CONSUMO DE ALIMENTOS ECO-INOVADORES: COMO VALORES E ATITUDES DIRECIONAM A COMPRA DOS CONSUMIDORES DE ORGÂNICOS?

RESUMO

O recente crescimento econômico do Brasil levou a uma procura crescente por produtos que devem satisfazer desejos que vão além das necessidades básicas. Seguindo este crescimento, a consciência social e ambiental se desenvolve, aumentando a demanda por alimentos sustentáveis e, posteriormente, a oportunidade para as empresas em agregar valor através da inovação em produtos alimentares sustentáveis, por exemplo, para desenvolver ingredientes e produtos inovadores (como orgânicos) que proporcionam saúde para os consumidores e uma oferta sustentável para o mercado. Considerando-se a importância da avaliação dos consumidores para a adoção e sucesso de uma inovação, o objetivo deste trabalho é investigar o comportamento de consumo consciente de alimentos orgânicos no Brasil. Mais especificamente, buscou-se verificar a relação entre os valores pessoais, atitudes em relação ao meio ambiente e tecnologia, bem como atitudes e comportamento do consumidor em relação aos alimentos eco-inovadores. Um levantamento com 401 consumidores foi realizado em mercados de rua de produtos orgânicos em Porto Alegre. Os dados foram analisados através de Modelagem de Equações Estruturais.

Os resultados indicam que os consumidores apresentam fortes valores coletivistas e atitudes muito positivas em relação ao meio ambiente e da natureza. Estas atitudes influenciam positivamente a compra de alimentos eco-inovadores. Atitudes em relação ao progresso tecnológico influenciam negativamente no seu consumo. Teoricamente, o modelo hierárquico foi confirmado. Este estudo abordou o consumo de alimentos eco-inovadores, neste caso, o alimento orgânico, tentando preencher a lacuna entre atitudes e comportamentos. Os entes públicos e as empresas devem trabalhar para aumentar a consciência do consumidor e o consumo de alimentos sustentáveis, beneficiando a sociedade e o ambiente natural, e devem melhorar a comunicação sobre a relevância de como a tecnologia pode agir para melhorar a segurança e aumentar a disponibilidade de alimentos eco-inovadores.

Palavras-chave: Alimentos Eco-Inovadores; Valores Pessoais; Inovação; Sustentabilidade; Consumidor Consciente;

CONSUMPTION OF ECO-INNOVATIVE FOOD: HOW VALUES AND ATTITUDES DRIVE CONSUMERS' PURCHASE OF ORGANICS?

ABSTRACT

Brazilian recent economic growth led to a rising demand for products that must satisfy desires that go beyond basic needs. Following this growth, social and environmental awareness upsurge, increasing demand for sustainable food, and subsequently, an opportunity for companies to add value through innovation in sustainable food products, e.g. to develop innovative ingredients and products (such as organics) that provide healthiness for consumers and a sustainable offer for the market. Considering the importance of consumer evaluation for the adoption and success of an innovation, the aim of this paper is to investigate conscious consumption behaviour of organic food in Brazil. In specific, to verify the relationship between personal values, attitudes towards the environment and technology, and attitudes and consumer behaviour towards eco-innovative food. A survey with 401 consumers was held in organic street markets in Porto Alegre. Data was analysed through Structural Equation Modelling. Results indicate that consumers presented strong collectivistic values and very positive attitudes towards environment and nature. These attitudes positively influence the purchase of eco-innovative food. Attitudes towards technological progress negatively influence on its consumption. Theoretically, the hierarchical model is confirmed. This study addressed the consumption of eco-innovative food, in this case, organic food, trying to overtake the gap between attitudes and behaviour. Public authorities and companies should work to increase consumer awareness and consumption of sustainable food, benefiting society and the natural environment, and must improve communication about the relevance of how technology can act to improve safety and increase the availability of eco-friendly food.

Keywords: Eco-Innovative Food; Personal Values; Innovation; Sustainability; Conscious Consumer; Organics.

Marcia Dutra de Barcellos[1]
Marilia Bonzanini Bossle[2]
Marcelo Gattermann Perin[3]
Luciana Marques Vieira[4]

---

[1] Doutora em Agronegócios pela Universidade Federal do Rio Grande do Sul - UFRGS. Brasil. E-mail: **marcia.barcellos@ufrgs.br**
[2] Mestre em Administração pela Universidade Federal do Rio Grande do Sul - UFRGS. Visiting PhD Researcher da Aarhus University, Dinamarca. Brasil. E-mail: **marilia.bossle@ufrgs.br**
[3] Doutor em Administração pela Universidade Federal do Rio Grande do Sul - UFRGS. Professor do Programa de Pós-Graduação em Administração da Pontifícia Universidade Católica do Rio Grande do Sul - PUC/RS. Brasil. E-mail: **mperin@pucrs.br**
[4] Doutora em Agricultural and Food Economics pela The University of Reading, Inglaterra. Professora da Universidade do Vale do Rio dos Sinos - UNISINOS. Brasil. E-mail: **lmvieira@unisinos.br**

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

110

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

1   INTRODUCTION

Brazil is the largest economy in Latin America and the seventh in the world. Significant advancements are noticed in several areas, although there is still the need to overtake important bottlenecks, such as the country's weak infrastructure, for further development (OECD, 2014). Economic growth led to a rising demand, wherein households are now experiencing consumption possibilities that go beyond the satisfaction of basic needs (Arnold & Jalles, 2014). Following this growth, the increase of social, environmental and, eventually, political awareness of young people in this emerging country may carefully be taken into account by enterprises, since their civil engagement can move out of the virtual sphere and can in fact materialize (De Barcellos, Teixeira & Venturini, 2014).

Growing consumers' environmental awareness (Bocken, Allwood, Willey, & King, 2011) can boost society and government to push companies to innovate in green products (Dangelico & Pujari, 2010). Although a greater environmental concern do not always turn directly into a greener consumer behaviour (Chan, 2001; Gupta & Ogden, 2009), environmental awareness, as well as personal values positively influence organic products consumption (Chan, 2001; Kim & Chung, 2011).

Economy in Brazil is based extensively in its natural resources and manufacturing and agricultural production, highlighting the importance of the food sector (OECD, 2014). In this respect, adding value through innovation in food products, including sustainability in the food chain, improving quality and efficiency in process are among the main features for developing the sector (Grunert, Jeppesen, Jespersen, & Sonne, 2005) and the country. One of the ways for business to innovate in the food sector is to develop eco-innovation. It can be achieved with concerns with basic ingredients (origin, organic or with low carbon footprint), packaging (i.e. recyclable), manufacturing process (energy saving, water recycling), logistics or distribution (new channels or direct consumer sales), making it easier for all businesses in the food production chain to integrate the environmental dimension (Ecotrophelia, 2014). Eco-innovation can be defined as an innovation (product, process, marketing or organizational) that leads to outstanding reductions in environmental burdens in comparison with alternative practices (Horbach, Rammer & Rennings, 2012; OECD, 2009).

Following this line of thought, the aim of this paper is to investigate conscious consumption behaviour of organic food in Brazil, specifically, to verify the relationship between personal values, attitudes towards the environment and technology,

and attitudes and consumer behaviour towards eco-innovative food. This paper builds on a hierarchical values-attitudes model with the aim to examine the degree to which consumers' purchase behaviour of eco-innovative food is *jointly* determined by a combination of consumers' *personal values* (egalitarian or selfish) and their general attitudes towards *environment and nature* (affective attitude) and *technological progress* (cognitive attitude).Conscious consumers can be defined as rational actors, who act systematically accordingly to their values and draw their choices based in reliable information (Salmela & Varho, 2006). These consumers see a direct relationship between their consumer behaviour and environmental or ethical problems, and believe in their strength to influence companies (De Barcellos *et al.*, 2014; De Pelsmacker & Janssens, 2007; Low & Davenport, 2009).

The focus is in the food sector not only because of its strategic importance (in Brazil, the food sector comprises 32,000 companies and employs 1.63 million workers according to ABIA, 2014) but because there is growing trend towards sustainability from production to consumption in the food business worldwide. For the adoption of a new way of production where environmental sustainability and eco-innovation can be aggregated, it is necessary to integrate the supply chain. The food chain integration is fundamental to ensure the provision of adequate raw materials (production), food processing and supply (food and packaging industry) to reach the consumers, who are increasingly more aware in relation to the health and convenience. Furthermore, the environmental impact and the level of emissions from the food sector are considered of high impact (Demirel & Kesidou, 2011).

Researchers in management and marketing must pay attention in the important role played by food on people's life. Food contributes for people's well-being, and is an important source of pleasure, worries and stress, not to mention that are a significant category of expenditure (Rozin *et al.*, 1999). The influence of cultural values is also a relevant determinant of the structure and attitudes towards food consumption (Cervellon & Dubé, 2002). Food is one of the main traits of a culture and is one of the elements that immigrants most miss when they leave home (Belk, 2010). Moreover, cultural values are also important factors that will influence the adoption or not of a new product (Daghfous, Petrof & Pons, 1999), as well as will determine food choices (Rozin, 2005). In addition, values concerned with the environment influence attitudes toward buying organic food (Chryssohoidis & Krystallis, 2005).

Results from this study will contribute to increase comprehension about this increasing market

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

111

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

in an emerging country. Considering that sustainable consumption is a recent subject in Brazil, identifying the main characteristics of this market will benefit companies of the food sector, both industry and retailing. The paper will first present a literature review in innovation, eco-innovation and the importance of consumer's attitudes, followed by the construction of the conceptual values-attitudes hierarchical model to be tested. Next, methodology and results, and finally, the section with discussion and results is presented.

2 INNOVATION, ECO-INNOVATION AND THE IMPORTANCE OF CONSUMER'S ACCEPTANCE

Innovation is essential for the economic progress and a critical element for companies and nations (Dosi, 1988; Freeman & Soete, 2008; Knight, 1967; Rowley, Baregheh, & Sambrook, 2011). The importance of innovation is related to the wealthy increase of companies and nations, but also to enable people to do things that had never been done previously (Freeman & Soete, 2008).

Newness and innovativeness are dependent on the context where the firm is embedded (Carrillo-Hermosilla, Del Río, & Könnölä, 2010). Therefore, firms need to innovate in response to changes on demands and on consumers' lifestyles and on the other hand, to take advantage of opportunities offered by technology and changing markets, structures and dynamics.

Look upon organic food as an innovation can produce a skeptical reaction, considering that it is the way food was produced in the past. But in addition to all the improvements in organic supplies of modern and convenient food products, e.g. ready to eat organic meals in reusable packaging, it makes even more sense if we consider the development of agriculture and the fact that current food practices are intrinsically connected to global consumption (Brom, Visak & Mejiboom, 2007).

Brom *et al.* (2007) explain three phases of development of agriculture since the second half of the 20th century. The first phase is related to the growth of agricultural efficiency, when one of the main driving forces was the development of intensive farming, currently recognized that as a production method that creates some externalities. This phase had its foundation on economic rationality, and had as a result some environmental and animal health and welfare damages. The second phase is related to the growth of a gap between producers and consumers,

as a result of urbanization and the emerging global market. In Western societies direct contact between consumers and producers are quite rare. Finally, the third phase is an attempt to tight the gap from the previous phase, seeking for more transparency and traceability in the food chain, empowering consumers with 'background' to conscious make their buying decision.

Therefore, for surviving in the market, producers and sellers must produce goods with aggregated value for consumers, in a way that they perceive it is worthwhile to pay an extra premium price, which is higher than conventional products due to its higher production costs (Grunert, Brunsø, & Bisp, 1993). The existence of a potential market willing to pay for an innovative product is the main condition for companies to invest in an innovation (Dosi, 1988).

The association between sustainable development, innovation and eco-innovation seems clear in theory, although it is not always possible to clearly understand how it is applied empirically. The concept of sustainable development has its main focus in guarantee the supply for future generation's needs. Thus, the concept of innovation is related to the supply of these needs or to the development of new products and processes by a combination of factors, knowledge, skills and resources (Fagerberg, 2005). While an eco-innovation is an innovation to address the needs in a way that contributes to a reduction of environmental burdens in comparison with alternative practices (OECD, 2009). It is known that innovation can not only result in economic strength, but also in better quality for the environment and for society in general (Faucheux, Hue, & Nicolaï, 2006; Vollenbroek , 2002). Eco-innovation arise, then, as an important concept.

The importance of including stakeholders, people, organizations, industries and communities in the transition to an economy that integrates ecological concepts in innovation strategies and competitiveness is highlighted in the adoption of an eco-innovation strategy. Eco-innovation seems to be more linked to a paradigm shift, a change in philosophy. Figure 1 shows this relationship, where the environment includes stakeholders and society in general, but showing that innovation tends to influence more the environment, while the eco-innovation suffers a significant influence of society, the regulatory framework, and necessarily influences the environment, decreasing environmental burdens. Both innovation and eco-innovation must deal with change, succeed in the markets and, therefore, depends on the internal capabilities of firms.
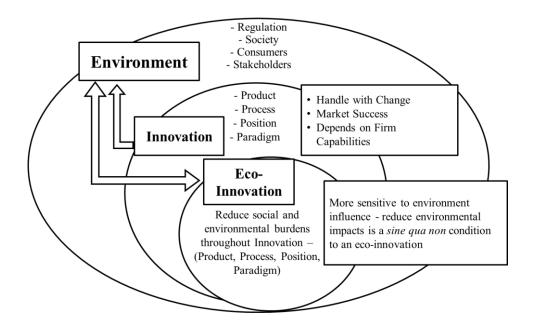
_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

112

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

Figure 1 – Innovation and Eco-innovation

Environmental consciousness of consumers is very relevant for production and consumption of environmental friendly products (Horbach, 2008), and the success of an eco-innovation can depend on consumer's evaluation (Oltra & Jean, 2009).

3 CONSTRUCTION OF THE HIERARCHICAL VALUE-ATTITUDES MODEL

Research dealing with interest and choice of consumers for ecological foods in the Western context are not uncommon (Baker, Thompson, Engelken, & Huntley, 2004; Beckmann, Brokmose, & Lind, 2001). The literature states a great impact of cultural values on consumers' attitudes towards food consumption (Thøgersen & Beckmann, 1997). In addition, personal values affect (usually positively) people's attitude and environmental behaviour, purchase intention and behaviour towards ecological food, e.g. organic food (Chryssohoidis & Krystallis, 2005; Grunert, 1993; Grunert & Juhl, 1995; Hopper & Mccarl, 1991; Schwartz, 1992).

Attitudes represent a disposition to respond favourably or unfavourably to an object, person, institution or event (Ajzen, 1988). Values are related to social norms (or rules of behaviour), and reflect an internal reference for what is considered good, beneficial, important, desirable, among others.

Within this context, the model described below suggests an influence of values and consumer's attitudes on the purchase of eco-innovative food. The contradiction between consumer's concerns towards ethical, social and environmental issues and their demand for varied and affordable food provides an important and relevant opportunity for further research on the relationship between attitudes towards the environment and nature (AttEnviro). Additionally, it is reasonable to infer that attitudes towards technology (AttTechno), that reveals consumer perceptions about the prevailing type of food supply in Western societies, e.g., industrial food production systems, should also influence (possibly negatively) on consumer's attitudes towards and consequently purchase of eco-innovative food. Elsewhere, it is of great importance to incorporate the study of consumer values (collective and individual) for analysing consumer's attitudes, once values are the main antecedents of attitudes, and allows the creation of the hierarchical value-attitudes model.

The research regarding this hierarchical model of values-attitudes is particularly challenging due to the fact that two constructs (attitudes towards the environment and nature, and attitudes towards technology) are naturally contradictory, and therefore should not correspond as determinants of consumer attitudes towards foods with ecological / ethical / social appeals. For example, conscious consumers are supposed to perceive environmental friendly food (e.g. eco-innovative food from organic agriculture) as the opposite of food produced in intensive production systems, technology-driven, such as those using genetic modification, for example.

The model depicted in Figure 2 aims to analyse in which level purchase behaviour (frequency) of eco-innovative food is affected of collectives and individual personal values and of

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

113

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

attitudes towards the environment and nature, and attitudes towards technology.

Due to the profound impact of personal values on food consumption (Thøgersen & Beckmann, 1997), their possible influence on conscious purchase of eco-innovative food is the starting point for this study with consumers. The model first assumes direct causal relationships between: a) egalitarian values of consumers and their attitudes towards environment and nature ("Collectivism - AttEnviro"); and b) self-promoting values and attitudes towards technological progress ("Individualism - AttTechno").
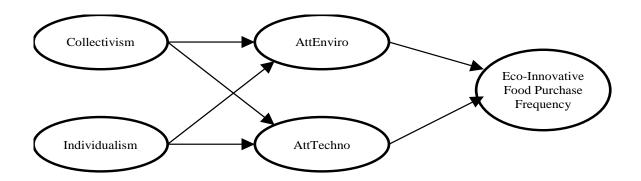

Figure 2 - The conceptual values-attitudes model

It is assumed that when jointly taken, these attitudes influence consumer's conscious purchase behaviour towards eco-innovative food ("AttEnviro – Purchase Freq" and "AttTechno – Purchase Freq" respectively). This assumption is particularly important from the strategic point of view for companies when developing new products, as it reflects the contradictory impact of the influence of consumers` pro-technological and pro-environment attitudes in relation to consumption of these foods. Preliminary studies indicate the validity of this model (Krystallis, Grunert, De Barcellos, Perrea, & Werbeke, 2012; Perrea, Grunert, Krystallis, & Zhou, 2011), what motivates a replication of the model in the Brazilian context.

4 METHOD

The research was descriptive and quantitative by its nature, aiming at investigating consumer values, attitudes and behaviour towards eco-innovative food. The proposed model was evaluated by the use of structural equation modelling (Byrne, 2001).

4.1 Data collection procedure and measures

A survey was conducted to analyse values, attitudes and buying behaviour of conscious consumers in traditional organic street markets in Porto Alegre, Brazil. We chose the organic street market by convenience, to ensure that the sample was composed by conscious consumers of eco-innovative food, e.g. organic food.

Consumer concerns includes food safety, environmental and animal welfare, and relationship between consumer and citizen is overlaped when consumers take into consideration citizen concerns when puchasing its goods in the market (Brom *et al.*, 2007). Therefore, eco-innovative food was defined in the questionnaire as follow: "*Eco-innovative food are those endowed with ethical/social/ environmental appeals, such as organic food, meat or eggs from free range animals, fair trade, family agriculture, among others*".

Data collection was performed with personal interviews conducted by trained researchers personally- in September 2013 in four organic street markets in the city of Porto Alegre. The final sample included 401 respondents.

The questionnaire applied in this phase included the following sections: 1) first, an initial filter question, to ensure that the respondent was a conscious consumer (i.e. *Do you consume foods with social, ethical or environmental appealing?*); 2) second, a section to investigate personal values using the 21- item of the Portrait Value Questionnaire (PVQ) from Schwartz (1992), same version proposed for the European Social Survey (see Schwartz, 2003), measured on a 6-point similarity scale with end-points 1 = "not like me at all" to 6= "very much like me"; 3) the third section refers to attitudes towards environment and nature (using a reduced 5-item version of the New Environmental Paradigm (NEP) scale by Dunlap, 2000), and technological progress (5

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

114

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

items by Beckmann *et al.* (2001), measured on 7-point Likert-type agreement scales, with end-points 1= "strongly disagree" to 7= "strongly agree"; 4) in the fourth section conscious purchase behaviour towards eco-innovative food was asked using purchase frequency as its proxy. 5) Finally, respondents' demographics were assessed.

Attitudes are determined by a combination of personal values (egalitarian or selfish) and general views on environment and nature (affective attitude) and technological progress (cognitive attitude). The quantitative data from this stage was analysed with SPSS univariate statistics) and Amos (multivariate statistics - structural equation modelling). The sample's profile is shown in Table 1.

Table 1 - Sample's profile

Variable	Level	Frequency	Percent
Gender	Female	259	64,6%
	Male	142	35,4%
Income (per month)	< R$ 1356	36	9%
	More than R$ 1356 – R$ 2.034	47	12%
	More than R$ 2.034 – R$ 3.390	95	25%
	More than R$ 3.390 – R$ 6.780	104	27%
	More than R$ 6.780 – R$ 13.560	72	19%
	> R$ 13.560	33	9%
Education	Primary (Basic education) or less	17	4,3%
	Secondary (High school)	140	35,4%
	Superior (University degree) or more	239	60,3%
Marital Status	Married	163	41%
	Not married, but living together	87	22%
	Not married, living alone	99	25%
	Divorced	25	6%
	Widowed	24	6%

Regarding the age of the respondents, the average age is 43.6 and median is 42. The majority of the sample population was female (64.6%). In Porto Alegre, there are 1,409,351 inhabitants: 54% women and 46% men (IBGE, 2013). The level of education of the consumers is high and 60.3% have a University degree or higher. Most of the consumers in the sample live together with other people, and have a median income per month. In the next section, the main results are described.

For testing the convergent validity, a confirmatory factor analysis (CFA) on the measurement model was conducted. The model fit indices were considered highly acceptable ($\chi2$ / df = 2.36, GFI = 0.933, AGFI = 0.907, TLI = 0.915, CFI = 0.931, RMSEA = 0.058). Table 2 provides factor loadings and t-values for all the constructs that were investigated. The loadings of all items on each construct were found highly significant (p<0.001) and exceeded the threshold value of 0.4 suggested by Hulland (1999).

Table 2 - Factor loadings and t-values

ATTITUDES	Loading	*t* values
Attitude towards environment and nature		
Humans are severely abusing the environment	0.709	13.372
The balance of nature is fragile to withstand the impacts of modern industrial nations*	0.660	12.449
The so-called "ecological crisis" facing humankind does not get proper attention*	0.734	13.799
The Earth is finite. with little space and limited resources	0.452	8.415

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

115

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

If things continue on their present course. we will soon experience a major ecological catastrophe	0.789	-
Attitude towards technological progress		
Many food manufacturers are more interested in making money than in the nutritional quality of its products	0.627	-
Modern production of food removes vitamins and minerals from food	0.763	11.934
The food industry is little concerned about the nutritional value of their products	0.813	12.393
Most foods are so processed that they lose nutritional value	0.763	11.934
The vast majority of food presents risks when consumed	0.551	9.318
Collectivism		
Conformity	0.828	6.741
Security	0.417	-
Tradition	0.705	7.056
Individualism		
Achievement	0.752	7.334
Hedonism	0.503	-
Power	0.659	7.505

The average extracted variance and construct reliability scores for each construct were supportive of unidimensionality (Table 3). To assess discriminant validity, we contrasted the correlation of each pair of factors with the squared root variance extracted from each factor (Fornell & Larcker, 1981).

In each case, the average variance exceeded the squared correlation, what supported discriminant validity. Thus, we found evidence of unidimensionality, convergent validity, discriminant validity, and measurement invariance on the measurement model.

Table 3 - Reliability and validity of measures

Variables	# Items	Mean	S.D.	CR	1	2	3	4	5
1.Collectivism	3	4,88	0,82	0.70	*0.67*				
2.Individualism	3	4,14	0,80	0.68	0.254**	*0.65*			
3.Att Environ	5	6,42	0,76	0.81	0.186**	0.118*	*0.68*		
4.Att Tech	5	6,07	0,83	0.83	-0.017	-0.039	0.356**	*0.71*	
5. Purchase Freq.	1	1,78	1,13	-	0.014	0.143**	0.100*	-0.098*	-

Note: Diagonal elements (in bold) are the square root of the Average Variance Extracted (AVE) and Purchase Frequency is 'times a week'.
* p<0.05; ** p<0.01

5   RESULTS

The modelling was undertaken using AMOS and the maximum likelihood (ML) method (Byrne, 2001). The model presented a good fit (χ2 / df = 2.238, GFI = 0.929, AGFI = 0.905, TLI = 0.903, CFI = 0.919, RMSEA = 0.056.). Table 4 presents the standardized loadings and *t* values of each path from the model.

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

116

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

Table 4 - Parameters Estimates

Relationship	Standardized Loading	*t*-value
Main variables		
Collectivism → attitude towards technological progress	-0,035	-0,507
Collectivism → attitude towards the environment and nature	0,176**	2,424
Individualism → attitude towards technological progress	-0,092	-1,264
Individualism → attitude towards the environment and nature	0,102	1,396
Attitude towards technological progress → purchase frequency	-0,168*	-2,758
Attitude towards the environment and nature → purchase frequency	0,157*	2,578
Control variables		
Income → purchase frequency	-0,074	-1,508

* p < 0.05
** p < 0.01

Results show that only the collectivistic values present a positive and significant effect on attitudes towards the environment and nature. Individualistic values did not show effects on attitudes towards technological progress or environment and nature. Both attitudes demonstrated effects on purchase frequency. However, attitudes towards the environment and nature were positively related to eco-innovative food purchase frequency, while attitude towards technological progress demonstrated a negative relationship with purchase frequency. Figure 2 depicts the conceptual model with the tested relationships, where the relevant estimated path coefficients between factors can be observed.
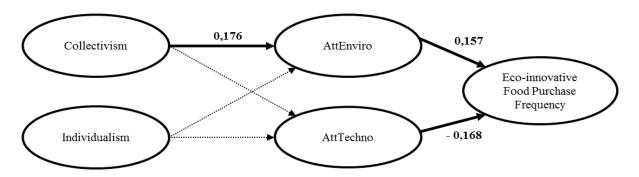

Figure 2 - The final conceptual values-attitudes model

6 DISCUSSION AND CONCLUSION

Personal values on food consumption have been validated in other studies (Thøgersen & Beckmann, 1997, De Barcellos, Saab, Perez-Cueto, Perin & Grunert, 2012) and in this Brazilian sample collectivistic values significantly influence on attitudes towards environment and nature, and consequently on the consumption of eco-innovative (organic) food. Although individualism did not impact on attitudes toward environment and nature there is a positive correlation between them, meaning that even consumers with selfish motives might favour the environment. For instance, even consumers who buy organic food aiming for their health are indirectly benefiting nature.

Our results also indicate that the frequency of consumption of eco-innovative food is ultimately influenced by both attitudes, positively by attitudes towards environment (AttEnviro) and negatively by attitudes towards technology (AttTech), meaning that those consumers who favour the environment and nature have a higher eco-innovative food purchase frequency. Findings are aligned to those found in developed countries, where the less favourable consumers are towards technological progress, the more environmental friendly they are (Krystallis *et al.*, 2012).

The survey indicates that consumers presented strong collectivistic values, such as benevolence and universalism, and very positive attitudes towards environment and nature, as also

_____
BARCELLOS/ BOSSLE
PERIN/ VIEIRA

117

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

shown in previous studies (De Barcellos, Krystallis, De Melo Saab, Kügler, & Grunert, 2011). Although Perrea *et al.* (2014) found a positively relationship in China for both paths, between collectivistic values and attitudes towards environment, and collectivistic and attitudes towards technology, in this sample, only attitudes towards environment seems to be predicted by collectivistic values.

Such result is of particular interest from a theoretical perspective, since conscious consumers from an emerging country like Brazil behave differently from China, considering technology is not so good for sustainability in food products. In practical terms, companies and public policies can benefit from such knowledge, as in more traditional societies the radical environmentalists hold an ideology that exalts nature and opposes technology and this might have a negative impact on technological development. In our case, society seems to follow the same pattern. In addition, is important to highlight that Brazilian consumers tend to relate organic food to fruits and vegetables, since the Brazilian market for sustainable food is under development and the availability of a wide range of eco-innovative products, gathering characteristics such as convenience, easy to handle, ecology and heath is still very incipient.

In conclusion, our research showed that the consumption of eco-innovative food in Brazil is based on a model of values-attitudes hierarchy, confirming previous results found in the literature. It is also an important point that individualism registered a positive and significant correlation with purchase frequency of eco-innovative food. This could mean an alternative path from individualism to purchase frequency through another set of attitudes, such as mass scale production, for example.

We acknowledge the limitations of this research, such as the use of a convenience sample. Many of the shoppers in the organic street market are women, with high education level and income, and they do not represent the Brazilian population. Nevertheless, for the objectives of the research, their contribution was valuable. One can also question the fact that organic products might not be initially seen as "eco-innovative", but as mentioned earlier, since there are new, industrialized and labelled organic products coming to the market on an everyday basis, such products are easily identified by consumers. Most eco-innovations taken at the processing level (such as water or energy saving measures) are normally not signalled to the market.

This research is of particular academic value, by adding empirical evidence about the relationships that rule how values and general attitudes influence the purchase of eco-innovative food in the Brazilian food consumption context. Although previous studies demonstrated strongest

weight between the paths, this study addressed the current consumption of eco-innovative food, in this case, organic food, trying to overtake the known gap between attitudes and behaviour.

Practical implications of this research is related to the need for companies to remain competitive and profitable, and innovation and environmental sustainability can be used as alternatives to mitigate environmental risks derived from the company´s activities. Considering that an innovation must be accepted in the market, and the importance of consumers' evaluation, food companies must take into consideration both the increase of consumers' awareness towards environment, and their attitude toward technology. This will require a better communication on healthier and more sustainable attributes to the consumers that can be achieved with more technology in the sector.

REFERENCES

Ajzen, I. (1988). Attitudes, personality, and behavior. Dorsey Press, Chicago

Arnold, J. and J. Jalles (2014), "Dividing the Pie in Brazil: Income Distribution, Social Policies and the New Middle Class", OECD Economics Department Working Papers, No. 1105, OECD Publishing. http://dx.doi.org/10.1787/5jzb6w1rt99p-en

Associação Brasileira das Indústrias de Alimentação, ABIA (2014). Retrieved January, 5, 2014, from http://www.abia.org.br/default.asp.

Baker, S., Thompson, E.K., Engelken, J., & Huntley, K. (2004). Mapping the values driving organic food choice: Germany vs the UK. *European Journal of Marketing*, 38, 995–1012.

Beckmann, S.C., Brokmose, S., & Lind, R.L. (2001). *Danish Consumers and Organic Foods*. Copenhagen: Copenhagen Business School.

Belk, R. W. (2010). Representing Global Consumers: Desire, Possession, and Identity. In: Maclaran, P., Saren, M., Stern, B., & Tadajewski, M. Handbook of Marketing Theory. Los Angeles: Sage.

Bocken, N.M.P., Allwood, J.M., Willey, A.R., & King, J.M.H. (2011). Development of an eco-ideation tool to identify stepwise greenhouse gás emissions reduction options for consumer goods. *Journal of Cleaner Production*, 19, 1279-1287.

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

118

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

Brom, F.W., Visak, T., & Mejiboom, F. (2007). Food, citizens and the market: The quest for responsible consuming. In L. Frewer, H. & Van Trijp, H. (Eds.), Understanding consumers of food products (pp. 610–623). Cambridge, MA: Woodhead.

Byrne, B. M. (2001). Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International Journal of Testing*, 1, 55 – 86.

Carrillo-Hermosilla, J., Del Río, P., & Könnölä, T. (2010). Diversity of eco-innovations: Reflections from selected case studies. *Journal of Cleaner Production*, 18, 1073-1083.

Cervellon, M. C. & Dubé, L. (2002). Assessing the Cross-Cultural Applicability of Affective and Cognitive Components of Attitude. *Journal of Cross-Cultural Psychology*, 33 (3), 346-357.

Chan, R. Y. K. (2001). Determinants of Chinese consumers' green purchase behavior. *Psychology & Marketing*, 18 (4), 389-413.

Chryssohoidis, G., & Krystallis, A. (2005). Organic consumers' personal values research: testing and validating the list of values (LOV) scale and implementing a value-based segmentation task. *Food Quality and Preference*, 16 (7), 585-99.

Daghfous, N., Petrof, J. V., & Pons, F. (1999). Values and adoption of innovations: a cross-cultural study. *Journal of Consumer Marketing*, 16 (4), 314-331.

Dangelico, R. M., & Pujari, D. (2010). Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability. *Journal of Business Ethics*, 95, 471–486.

De Barcellos, M. D., Teixeira, C. M., & Venturini, J. C. (2014). Personal values associated with political consumption: an exploratory study with university students in Brazil. International Journal of Consumer Studies, 38, 207–216.

De Barcellos, M.D., Perin, M.G., Perez-Cueto, F.J.A, Saab, M.S.M., & Grunert, K.G. (2012). Consumers' values and attitudes and their relation to the consumption of pork products: a study from Q-PorkChains in Brazil. *Journal on Chain and Network Science* (Print), 12, 41-54.

De Barcellos M. D., Krystallis, A., De Melo Saab, M. S., Kügler, J. O. & Grunert, K. G. (2011). Investigating the gap between citizens' sustainability attitudes and food purchasing behaviour: Empirical evidence from Brazilian pork consumers. *International Journal of Consumer Studies*, 35, 391-402.

De Pelsmacker, P. & Janssens, W. (2007). A model for fair trade buying behaviour: The role of perceived quantity and quality of information and of product-specific attitudes. *Journal of Business Ethics*, 75 (4), 361-380.

Demirel, P., & Kesidou, E. (2011). Stimulating different types of eco-innovation in the UK: Government policies and firm motivations. *Ecological Economics*, 70, 1546–1557.

Dosi, G. (1988). The nature of the innovative process. In: Dosi, G. et al. (Org.),Technical Change and Economic Theory. Pinter Publisher, London and New York, 1988, p. 221-238.

Dunlap, R.E., Van Liere, K.D., & Mertig, A.G. (2000). Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. *Journal of Social Issues*, 56 (3), 425-442.

Ecotrophelia (2014) European Food Innovation: Student awards. Retrieved November 14, 2014, from www.ecotrophelia.eu/sites/default/files/ecotro_eu_2014_web.pdf

Fagerberg, J. (2005). Innovation: A Guide to the Literature. In: Fagerberg, J.; Mowery, D.; Nelson, R. (Eds.), *The Oxford Handbook of Innovation* (pp. 1-27). Oxford: Oxford University Press.

Faucheux, S., Hue, C., & Nicolaï, I. (2006). L'éco-innovation: une opportunité pour l'avenir du développement durable ? Quelques éléments de bilan et de prospective aux niveaux européen et international. *Les Ateliers de L'Éthique*, 1 (2), 41-56.

Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18 (1), 39-50.

Freeman, C., & Soete, L. (2008). *A economia da inovação industrial*. Campinas: Ed. da UNICAMP.

Grunert, K. C., Jeppesen, L. F., Jespersen, K. R., & Sonne, A.-M. (2005). Market orientation of value

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

119

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

chains: A conceptual framework based on four case studies from the food industry. *European Journal of Marketing*, 39 (5/6), 428-455.

Grunert, K. G., Brunsø, K., & Bisp, S. (1993) Food-related life style: Development of a cross-culturally valid instrument for market surveillance. *MAPP working paper*, 12, project n. 14, October.

Grunert, S.C. (1993). Green consumerism in Denmark: Some evidence from the Oko foods-project. *Der Markt*, v.32, n.3, p.140-151.

Grunert, S.C., & Juhl, H.J. (1995). Values, environmental attitudes, and buying of organic foods. *Journal of Economic Psychology*, 16, 39-62.

Gupta, S., & Ogden, D. T. (2009). To buy or not to buy? A social dilemma perspective on green buying. *Journal of Consumer Marketing*, 26 (6), 376–391.

Hopper, J.R., & Mccarl N. (1991). Recycling as altruistic behavior. Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23, 195-220.

Horbach, J. (2008). Determinants of environmental innovation – New evidence from German panel data sources. *Research Policy*, 37, 163–173.

Horbach, J., Rammer, C., & Rennings, K. (2012). Determinants of eco-innovations by type of environmental impact — The role of regulatory push/pull, technology push and market pull. *Ecological Economics*, 78.

Hulland, J. (1999). Use of Partial Least Squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal*, 20, 195–204.

Instituto Brasileiro de Geografia e Estatística, IBGE (2013). Retrieved January 5, 2014, from http://www.ibge.gov.br/home/.

Kim, H. Y., & Chung, J. (2011). Consumer purchase intention or organic personal care products. *Journal of Consumer Marketing*, 28 (1), 40–47.

Knight, K. E. (1967). A Descriptive Model of the Intra-Firm Innovation Process. *The Journal of Business*, 40 (4), 478-496.

Krystallis, A., Grunert, K.G., De Barcellos, M.D., Perrea, T., & Werbeke, W. (2012). Consumer

attitudes towards sustainability aspects of food production: Insights from three continents. *Journal of Marketing Management*, 28 (3–4), 334–372

Low, W., & Davenport, E. (2009). Organizational leadership, ethics and the challenges of marketing fair and ethical trade. *Journal of Business Ethics*, 86 (1), 97-108.

OECD, 2009. Sustainable manufacturing and eco-innovation: towards a Green economy. Policy Brief June 2009. Retrieved November 20, 2010, from http://www.oecd.org/sti/42944011.pdf.

OECD, 2014. The Organisation for Economic Co-operation and Development (OECD) Retrieved November 14, 2014, from http://www.oecd.org/brazil/.

Oltra, V., & Jean, M. S. (2009). Sectoral systems of environmental innovation: An application to the French automotive industry. *Technological Forecasting & Social Change*, 76, 567–583.

Perrea, T., Grunert, K., Krystallis, A. & Y. Zhou. (2011). Chinese consumers' attitudes towards green food production: a test of the values-attitudes hierarchy. Proceedings: EAAE 2011 Congress, Zurich, Switzerland. Retrieved February 12, 2012, from http://ageconsearch.umn.edu/bitstream/114765/2/Perrea_Toula_215.pdf.

Perrea, T., Grunert, K., Krystallis, A. Zhou, Y., Huang, G. & Y. Hue (2014).Testing and Validation of a Hierarchical Values-Attitudes Model in the Context of Green Food in China. Asia Pacific Journal of Marketing and Logistics, 26 (2), 296-314.

Rowley, J., Baregheh, A., & Sambrook, S. (2011). Towards an innovation-type mapping tool. *Management Decision*, 49 (1), 73-86.

Rozin, P. (2005). The Meaning of Food in Our Lives: A Cross-Cultural Perspective on Eating and Well-Being. *Journal of Nutrition Education and Behavior*, 37 (2).

Rozin, P., Fischler, C., Imada, S., Sarubin, A., & Wrzesniewski, A. (1999). Attitudes to Food and the Role of Food in Life in the U.S.A., Japan, Flemish Belgium and France: Possible Implications for the Diet–Health Debate. *Appetite*, 33, 163–180.

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

120

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015

Salmela, S., & Varho, V. (2006). Consumers in the green electricity market in Finland. *Energy Policy*, 34, 3669–3683.

Schwartz, S.H. (1992). *Universals in the content and structure of values*: Theory and empirical tests in 20 countries. In M. Zanna (Ed.) (PP.1-65), Advances in experimental social psychology. New York: Academic Press, 25.

Schwartz, Shalom H. (2003). A Proposal for Measuring Value Orientations across Nations. Chapter 7 in the ESS Questionnaire Development Report. Retrieved November, 15, 2014, from

http://www.europeansocialsurvey.org/docs/methodology/core_ess_questionnaire/ESS_core_questionnaire_human_values.pdf

Thøgersen, J., & Beckmann, S.C. (1997). Values and attitude formation towards emerging attitude objects: from recycling to general waste minimizing behavior. In Brucks,M. and MacInnis,D.J.(Eds)(pp.182-189). *Advances in Consumer Research*, 24 (2).

Vollenbroek, F. A. (2002). Sustainable development and the challenge of innovation. *Journal of Cleaner Production*, 10, 215–223.

_____

BARCELLOS/ BOSSLE
PERIN/ VIEIRA

121

Brazilian Journal of Marketing - BJM
Revista Brasileira de Marketing – ReMark
Vol. 14, N. 1. Janeiro/Março. 2015