	0.573	0.250
Total	Mean	4.51	3.63	3.31
	N	824	824	824
	Standard Deviation	0.467	0.913	0.941

Source: Developed by the Authors (2016).

5 CONCLUSION

Baby Boomers, generation X and Y present differences in relation to behavior, depending on the context in which they were formed, therefore, analyzing and measuring the perceptions of these generations regarding environmental sustainability awareness, environmental practices and sustainable consumption can indicate ways for different institutions and companies to disseminate the precepts of environmental sustainability and indirectly influence sustainable consumption. Based on the purpose of the study to analyze the perception of the Baby Boomers, X and Y generations regarding the relationship between environmental sustainability awareness, environmental practices and sustainable consumption, we analyzed 824 respondents from different regions of Brazil to determine the intensity of the relationships.

The results of the research show that there is a difference between generations in the perception of the relationship between environmental sustainability and sustainable consumption (ESA-->SC). It should be noted that in three generations the mean for the ESA questions remained at 4.5, which shows a high degree of agreement of responses, it can be interpreted as the existence of the awareness of environmental issues, though when we evaluate the regressions between ESA-->SC, we can observe that even those people who have high ESA do not materialize it in a conscious consumption behavior. The analysis of these results allows an important contribution of the research, in order to demonstrate that it is not enough to have environmental awareness, therefore it is fundamental that institutions and companies invest in environmental awareness and education programs that demonstrate ways for people to exercise environmental responsibility. Therefore, the formation of critical thinking is not sufficient, it is necessary to articulate this awareness in behaviors such as sustainable consumption.

The evaluation of the relationship between environmental practices and sustainable consumption presents contributions to academic studies and research on consumer behavior performed by companies, inasmuch as it became evident in this study the pragmatic behavior of generation Y, in which an intense relationship was presented between EP-->SC, with $R^2=0.407$, suggesting that businesses and various institutions should invest in actions that take advantage of the willingness to engage in environmental practices, so it can be converted into sustainable consumption.

Another important contribution of this study is the provision, both for the scholarly community and the managerial context, of a scale to measure the behavior of people in relation to environmental sustainability awareness, environmental practices and sustainable consumption. The measurement scale was statistically validated, based on reliability parameters, normality and factorial analysis, which showed consistency in the grouping of observable variables, this way other researchers and companies can use the questions as a way to measure the three constructs.

With regards to the limitations of the study, we can mention the non-probabilistic sample, as it was not possible to segment proportionally, which is not possible by means of collecting data with the use of the Snowball method, considering the characteristics of the population. The non-probability of the sample interferes only with the generalization capacity, but statistically speaking, the scale (questions) is validated and the results are significant, allowing inference on respondents.

Future studies suggest new research that may contribute to the understanding of issues such as: What types of products are purchased considering sustainable consumption? What are the social agents (different companies and institutions) that influence the formation of environmental sustainability awareness? What are the environmental sustainability expectations of consumers in relation to companies? The answers to some of these questions, added to the results of this study may guide companies and other institutions to influence individuals on environmentally responsible behavior.

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