

## CONSUMO DE ALIMENTOS ECO-INOVAADORES: 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.

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## 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

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).

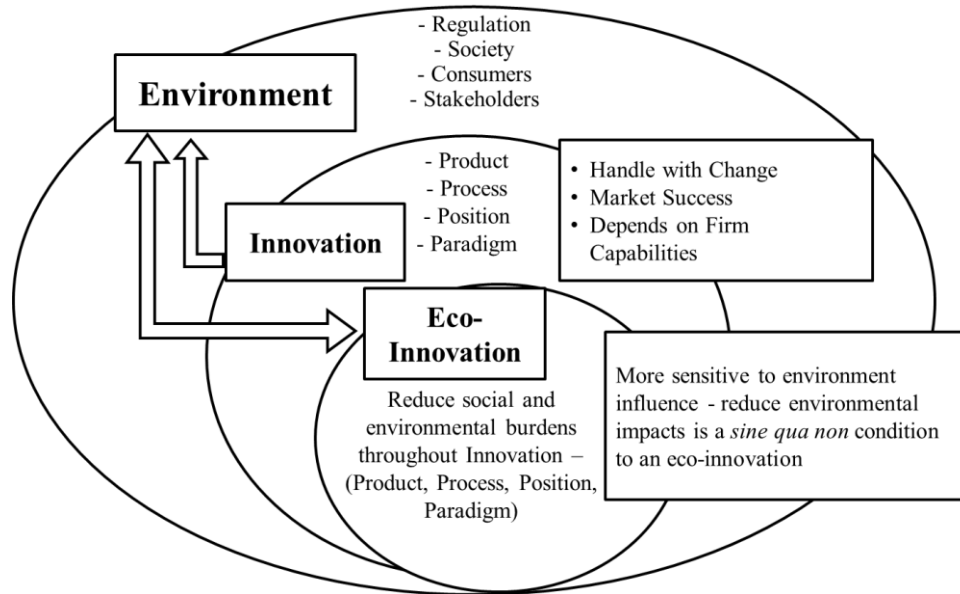
Brom *et al.* (2007) explain three phases of development of agriculture since the second half of the 20th century. The first phase is related to the growth of agricultural efficiency, when one of the main driving forces was the development of intensive farming, currently recognized that as a production 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, & Nicolai, 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.



**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 (Chrysohoidis & 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.

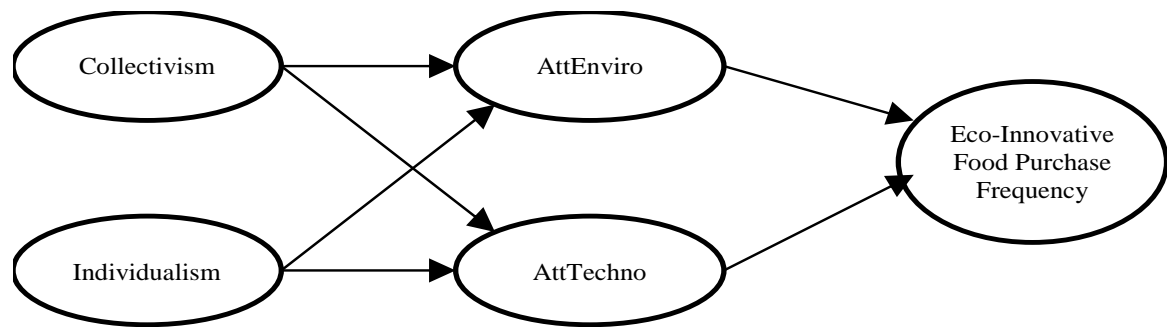
The research regarding this hierarchical model of values-attitudes is particularly challenging due to the fact that two constructs (attitudes towards the environment and nature, and attitudes towards technology) are naturally contradictory, and therefore should not correspond as determinants of consumer 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

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 purchasing 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 endpoints 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

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 ( $\chi^2 / df = 2.36$ , 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 |
|---|---------|----------|
| <b>Attitude towards environment and nature</b>  |         |          |
| 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    |

|   |       |        |
|---|-------|--------|
| If things continue on their present course. we will soon experience a major ecological catastrophe          | 0.789 | -      |
| <b>Attitude towards technological progress</b>  |       |        |
| 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  |
| <b>Collectivism</b>   |       |        |
| Conformity  | 0.828 | 6.741  |
| Security  | 0.417 | -      |
| Tradition   | 0.705 | 7.056  |
| <b>Individualism</b>  |       |        |
| 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 | <b>0.67</b> |             |             |             |   |
| 2. Individualism  | 3       | 4,14 | 0,80 | 0.68 | 0.254**     | <b>0.65</b> |             |             |   |
| 3. Att Environ    | 5       | 6,42 | 0,76 | 0.81 | 0.186**     | 0.118*      | <b>0.68</b> |             |   |
| 4. Att Tech       | 5       | 6,07 | 0,83 | 0.83 | -0.017      | -0.039      | 0.356**     | <b>0.71</b> |   |
| 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 ( $\chi^2 / df =$

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.

**Table 4** - Parameters Estimates

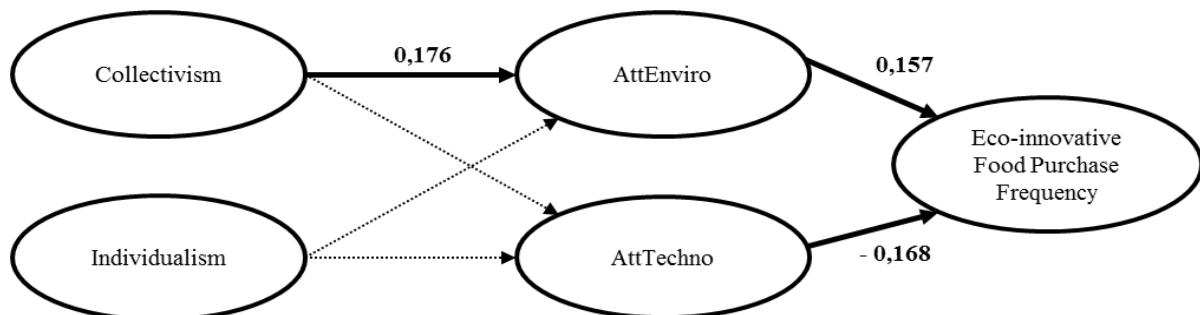
| Relationship   | Standardized Loading | t-value |
|--|----------------------|---------|
| <b>Main variables</b>  |                      |         |
| Collectivism → attitude towards technological progress           | -0,035               | -0,507  |
| Collectivism → attitude towards the environment 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   |
| <b>Control variables</b>   |                      |         |
| Income → purchase frequency                                      | -0,074               | -1,508  |

\* p &lt; 0.05

\*\* p &lt; 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



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 health 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.

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