SUSTAINABLE DEVELOPMENT IN FERNANDO DE NORONHA, PERNAMBUCO, BRAZIL, ACCORDING TO TOURISM PROFESSIONALS

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ABSTRACT

This study aims to identify how tourism professionals realize sustainable development in Fernando de Noronha, Pernambuco, Brazil, to that end, a questionnaire based on Sen (2010) sustainable development model was applied to a sample of 127 elements and a search in secondary socioeconomic data was performed. The data obtained through the questionnaire were subjected to analysis with the Statistical Package for Social Sciences software to perform an Exploratory Factor Analysis and after, it was made a Confirmatory Factor Analysis using AMOS software. As a result, the socio-economic data indicated the emergence of social and economic problems over time and that the sustainable development model has not been identified, suggesting that, according to the tourism-related professionals, the management model applied to the island does not track the path that leads to sustainability, even when a special attention is given to the preservation of the local environment.

Keywords: Tourism Professionals, Sustainable Development, Fernando de Noronha, Sustainable Tourism, Structural Equation Modeling.

JEL Classification: Z32, Q26

1. INTRODUCTION

The technological, social and economic development observed in recent decades, besides causing changes in societies, also resulted in a new way to identify, explore, evaluate and conserve environmental resources from the understanding that they determine not only the supply of raw material, but also leisure, relaxation and better quality of life for current elements that form society besides being the most important legacy for those who will inherit it.

Tourism aims to contribute to the evolution of individuals and social groups, promote their development and provide rest and fun; for this, several dimensions such as marketing, transportation, lodging, food and beverage, infrastructure and services, are put together forming a system where the involved variables interact with one another and the results may cause positive or negative effects on economic, social and environmental dimensions. In this context, the paradigm of sustainability must be incorporated to the tourism market to drive its development to use natural, social and economic available resources and predict and control the resultant impacts, giving the basis for the sustainable tourism concept.

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According to 24th Article of the Universal Human Rights Declaration, everyone has the right to rest and enjoy leisure; to a reasonable limit of working hours and paid vacations, that implies that tourism is not a luxury but a right, so it indicates the trend to an increase in activities related to tourism all around the world. The World Tourism Organization [UNWTO] predicts that by 2020, there will be a tourist movement of 1.6 billion people in the world (UNWTO, 2010), but it does not refer to the impact of this fact to natural resources. The development of tourism can affect the natural environment due to visual and aesthetic impacts, waste generation, air pollution, erosion and destruction of environments due to human action (Huiqin & Linchun, 2011). With the degradation of the environment, tourism, which depends on it directly, will suffer negative impacts (Huiqin & Linchun, 2011; Tortella & Tirado, 2011) and it will be reflected on the lives of those who depend on such activity for their livelihood. The tourism-related researches generally emphasize economic variables, with certain detriment of their socio-cultural and environmental characteristics.

The sustainability concept is not still well defined (Jickling, 2000; Keiner, 2006; Ciegis, Ramanauskiene & Martinkus, 2009; Barbieri, Vasconcelos, Andreassi & Vasconcelos, 2010), thus the Sachs (1993) and Sen (2010) sustainable development, models and Elkington (2012) sustainability model address different dimensions for sustainability and sustainable development. It is emphasized that "due to the imprecision of the concepts often these terms are used interchangeably; but they are different (Silva & Mendes, 2005, p. 12). These authors consider that sustainable development can be seen as a process and sustainability as an end, the topic sustainability is linked to "where" you want to go while sustainable development is highlighted as "how" you must go (Silva & Mendes, 2005). Sustainable development must include improvement of quality of life for people, considering the resilience of the ecosystem, which should be considered as the maximum load for the environment while maintaining the ecological balance, this procedure requires periodic evaluations of the environment to take decisions to make adjusts to new conditions (Ciegis *et al.*, 2009).

So considering, first, the path to sustainable development should be followed and only after that, sustainability, with its economic, social and environmental dimensions (Elkington, 2012), can be achieved. In this context the question which led this research arose: How tourism professionals realize sustainable development in the region in which they operate? As a research place it was elected the main island of Fernando de Noronha archipelago and, to answer the previous question, it was established as a general objective, to identify how the professionals linked to tourism realize sustainable development in Fernando de Noronha island and, as a specific objective, knowing the socioeconomic profile of the population living in the island.

As a justificative for this work, there is the need to aim sustainable development as a way to achieve sustainability to predict and prevent the environmental, social and economic impacts of tourism in the archipelago on which most of the Fernando de Noronha inhabitants depend.

2. THE FERNANDO DE NORONHA ARCHIPELAGO

In contrast to the continent, islands tend to create in the tourist a positive image (Pearce, 2003), those from warmer climates become havens to escape from the everyday routine (Gössling, 2003), this is how the Fernando de Noronha archipelago can be seen, due to its distance to the mainland, warm and clean water beaches and, especially for its gorgeous and preserved biodiversity, the archipelago highlights its tendency to tourism based on natural resources.

The Fernando de Noronha archipelago is located 340 km from São Roque Cape (in Rio Grande do Norte State in Brazil) and 545 km from Recife (Capital of Pernambuco State in Brazil)in the Brazilian Northeast region and consists of 21 islands with an area of nearly 26 km2, originated by volcanic processes with its base to 4,000 m deep and 60 km in diameter, it is a part of the called Median Dorsal of the Atlantic, which is a chain of underwater mountains about 15,000 km long, which divides the Atlantic Ocean into two parts (Ferreira, Jesus & Silva, 1990). The main island, the only one inhabited has the archipelago's name and occupies a 17 km2 area with a population of 2,630 permanent residents (Instituto Brasileiro de Geografia e Estatística [IBGE], 2010), in addition to these, there are some temporary residents, totaling 3,500 residents. The average temperature is 28º C in the land and 26º C in the sea. The islands have two seasons: a dry season that goes from September to March and a rainy one from April to August which is characterized by sporadic rain merged with intense sun. Figure 1 shows the map of the archipelago.

Figure 1. Map of the Fernando de Noronha archipelago

Source: http://www.noronha.pe.gov.br/

Due to its geographical position, the archipelago remained isolated for a long time and, after a Dutch and French incursions, in 1737, it was put under the jurisdiction of the government of Pernambuco State. In 1938, it was again under the jurisdiction of the Federal Government that, in 1942, created the Fernando de Noronha Federal Territory. Brazilian militaries ruled Fernando de Noronha for 45 years and, in 1987, it was elected the first civilian governor, which enabled the beginning of tourist activities on the island, that was when the first family guesthouses were established, facilitating the establishment of a framework to support tourists. In 1988 the Brazilian government determined that about 70% of the archipelago was changed into a maritime national park aiming to preserve the land and marine environment. On October, 5, 1988 the Federal Territory was extinct and the archipelago was added to Pernambuco State.

In 2001, the United Nations Educational, Scientific and Cultural Organization [UNESCO] awarded Fernando de Noronha the title of World Natural Heritage Site. The rational tourist exploitation is currently the main economic activity on the island. This economic activity has limitations due to the lack of infrastructure and also for the standards determined by the Instituto Chico Mendes para a Conservação da Biodiversidade - ICMBio – organization responsible for monitoring and conservation of the environment on the island (Souza & Filho, 2011).

Tourism is the main source of income of the island, biodiversity and its clear water beaches are its main attractions, as they favor snorkeling and diving, Aqua Sub, boating, as well as peace and silence for the appreciation of the sunset at the Boldró Belvedere or at any other point of the island. Photos 1, 2, 3 and 4 show the main beaches in the island.

Photo 1 – Dois Irmãos Hill

Source: Photographed by the authors (2016)

Photo 2 – Sancho Beach

Source: Photographed by the authors (2016)

Photo 3 – Cacimba do Padre Beach

Source: Photographed by the authors (2016)

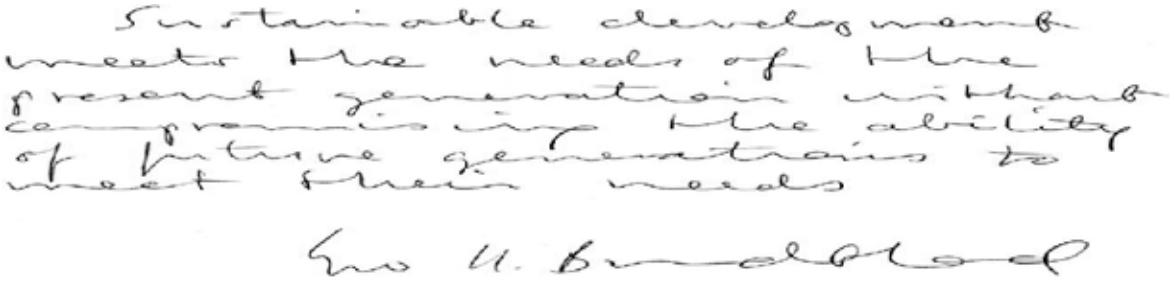
Photo 4 – Porcos' Bay

Source: Photographed by the authors (2016)

3. SUSTAINABLE DEVELOPMENT ACCORDING TO SEN (2010)

Many researches have been made to define sustainable development, however, there is no consensus among authors as to its exact definition (Keiner, 2006; Barbieri *et al.*, 2010) however, the most referenced is the one found in the "Our Common Future" document elaborated by the World Commission on Environment and Development [WCED] (1987), that was led by the Prime Minister of Norway Gro Brundtland: "sustainable development is one that meets the needs of the present without compromising the ability of future generations to meet their own needs "(WCED, 1987), which is indicated in figure 2.

Figure 2. Definition of sustainable development (signed by Gro Brundtland)



Source: Keiner (2006, p. 2)

Among the most used sustainable development models are: I – Sachs (1993), that defines that sustainable development is formed by five dimension: Social Sustainability, Economic Sustainability, Ecological Sustainability, Spatial Sustainability and Cultural Sustainability; II - Sen (2010) that states that sustainable development is based on freedom, so the author defines its model as formed by the Political Freedoms, Economic Facilities, Social Opportunities, Transparency Guarantees and Protective Security. This model will be used in this study.

Even with the technological advances achieved in recent decades it is still possible to see a gap among the living conditions not only among communities but also within them, favoring the deprivation that hinders development and emphasizes the need to identify a new means by which societies can achieve more homogeneous living conditions. It also may be seen that among so many social disparities, there is a consensus that development should be measured using only economic instruments, which do not consider the consequences that this context causes and that will culminate by involving everyone in a chaotic situation. In the search for another development model, Sen (2010) suggests that "an adequate conception of development must go much beyond the accumulation of wealth and the growth of gross national product and other variables related to income, without disregarding economic growth, we need see beyond it "(Sen, 2010, p. 28); highlighting the fundamental role of freedom for the development, the author states that "freedom is a major determinant of individual initiative and social effectiveness. Having more freedom improves the potential of people to take care of themselves and to influence the world, central issues to the development process" (Sen, 2010, p. 33). Highlighting that "development is actually a tremendous commitment to the possibilities of freedom" (Sen, 2010, p. 337), the author defines the instrumental freedoms as: Political Freedoms, Economic Facilities, Social Opportunities, Transparency Guarantees and Protective Security.

3.1 Political Freedoms

Political freedoms must be exercised without restrictions, respecting civil rights and ensuring to all members of society the choice of their rulers and the principles that will guide this government; dissent and free personal and media expression.

3.2 Economic Facilities

Refer to the freedom of accessing market and using the available resources according to the desired purpose. The economic rights will depend not only on the resources of the people and market conditions but also on the laws that regulate it. Economic development arises when society enriches and also do the economic rights of its members, resulting in little difference among social classes and a more homogeneous income distribution.

3.3 Social Opportunities

They refer to the possibilities of development and social growth available within a society and include factors such as health, sanitation, education and security.

3.4 Transparency Guarantees

They are related to the compliance with applicable laws and regulations in the social environment, causing protection against arbitrary acts and defining the form of social interaction in addition to preventing unlawful acts and providing a better quality of life and safety. According to Sen (2010, p. 56), the guarantees of transparency "refer to the needs of

sincerity that people can expect: the freedom to deal with one another under guarantees of transparency and lucidity."

3.5 Protective Security

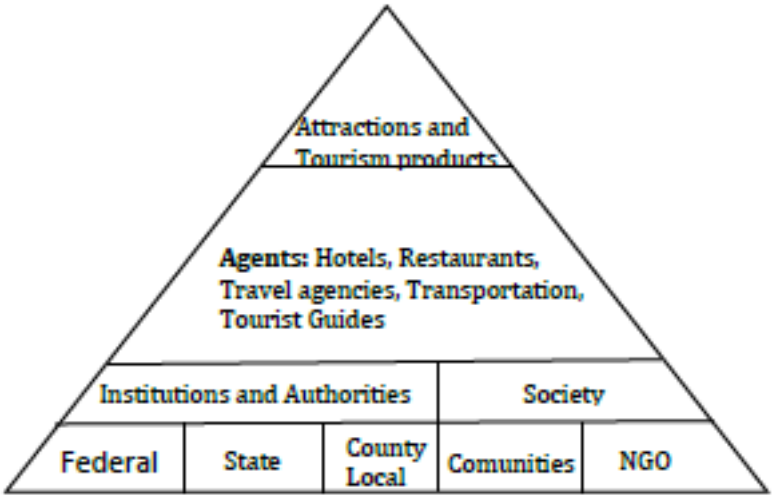
It refers to the security offered to parts of the population who suffer threats or have vulnerabilities; for its establishment it should be adopted security procedures that aim to create, maintain and operate a network to prevent or assist the population or part of it, in situations with adverse conditions, according to Sen (2010, p. 57) a "social safety net is needed, preventing that the affected population to be exposed to misery and, in some cases, even to death and hunger."

4. METHODOLOGY

The impacts of tourism are observed not only in the emission areas (where the tourists come from), but on the transit area (where the tourists pass by) and also on the receiving area (where the tourist lodges) and where the greatest environmental impact occurs (Hunter, 2002). The Fernando de Noronha archipelago, as a receiving area was chosen to be the place to make this research.

This quantitative work, aims to identify how the variables that form the dimensions of sustainable development, required path to achieve sustainability, are perceived by tourism professionals working at Fernando de Noronha archipelago. It was chosen the sustainable development model suggested by Sen (2010). The research subjects were defined based on Guzman and Rebbolloso (2012) statements in relation to the players taking part in tourism product that are shown on figure 3. Table 1 shows the agents that formed the sample.

Figure 3. Agents that participate in the touristic product



Source: Guzman and Rebbolloso (2012, p. 75)

Table 1. Professionals forming the sample

Professionals linked to tourism that formed the sample			
Agents	**Description**	**Number**	**Answers by e-mail**
Hotels	Inn owners (or relatives)	25	13
Restaurants	Restaurant owner or Managers	28	18
Traveling and services agencies	Agencies Employees and other tourism-related professionals *	27	16
Land transportation	Professionals linked to land transport **	11	-
Air transportation	Professionals linked to air transport	3	-
Tourism Guides	Tourism guides	18	9
Society	People from the community	15	

* Travel agencies employees, Dive Instructors, Underwater Photographers, Boat conductors

**Taxi and buggies for rent drivers, Tourism bus driver, Drivers of vehicles that make tour around the island.

Source: Data from the Research (2016)

The research instrument used was a questionnaire consisting of 20 questions based on Sen (2010), which had already been validated by Oliveira (2014), associated to a 5 points Likert scale shown on table 2. This scale is recommended when one is seeking to evaluate the intensity of a feeling or perception (Churchill JR, 1999). The questionnaire was applied to 71 research subjects directly, 56 were received by electronic means, totaling 127 questionnaires. After verifying Missing Values and Outliers (Hair Junior, Black, Babin, Anderson & Tathan, 2009) all questionnaires were considered valid. The minimum size of the sample must be defined before data collection to reach the desired statistic power (Shah, 2012). It was used a non-probabilistic sample and it was considered that, according to Hair Junior *et al.* (2009), SEM models formed by 5 constructs or less and having more than 3 variables each one and with communalities ≥ 0,6 may use a sample composed by 100 to 150 elements. The sample used in this work reached these criteria.

Table 2. Point of the Likert scale

1	Totally disagree
2	Disagree
3	Don't agree or Disagree
4	Agree
5	Totally agree

Source: Elaborated by the Authors (2016)

Considering that the fixed population of the island = 2630 and the sample = 127; 127/2630 = 0.048; it means that the sample corresponds to ± 5% of the fixed island population. The number of responses sent by email (± 44%) indicated willingness to participate in the research; however, none of the respondents authorized the publication of their names or of their companies in this work. The operationalization of the sustainable development model proposed by Sen (2010), with the dimensions and variables used, is indicated on table 3.

Table 3. Operationalization of the model proposed by Sen (2010).

		DIMENSIONS			
	Political Freedoms	**Economic Facilities**	**Social Opportunities**	**Transparency Guarantees**	**Protective Security**
VARIABLES	1 – Decide who governs and the rules to regulate it	1 – Access to the economic resources	1 – Access to health services	1 – Confidence among people	1 – Existence of a Social Security Net
	2 – Supervise and criticize authorities	2 – Access to goods produced	2 – Access to Education	2 – Mechanisms to combat corruption and illegal acts	2 – Existence of income supplementation programs
	3 – Freedom of political expression and free press	3 – Prices that are similar to other markets	3 – Safety	3 – Broad access to the acts of the rulers	3 – Food distribution procedures in case of emergency
		4 – Difference among social classes	4 – Infrastructure		4 - Emergency procedures to support needy
		5 – Income distribution			
		6 – Access to credit			

Source: Based on Sen (2010, p. 10)

Data collection was conducted from May to June, 2016. The data were inserted in the software Statistical Package for Social Sciences - SPSS - version 20. Initially, it was made the calculation of the Cronbach's Alpha to check the internal consistency of data and validity of the research instrument, then the mean for each variable and dimensions were calculated. Still using the SPSS, it was made an Exploratory Factor Analysis - EFA - to verify the possibility of using all variables in the AMOS software, version 21, to perform a Confirmatory Factor Analysis - CFA - using Structural Equation Modeling - SEM - in order to assess whether the model fit the conditions presented.

For SEM calculation it was used de Maximum Likelihood Estimation that aims to reproduce the covariance matrix of the observed variables and implies that these variables follow a normal distribution, "the analysis is predominantly confirmative in nature, that is, it seeks to determine the extent to which the postulated structure is actually consistent with the empirical data at hand" (Crisci, 2012, p. 6). To analyze normality, it was followed the recommendations of Finney and Distefano (2006): $|skew| > 2\text{-}3$ e $|kurtosis| > 7\text{-}10$.

5. RESULTS

Initially, based on secondary data, it was made an assessment of the evolution of socio-economic data of the population that live in the archipelago; then the data, collected through the survey instrument, were inserted in the SPSS software; it was performed the analysis of the Cronbach's alpha to verify the reliability of the research instrument reliability and the internal consistency of the data; After the averages were calculated for each variable and dimensions involved, it was finally made an EFA as an initial analysis to verify the model adjustment using CFA.

5.1 Socioeconomic information about the population in Fernando de Noronha

In 2005, Fernando de Noronha had a highest Human Development Index [HDI]; highest per capita income; highest life expectancy and the lowest percentage of poor and illiterate people aged 25 or over in the Brazilian Northeastern region (Rocha & Brasileiro, 2013).

Such information indicates that the Islands occupied a privileged position not only in the region but also in Brazil. The variation of the socioeconomic indexes of the population in Fernando de Noronha Island is shown on table 4.

Table 4. Variation of the socioeconomic data of the population living in Fernando de Noronha

Indexes	1991	2000	2010	Observations
HDI	0,548	0,694	0,788	Fernando de Noronha occupies the 76th position among the 5,565 Brazilian cities. The biggest HDI is 0.862 and the lowest is 0.418.
Life expectancy	79.7	74.8	75.4	In Brazil, the life expectancy was 64.7 in 1991, 68.6 in 2000 and 73.9 in 2010.
Years of studying: until 18 years old	7.26	9.10	10.76	In Pernambuco State: 1991 → 7.67; 2000 → 7.70; 2010 → 9.13. The indexes of the archipelago are higher than those of the State.
% vulnerable to poverty	25.02%	7.19 %	5.12 %	The developments indicate progress in Protective Security
% persons aged 15 to 24 who do not study, do not work and are vulnerable in the population of this band	-	1.44 %	3.22 %	There is a significant increase in this index.
Population	1,686	2,051	2,630	Between 1991 and 2000, the population grew at an annual average rate of 2.20%; in Brazil it was 1.63% in the same period. Between 2000 and 2010 the annual average rate was 2.52%; while in Brazil it was 1.17%.
Per capita **income**	465.55	1,104.89	1,034.14	Lower *per capita* income between 2000 and 2010. (in Reais (R$) – Currency in Brazil)
% of poor people	0.00%	0.98 %	2.20 %	Poor: People with *per capita* household income below R$ 140.00 (reference: August 2010).
Gini Index*	0.36	0.50	0.46	The difference in income distribution has grown over the years
* Index used to measure the degree of income concentration, indicates the difference between the incomes of the poor and the rich, it ranges from 0 to 1, zero is the situation where everyone has the same income, and 1 means complete inequality in income distribution, i.e., one person has all the income of the place.				

Source: Adapted from the Atlas do Desenvolvimento Humano Brasil (2013)

The data on table 4 indicate that Fernando de Noronha has evolved in relation to the HDI, life expectancy, the percentage of people vulnerable to poverty, access to study and increase in per capita income (only between 1991 and 2000). However, considering the reduction of the per capita income (between 2000 and 2010); population growth above the national average; increase in the percentage of poor people and the increase in the Gini index that indicates inequality in income distribution; it can be concluded that although Fernando de Noronha has occupied a prominent place in the northeastern socioeconomic scenery, the

data indicate a fall and consequent change in the profile of the population of the island over the years, suggesting that their socioeconomic conditions are no longer the same of those two decades ago. These data are from 2010, if the tendency is still the same, the worsening of such conditions will compromise the quality of life of residents and a distancing of the sustainable development.

5.2 Cronbach's *Alpha*

Hair Junior *et al.*, (2009, p. 100) argue that "Cronbach's *Alpha* is a measure of reliability ranging from 0 to 1, with values from 0.60 to 0.70 considered the lower limit of acceptability." The Cronbach's *Alpha* found in this work, shown on table 5, was 0.646, indicating that the scale used is reliable and that there is internal consistency among the data.

Table 5. Cronbach's *Alpha*

Reliability Statistics	
Cronbach's Alpha	N of Items
,646	20

Source: Elaborated by the authors (2016)

5.3 Average of Variables and dimensions of sustainable development

To evaluate the mean of variables, dimensions and of the sustainable development construct, it was considered that: as the values assigned to variables ranged from 1 to 5, it was considered 3 as the mean value. The average of each variable as well as the average obtained for each dimension was calculated; the result is shown on table 6 and indicates that the construct happens in a moderate way.

Table 6. Average of variables, dimensions and sustainable development

Variables	Mean	Dimension and Mean	Result
Political Freedoms 1	3,43	Political Freedoms **M** = 3,35	**Moderate**
Political Freedoms 2	2,96		
Political Freedoms 3	3,66		
Economic Facilities 1	3,89	Economic Facilities **M** = 3,16	**Moderate**
Economic Facilities 2	3,61		
Economic Facilities 3	2,76		
Economic Facilities 4	2,80		
Economic Facilities 5	2,69		
Economic Facilities 6	3,24		
Social Opportunities 1	3,27	Social Opportunities **M** = 3,37	**Moderate**
Social Opportunities 2	3,39		
Social Opportunities 3	4,27		
Social Opportunities 4	2,56		
Transparency Guarantees 1	4,02	Transparency Guarantees **M** = 3,30	**Moderate**
Transparency Guarantees 2	3,05		
Transparency Guarantees 3	2,84		
Protective Security 1	2,83	Protective Security **M** = 3,09	**Moderate**
Protective Security 2	3,10		
Protective Security 3	3,24		
Protective Security 4	3,18		
Overall mean for the sustainable development construct = 3,25			**Moderate**

Source: Elaborated by the authors (2016)

5.4 Exploratory Factor Analysis - EFA

To perform safely an EFA it is necessary to evaluate the results of the KMO test (Kaiser-Meyer-Olkin; a Measure of Sampling Adequacy - MSA) that has to be greater than 0.50; and also the Bartlett Sphericity Index, which must indicate the Sig. (General significance test) less than 0.05 (Hair Junior *et al.*, 2009). The results, shown in table 7, indicate that the EFA can be performed.

Table 7. Previous tests for EFA

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,532
Bartlett's Test of Sphericity	Approx. Chi-Square	351,850
	df	190
	Sig.	,000

Source: Elaborated by the authors (2016)

When performing an EFA, the anti-image matrices should be evaluated, their indexes should be above 0.50 and also the communalities (explanatory power of the variables) must be greater than 0.50 (Hair Junior *et al.*, 2009). It was found that the anti-image matrices and the communalities showed indices outside of the recommended parameters, thus, correction was carried out and, based on data, variables 1, 2 and 3 from the Political Freedoms dimension were excluded from the model; the same procedure was applied to the variable 1 from the Economic Facilities and to the variable 1 from Social Opportunities dimension. After excluding these variables, the anti-image matrices data indicated indexes that ranged between 0.529 and 0.692 and the communalities between 0.612 and 0.752. This result indicates that the model can now be used in the AMOS software to perform a CFA. It was not found Skew and Kurtosis, so the data were considered as having normal distribution.

5.5 Confirmatory Factor Analysis – CFA

SEM models formed by 5 constructs or less, having at least three observed variables each and that show communalities larger than 0.6, can use samples of 100-150 elements (Hair Junior *et al.*, 2009); as the model under research fits these requirements, a CFA will be made. Table 8 shows the results of the initial tests without the excluded variables.

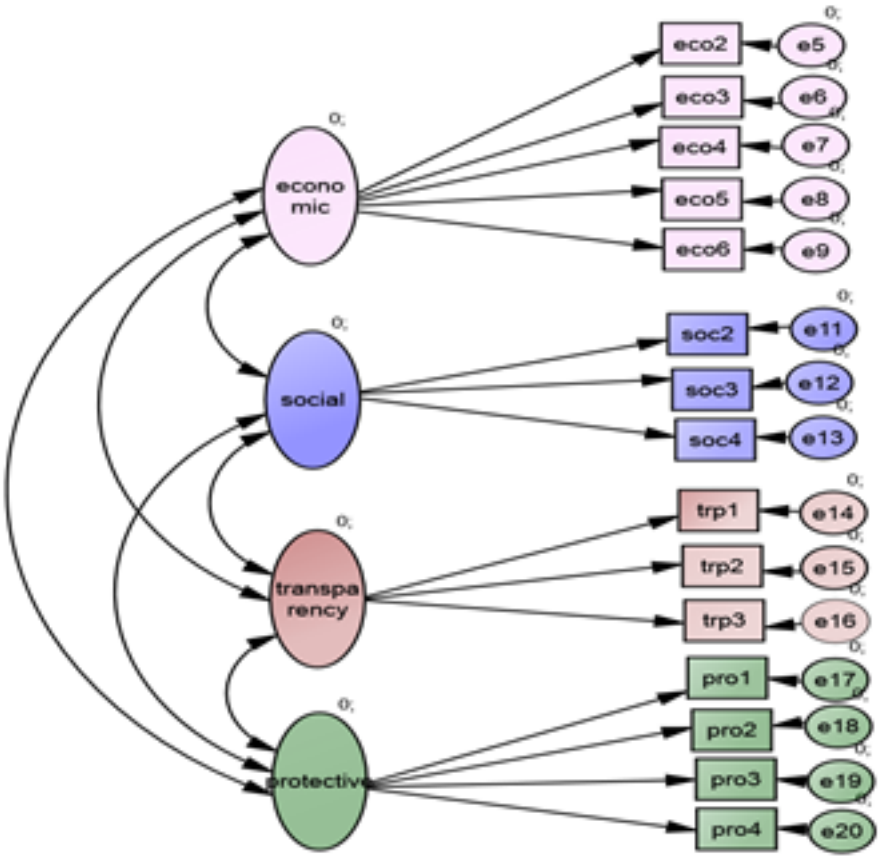
Table 8. Previous tests for CFA

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,580
Bartlett's Test of Sphericity	Approx. Chi-Square	223,506
	df	105
	Sig.	,000

Source: Elaborated by the authors (2016)

The variables were inserted in the AMOS software, version 21; figure 4 shows the model without changings, since it was not found asymmetry or kurtosis (Kline, 2004; Finney & Distefano, 2006). The model fit indices obtained are shown on table 9.

Figure 4 – Variables inserted in the AMOS for a CFA



Source: Elaborated by the authors (2016)

Table 9. Model fit indexes

CMIN	DF	CMIN/DF	CFI	TLI	RMSEA	NFI	PCFI
142,818	75	1,904	0,414	0,578	0,045	0,394	0,259

Source: Elaborated by the authors (2016)

Table 9 indicates that CMIN (Minimum Value of the Discrepancy) = 142.818 and DF (Degrees of Freedom) = 75, with CMIN / DF = 1,904, "although there is not a consensus about the accuracy of this index, the recommendations are that it can vary from 2.0 to 5.0" (Hooper, Coughlam & Mullen, 2008, p. 54). Although it is near the lower limit, the result does not indicate a good fit.

According to Hair Junior *et al.* (2009, p. 586) "The CFI (Comparative Fit Index) and TLI (Tucker-Lewis Index) vary from zero to 1, with higher values, above 0.90, indicating better fit". The CFI = 0.414 and TLI = 0, 578 do not indicate a good fit

According to Byrne (2010) the RMSEA (Root Mean Square Error of Approximation) must be less than 0.05 for indicating excellent fit, however, Hair Junior *et al.* (2009, p. 570) stated that "the RMSEA is between 0.03 and 0.08 ", in agreement with Arbuckle (2007, p. 592) that suggests "an excellent indicator setting for the RMSEA is around 0.05 and it can be used until 0.08 and that this index should not be used if it is greater than 0.1", in his turn, Mulaik (2009, p. 339) states that "a value equal to or less than 0.05 indicates a good fit". Thus, RMSEA = 0.045 with LO 90 = 0.034 and HI 90 = 0.057, found in this work indicate a good fit.

The "NFI (Normed Fit Index) varies between 0 and 1" (Hair Junior *et al.*, 2009, p. 570; Mulaik, 2009, p. 325) and "a model with good fit should be between 0.8 and 0.9" (Marôco, 2010, p. 234). The NFI = 0.394 found in this study does not indicate good fit.

The PCFI index must be greater than 0.5 (Hu & Bentler, 1999), thus the PCFI = 0.259 found in this study does not indicate a good fit.

According to Hair Junior *et al.* (2009, p. 577) to evaluate more complex models, multiple fit indices should be used, we must consider: "The $\chi 2$ value and the associated DF; An absolute adjustment index (i.e. GFI, RMSEA or SRMR); An incremental adjustment index (i.e. CFI or TLI); An adjusting quality index (GFI, CFI, TLI, etc.) and a poor adjustment index (RMSEA, SRMR etc.). No single "magic" value for fit indexes separates good from bad models". Following the statements of the author, as only the RMSEA index indicated good fit, the model does not fit the data, indicating that the construct sustainable development was not identified.

6. CONCLUSION

Based on averages, which are evaluated independently, it can be said that the perception of the dimensions of sustainable development of the tourism-related professionals in Fernando de Noronha island, indicates the presence of sustainable development on a regular basis, however, it should be noted that the variables that form the construct are interdependent, so when considering the construct as it really is, considering the interaction between its variables and dimensions, the construct sustainable development, as suggested by Sen (2010), was not identified in Fernando de Noronha. This finding suggests that although the environmental dimension has been subject of intense attention, the path to sustainability is not being followed in the researched site, which can compromise not only the living conditions of the inhabitants, but also of the island itself.

It is noteworthy that the variables related to Political Freedoms dimension had a too low power of explanation of the construct; it seems that this has occurred because of the fact that the inhabitants do not choose the administrator of island and, from this fact, all political freedoms are placed in the background.

The access to health services variable also showed low explanatory power and was dropped from the model, it should be noted that during the applications of the questionnaires, it was said by two interviewees that pregnant women are accompanied on the island to a certain point and then sent out of it (only sent, after that the patients are on their own); Another fact was observed: during the interviews a photographer was injured and he was told to go to the hospital, the first response that came from the group around was: Why? There is nothing there. These findings lead to the inference that the health conditions offered in the island, an indicator of the social dimension, do not attend the population properly, confirming the quantitative result found here.

The Triple Bottom Line (Elkington, 2012) sustainability model is formed by the social, economic and environmental interdependent dimensions, so even with the local attention on the environmental dimension, the indexes that indicate the socioeconomic conditions of the people living in Fernando de Noronha, over the past two decades, suggest that the conduction of social and economic life in the island is not sustainable over time because, as in 2010, it can be identified population and poverty growth, decrease in per capita income and, above all, increasing in the unequal distribution of income. The worsening of these indexes may lead to a collapse in the whole system.

As a limitation to this research, it can be mentioned the use of socioeconomic data about the population from Fernando de Noronha collected in 2010. For future research it

is suggested the use of a current economic and social indicators in order to better identify its future trends to suggest which variables or dimensions require greater attention, aiming to maintain the economic means and the quality of life in the island at current levels or, if possible, improve it. It is also suggested, the analysis of how the economic resources generated on the island are applied, not only the one from the fees paid by tourists but also the one generated by people who offer products and services, as it was noted, during this research, that a part of the population live in other States (such as Pernambuco and Rio Grande do Norte).

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