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Sustainable food consumption in China and India

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Abstract

This study examines sustainable food consumption in China and India, based on online consumer survey data. It explores which factors influence sustainable food consumption in these countries, based upon a model related to the Theory of Planned Behaviour. Structural equation modelling is used for the analysis and comparison of both countries.

Among the similarities found are the significant influence of subjective norms on intention towards sustainable food consumption and the influence of perceived consumer effectiveness on sustainable food consumption behaviour. Price is identified as a barrier to sustainable food consumption. Based on these findings policy and marketing implications are given.

Keywords: *sustainable food consumption; consumer behaviour; partial least squares; China; India*

JEL-classifications: *Q 13; Q18; Q19*

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1. Introduction

Sustainability has gained significant attention over the past three decades. Depletion of and unequal access to resources, biodiversity loss, pollution, climate change hunger and malnutrition are current sources of international concerns closely related to ethical, and environmental sustainability in the agri-food sector (Reisch, Scholl and Eberle 2010; Sustainable Development Commission 2011). A more sustainable development and consumption, is needed to address these challenges (Aikin 2011 and 2014; Abeliotis, Koniari, and Sardianou 2010; Verain, Bartels, Dagevos, Sijtsema, Onwezen, Antonides 2012). This holds especially true for food consumption, which accounts for major parts of the above mentioned problems (Rockström et al. 2009; Aikin 2014).

Against this background understanding consumer preferences and their behaviour is a crucial, but yet complex task (Kearney 2010). Factors such as culture, psychological and physical needs, personal experiences, economic development, the availability of information, money and time etc. have an effect on consumer food habits and behaviour (Reisch et al. 2010).

Moreover, a substantial amount of available literature addressing sustainable food consumption has until today been focused on developed countries (Arvola, Vassalob, Deanc, Lampilaa, Sabab, Lähtenmäki, Shepherd 2008; Boer, Hoogland and Boersema 2007; Cox, Anderson, Lean, Mela et al. 1998; Gil, Gracia and Sánchez 2000; Lorenz, Hartmann and Simons 2014; Menozzi and Mora 2012; Persson 2013). However, developing and emerging economies such as China or India today represent a large and augmenting share of worldwide economic activity and represent promising future markets for sustainable food (OECD-FAO 2013). Their economic growth fosters globalisation, urbanisation and the rise of disposable incomes that lead to changes in the consumption behaviour (Mendez and Popkin 2004).

Getting to know the determinants of sustainable food consumption in these countries is necessary to further promote this kind of consumption effectively. This study thus addresses the research question: “Which are the main factors that affect sustainable food consumption intention and behaviour in China and India?” Country specific models closely related to the Theory of Planned Behaviour (TPB) which represent consumers and non-consumers of sustainable food are built and analysed. The data for this study was collected via an online consumer survey 2013 in China (N=295) and India (N=279).

2. Literature Review

2.1 The sustainable food concept

Although sustainability is today a widely discussed issue there is no exact shared definition of the sustainability concept as a whole (Johnston et al. 2007); nor a standard approach about the concept of sustainable food products or consumption (Agriculture and Agri-Food Canada 2012; Reisch et al. 2010). However, putting several approaches together (British Sustainable Development Commission 2005; Reisch et al. 2010; Reisch et al. 2013), sustainable food should at least comply with the following criteria: respect biophysical and environmental limits in their production and processing, respect high standards of animal health and welfare, be compatible with the production of affordable food for all sectors of society, support rural economies and the diversity of rural culture, provide a viable livelihood for farmers, processors and retailers, whose employees enjoy a safe and hygienic working environment whether nationally or abroad, be available, be affordable, safe, healthy and nutritious.

2.2 Sustainable food consumption in China

The economic reforms China experienced since the 1980ties were oriented towards liberalising its economy, primarily by opening up to international trade (Chan 2001; Chan and Lau 2001; Kearney 2010). The economic growth that followed these reforms led to an increase in per-capita income and consumption (Kearney 2010; Zhou, Li, Geng, Qi 2012). The latter has been particularly evident in augmented food expenditure, with remarkable pattern shifts such as an increased demand for high value and quality foods, a wider food variety choice and more out of home consumption. (Zhou et al. 2012). These changes can also be explained by increased imports, lower prices (Kearney 2010), and ongoing urbanisation (Mendez and Popkin 2004).

In comparison with other developing countries, there is a fast nutritional transition in China from low-fat and sugar diets to high-fat and sugar diets at least among the growing urban high and middle classes. This includes a higher intake of dairy and meat products and a decrease in the intake of staple foods such as rice (Hamshere, Sheng, Moir, Syed, Gunning-Trant 2014; Zhou et al. 2012; World Bank Beijing Office 2014). Another observed trend is the growing interest in food safety, quality and nutrition issues, especially among young and educated high-income consumers. These have been additionally motivated by some severe food scandals in China during the past years (Shimokawa 2014; Zhou et al. 2012).

However, Chinas domestic market for sustainable food is still at an early stage. In the case of organic food for example, consumption accounts approximately for 0.02% out of total consumption (Lagos, Scott, Rasmussen, Bugang, Chen 2010). Among the current food certification schemes there is no label for sustainable food as such, but three related labels do exist: 1. safe food certification: requires compliance with minimum food safety standards; 2.

green food certification: restricts use of chemical inputs; 3. organic food certification (Shimokawa 2014).

Until today very few studies attempt to understand Chinese consumers' behaviour towards sustainable food and the few available ones are often limited to a specific region, label, or product, so that they lack generalizability (Chan 2001; Chan and Lau 2001; Gomersall and Wang 2012; Shimokawa 2014; Sirieix, Kledal and Sulitang 2011; Yin, Wu, Du, Chen 2010; Yu, Gao and Zeng 2014; Zhu et al. 2013).

2.3 Sustainable food consumption in India

India's emerging economy has experienced notorious growth over the last two decades, carrying with it changes in urbanisation, per-capita income, education, health awareness and lifestyles (Ali, Kapoor and Janakiraman 2010). Nevertheless, there are mixed conclusions on whether India's food consumption per capita has actually increased in terms of quantity and quality (Deaton and Dreze 2008 and 2009; Alexandratos and Bruinsma 2012; Mittal 2008).

Nevertheless, middle and high income urban consumer segments in India are becoming more aware regarding their food choices; they increasingly demand high quality and nutritious food including e.g. organic food (Ali et al. 2010; Kapoor and Garyali 2013; The economic Times 2013). Moreover, there is a considerable percentage of the population that is vegetarian due to religious reasons (Alexandratos and Bruinsma 2012).

Different certification labels can be found in India for sustainable products including organic, fair trade and the state lead eco-labeling scheme Ecomark (Indian Eco-labelling and Promotion of Eco-friendly Products Centre 2012). Despite this there is still missing knowledge among

Indian consumer concerning sustainable food consumption (Jain and Kaur 2004). However, until today very few studies exist that have analysed sustainable food consumption in India, so that a broader picture about the situation is still missing (Diamantopoulos et al. 2003; Jain and Kaur 2006; Jain and Kaur 2004; Kumar 2012).

3. Conceptual Framework

3.1 The Theory of Planned Behaviour (TPB)

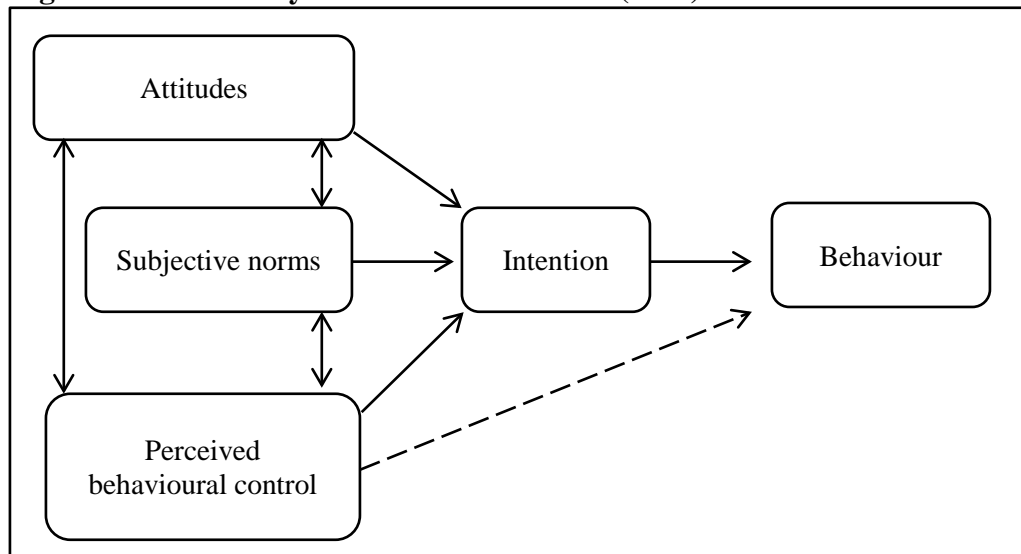
Introduced by Ajzen (1991), the Theory of Planned Behaviour (TPB) is an extension of the Theory of Reasoned Action (TRA), with the main difference being the inclusion of a construct measuring the control degree (perceived behavioural control) a person exerts over his or her behaviour. The theory's main objective is to predict a determined behaviour considering the behaviour "is intentional". In other words, the immediate predictor of actual behaviour is a person's intention or willingness to perform it (Ajzen 1991; Francis, Eccles, Johnston, Walker, Grimshaw, Foy, Kaner, Smith, Bonetti 2004). The latter relies on the assumption that individuals operate rationally and according to their objectives (Collins and Mullan 2011). Therefore, Ajzen (1991) stated that the stronger the intention towards a certain behaviour, the higher the chance is that it is going to be performed; thus the "intention" predictor is also referred to as "behavioural intention". The TPB model includes three further constructs that predict intention, namely attitudes, subjective norms and perceived behavioural control (PBC) (Ajzen 1991; Armitage and Conner 2001; Madden, Scholder Ellen and Ajzen 1992).

Attitudes are composed by beliefs and motivations. Subjective norms is a measure of the influence of significant others in the individual's own behaviour. PBC is a construct that

measures perceived control over performing a behaviour and the degree of contribution with one's decision over performing the behaviour. Likewise the PBC construct has also been considered to directly predict behaviour together with intention (Ajzen 2002; Armitage and Conner 2001; Sparks, Guthrie and Shepherd 1997).

Among the literature concerning behavioural psychology, marketing research and other related disciplines the use of TPB models has been widespread (Armitage and Conner 2001; Chen 2007). The efficiency of the TPB model in predicting intention and behaviour has been supported, accounting on average for a variance of 39% and 27% respectively (Armitage and Conner 2001). Specifically in relation to food consumption, including sustainable food, several authors have incorporated TPB models into their work (Chan and Lau 2001; Chen 2007; Cox et al. 1998; Kumar 2012; Lorenz et al. 2014; Meyer-Höfer, Olea Jaik, Padilla-Bravo, Spiller 2013; Persson 2013; Vermeir and Verbeke 2008). The following figure depicts the TPB model proposed by Ajzen (1991).

Figure 1: The Theory of Planned Behaviour (TPB)



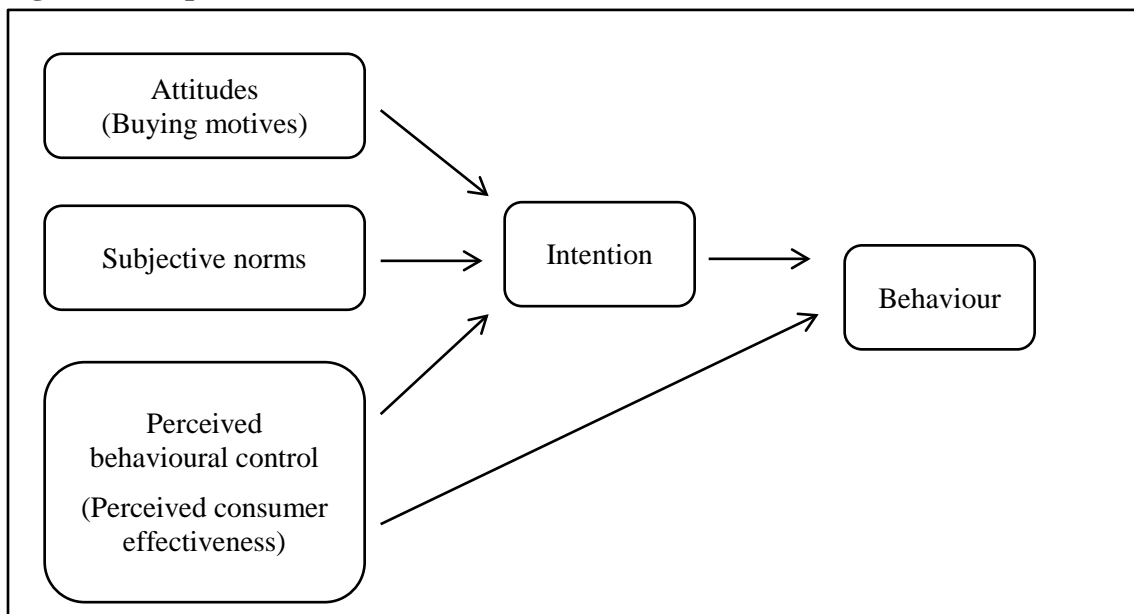
Source: Own elaboration (2014), based on model by Ajzen (1991, p.182).

3.2 Research objectives and proposed model

The central aim of the study is to explore which factors significantly influence the consumption of sustainable food in China and India, based upon country specific models closely related to the Theory of Planned Behaviour (TPB).

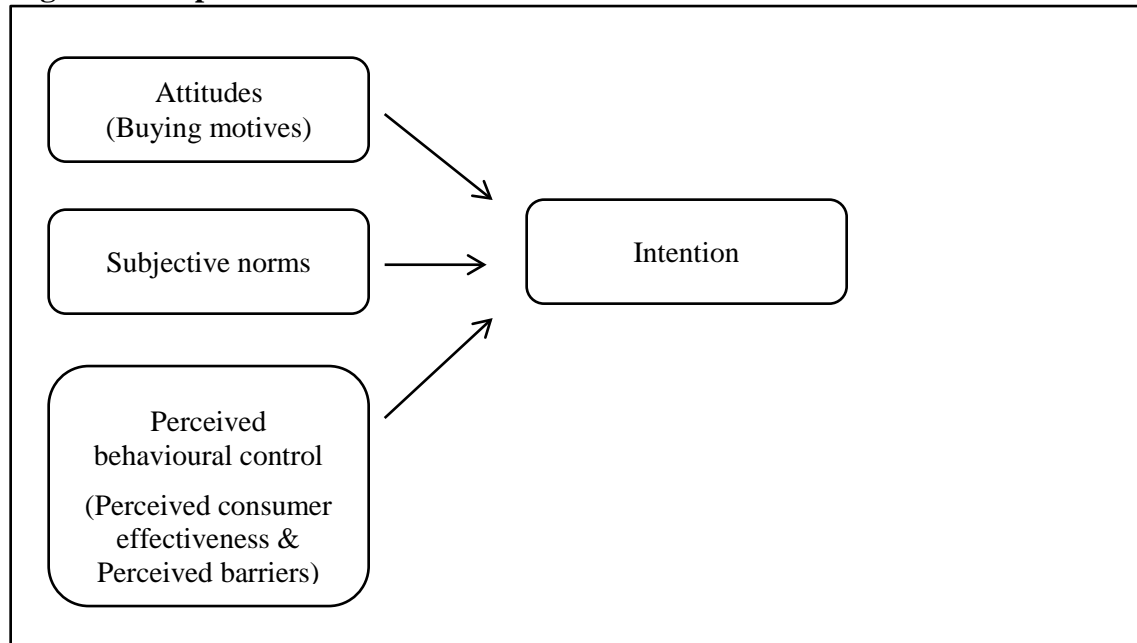
For each country two models are constructed based on respondents stated sustainable food consumption. For participants that stated to have already consumed sustainable food (consumers) the model includes the constructs: attitudes (buying motives), subjective norms, perceived behavioural control (perceived consumer effectiveness) that influence their intention and stated behaviour. For the participants that have not yet consumed sustainable food (non-consumers) the model includes the constructs: attitudes (buying motives), subjective norms, perceived behavioural control (perceived consumer effectiveness and perceived barriers) that influence their intention to consume sustainable food. Figure 2 shows the consumer model; Figure 3 shows the non-consumer model.

Figure 2: Proposed consumer research model of sustainable food



Source: Own elaboration (2014).

Figure 3: Proposed non-consumer research model of sustainable food



Source: Own elaboration (2014).

4. Methodology

4.1 Research design and sample

The data for his explorative study was collected in an online consumer survey conducted during July and August 2013 in China and India. The total number of respondents is 574 (CN=295; IN=279). The reasons for choosing these two countries for this study go beyond the fact that they are the world's largest developing economies with populations exceeding one billion people. Changing nutrition habits, and expected future food consumption growth, make both crucial for developing sustainable food habits (The Association of Academies of Sciences in Asia-AASA 2011; Hubacek, Guan and Barua 2007; OECD-FAO 2013; World Bank Beijing Office 2014).

The participants were recruited by a private marketing research panel provider. Only individuals responsible for the majority of food shopping in their household took part in the survey.

The rich diversity of cultures and languages within the studied countries could not fully be taken into account. In India the language of the questionnaire was English. In China a Mandarin questionnaire was used for the whole country. This questionnaire was translated from the original English version and then back translated by native speakers to ensure the quality of the translation.

The main reason for conducting an online survey was that this method means that data collection is not regionally restricted based on the mobility of the interviewer. Further advantages are lower costs and quicker response times compared to other survey methods (Weber and Bradley 2006).

The panel providers sent the link of the survey to their panel participants and they could respond to the questionnaire at any time or place where they had internet access. The statements of the respondents were saved online and converted into Excel and SPSS files for the analysis. The average time spent for answering to the questionnaire was approximately 20 minutes.

The country samples are not representative to make general conclusions, because they are biased towards higher educated participants with higher incomes from urban centres compared to the averages of the analysed countries. Still, it can be expected that these characteristics of the respondents match quite well with those of (potential) sustainable food consumers. It has been observed that educated individuals with higher income have a higher willingness to pay for high quality food (Gonzalez, Johnson and Qaim 2009; Krishna and Qaim 2008; Mergenthaler, Weinberger and Qaim 2009; Padilla-Bravo, Villalobos, Spiller, Henry 2007).

Socioeconomic variables are not considered within the proposed TPB based models, because results concerning the effects of socioeconomic variables in the context of sustainable food

consumption are mixed (Anderson and Cunningham 1972; Dagevos 2005; Diamantopoulos et al. 2003; Dickson 2001; Doran 2009; Gil et al. 2000; Jain and Kaur 2006, Loureiro and Lotade 2005, Vermeir and Verbeke 2006).

4.2 The Sample

The sample size for China consists of a total of 295 respondents. In the case of India there are 279 respondents. Furthermore, as it has been described previously, the country samples are divided into two sub-samples, based on stated past sustainable food consumption. This is done based on the question included in the survey: “Have you already consumed sustainable food?” The respondents who answered “No” or “I don’t know” to this question are included in the corresponding country sub-sample for “non-consumers”. For China, the respondents that had already consumed sustainable food account for 216; the number of respondents that have not consumed before are 79.

Regarding India, the consumer sub-sample consists of 184 and the non-consumer comprises 95 observations.

Table 1: Sample characteristics

	China	India
	% of sample	% of sample
Female	41	29
Male	59	71
Average age	32	31
University degree	89	90
Residence in urban area	93	91

Source: Own data (2013).

4.3 Measurements

To measure the proposed models the following procedure was applied:

Attitudes are measured based on the question about buying motives: “How important are the following product characteristics when you decide which food product you buy?” A 7 point Likert scale was used, ranging from 1 (not at all important) to 7 (extremely important).

Based on the existing literature, 24 buying motives are tested: 8 environmental, 9 ethical and 7 traditional food quality attributes. An exploratory factor analysis (EFA) in each country is then used to reduce the complexity of the construct. The resulting factors (see Appendix) are the latent variables used as measures of attitudes in the research models.

Subjective norms are measured based on two statements: “The appreciation of my family / friends with regard to my food consumption is of great importance to me”. And: “My family / friends support me in sustainable food consumption”. The applied 7 point Likert scale ranges from 1 (strongly disagree) to 7 (strongly agree).

The PBC construct is divided into PCE (perceived consumer effectiveness) and perceived barriers. The PCE construct is measured with a 7 point Likert scale (1=strongly agree to 7=strongly disagree) by five statements: “My food consumption has an important impact on the environment; My food consumption has an influence on the working and living conditions of food producers; My food consumption habits have an impact on farm animal welfare standards in our country; People should urge their family / friends to consume ethically responsible food; My food consumption has an impact on the global food security”.

Perceived barriers were measured by 12 statements: “The products I usually consume are not available in this quality; Others do not consume such products either, so why should I do so? I think such products are too expensive; For me, it is hard to change my consumption and

shopping routines; I think preparing / cooking such products takes too much time; I do not think that such products really exist; My family / friends do not like such products; I have had some bad experiences with such products; I think such products are too expensive; I do not know where to buy such products; I do not know how to distinguish such products from conventional food; Such products are not available where I usually go shopping; I think shopping for such products takes too much time.” Only non-consumers of sustainable food were considered to evaluate these statements based on a 7 point Likert scale (1=fully applies to 7=does not apply at all). The perceived barriers are like the attitudes subject to an EFA to reduce the constructs complexity and then used as latent variables in the research models (see Appendix).

Intention is measured by the question: “Would you consume more sustainable food in the future?”. A 7 point Likert scale ranging from (1=strongly disagree to 7=strongly agree) is utilised.

With regard to the behaviour construct, two different measures are included for respondents that stated to already have consumed sustainable food: frequency and quantity. The frequency and quantity questions used are: “How often do you usually consume sustainable food?” and “How big is the share of sustainable food you usually consume compared to your average conventional food consumption?” 5 point scales are used (from 1: never, to 5: always) for frequency and (1: much lower to 5: much higher compared to your average conventional food consumption) for the quantity question.

4.4 Hypotheses

Addressing the research question “Which are the main factors that affect sustainable food consumption intention and behaviour in China and India?” various hypotheses are formulated for each country and their specific consumer / non-consumer sub-models.

The complexity of the constructs attitudes (buying motives) measured by 24 items and perceived behavioural control measured by five perceived consumer effectiveness items (consumer / non-consumer) and 12 perceived barrier items (non-consumer) is reduced by exploratory factor analysis which result in different factors in each country.

The EFA analyses are carried out in the IBM[®] statistical software SPSS[®] 15.0 using the extraction method of Principal Component Analysis (PCA) and suppressing factor loadings less than 0.3. The factors are then rotated using the orthogonal rotation method Varimax. Furthermore, the decision on the number of factors to retain is based on two aspects recommended in the literature: the overall explained variance of the factors (at least 50%), and their interpretability (Beavers, Lounsbury, Richards, Huck, Skolits, Esquivel 2013; Suhr 2006). The last step in EFA is to reduce the number of items contained within each factor, keeping only those with loadings over 0.5, which did not load on more than one factor with a cross-loading over 0.4 (Beavers et al. 2013).

Concerning the Chinese buying motives, four factors are identified: “ethical & innovation motives” (animal welfare, reduced greenhouse gas emissions, fair payment for producers, current trends, good working conditions, innovation, no child labour, seasonal food), “health motives” (safety, healthiness, nutritional value, freshness), “genetically modified organisms (GMO) free” (no GMO), and “price” (cheap).

Regarding India, buying motives are grouped into four factors: “fairness & environmental friendliness motives” (no child labour, environmentally friendly production / packaging, good

working conditions), “traditional food quality criteria” (taste, healthiness, price, convenience), “naturalness” (no synthetic fertilisers, no GMO, no artificial additives) and “trends & tradition” (current trends, local production, tradition).

Factors and their items are different within the two countries so that there are two different models used with the respective hypothesis for measuring attitudes (buying motives) in China and India.

The EFA with the perceived barriers towards consumption of sustainable food in China results in three factors: “time & scepticism” (I think preparing / cooking such products takes too much time; I think shopping for such products takes too much time; I do not think that such products really exist), “price, routines & bad experiences” (I think such products are too expensive; For me, it is hard to change my consumption and shopping routines; I have had some bad experiences with such products), “lack of availability and information” (Such products are not available where I usually go shopping; I do not know where to buy such products; I do not know how to distinguish such products from conventional food).

For India three different factors are extracted: “routines, bad experiences & price” (For me, it is hard to change my consumption and shopping routines; I think preparing / cooking such products takes too much time; My family / friends do not like such products; I have had some bad experiences with such products; I think such products are too expensive), “lack of availability & information” (I do not know where to buy such products; I do not know how to distinguish such products from conventional food; Such products are not available where I usually go shopping), “time constraints” (I think shopping for such products takes too much time). The detailed results of exploratory factor analyses are presented in the Appendix.

The below mentioned hypotheses are specific to each countries consumer / non-consumer models. Table 2 summarise the hypothesis for the models tested in China and India.

4.4 Statistical procedure

Partial least squares path modelling (PLS- PM) analysis is carried out to determine the effects of the different constructs on intention and behaviour. PLS path modelling is a structural equation modelling (SEM) approach that is often used in international marketing, consumer behaviour and management (Henseler, Ringle and Sinkovics 2009). SEM models' main objective is to estimate causal relationships that can be established by a theoretical model, which can have more than two latent variables (constructs), measured with various indicators that altogether help predicting certain relationships and effects.

Furthermore PLS has been distinguished from covariance-based equation modelling because it has less strict assumptions regarding distribution of the data, the representativeness and size of the sample (Birkinshaw, Morrison and Hulland 1995; Esposito Vinzi, Trinchera and Amato 2010; Henseler et al. 2009).

PLS path modelling is defined by an outer model, i.e. measurement model, and an inner model, i.e. structural model (Tenenhaus, Esposito Vinzi, Chatelin, Lauro 2005). The inner model establishes the relationships between constructs, and the outer model establishes relationships between constructs, latent factors, and its observed variables and indicators (Henseler et al. 2009). Consequently, the software SmartPLS® 2.0 M3 is used for PLS path modelling, and determining construct effects and relationships.

Table2: Hypotheses for the China and India models

Construct	Consumer / non-consumer model	Hypothesis No.	Hypothesis China	Hypothesis India
Attitudes (buying motives)	Consumer & non-consumer	H.1	Ethical innovation motives have a significant positive effect on intention to consume sustainable food in China.	Fairness & environmental friendliness motives have a significant positive effect on intention to consume sustainable food in India.
		H.2	Health motives have a significant positive effect on intention to consume sustainable food in China.	Traditional food quality criteria have a significant positive effect on intention to consume sustainable food in India.
		H.3	GMO-free motive has a significant negative effect on intention to consume sustainable food in China.	Naturalness motives have a significant positive effect on intention to consume sustainable food in India.
		H.-4	Price has a significant negative effect on intention to consume sustainable food in China.	Trends & traditions have a significant positive effect on intention to consume sustainable food in India.
Subjective norms	Consumer & non-consumer	H.-5	Subjective norms have a positive & significant effect on intention to consume sustainable food in China	Subjective norms have a significant positive effect on intention to consume sustainable food in India
PCE	Non-consumer	H.-6a	Perceived consumer effectiveness (PCE) has a significant positive effect on intention to consume sustainable food in China	Perceived consumer effectiveness (PCE) has a significant positive effect on intention to consume sustainable food in India
	Consumer	H.-6b	Perceived consumer effectiveness (PCE) has a significant positive effect on sustainable food consumption behaviour in China	Perceived consumer effectiveness (PCE) has a significant positive effect on sustainable food consumption behaviour in India
Perceived barriers	Non-consumer	H.-7	Lack of availability & information have a significant negative effect on intention to consume sustainable food in China	Lack of availability & information have a significant negative effect on intention to consume sustainable food in India
		H.-8	Time & skepticism have a significant negative effect on intention to consume sustainable food in China	Time constraints have a significant negative effect on intention to consume sustainable food in India
		H.-9	Price, routines & bad experiences have a significant negative effect on intention to consume sustainable food in China	Routines, bad experiences & price have a significant negative effect on intention to consume sustainable food in India
Intention	Consumer	H.10	Intention has a positive and significant effect on sustainable food consumption in China.	Intention has a positive and significant effect on sustainable food consumption in India.

Source: Own elaboration (2014).

5 Results

5.1 Accuracy, reliability and validity of measurement models

The measurement models for each country data set contain only reflective indicators. Quality criteria measuring accuracy, reliability and validity were analysed for all measures. Table 3 and 4 summarise the results for the measurement models of China and India.

Evaluating the China models, concerning reliability criteria measured by the Cronbach's alpha and composite reliability indicators, almost all measures are over the acceptable recommended values for exploratory studies: 0.6 for Cronbach's alpha and 0.7 for the composite reliability indicator (Hair, Ringle and Sarstedt 2011; Henseler et al. 2009). The only exception is the latent variable "lack of availability & information", which has a Cronbach's alpha of 0.57. Nevertheless, some authors suggest that despite quality criteria not being fulfilled by some variables, their utility must be assessed based on theoretical implications (Beavers et al. 2013).

Regarding accuracy criteria of the China models, the latent variables "lack of availability & information barriers" and "price, routines & bad experiences barriers" do not comply with the minimum recommended value for average variance explained ($AVE = 0.5$). However, "price, routines & bad experiences barriers" have acceptable reliability indicators; "lack of availability & information" on the other hand are an important variable affecting consumer behaviour in developing countries including China (Agriculture and Agri-food Canada 2010; Gomersall and Wang 2012; Zhu et al. 2013).

Table 3: Accuracy, reliability and validity in the Chinese models

Construct (latent variable)⁽¹⁾	Consumer model			Non-consumer model		
	Cr.A⁽²⁾	CR⁽³⁾	AVE⁽⁴⁾	Cr.A.	CR	AVE
Ethical & innovation motives	0.88	0.91	0.54	0.89	0.91	0.56
Health motives	0.74	0.83	0.56	0.75	0.84	0.57
PCE	0.81	0.87	0.57	0.79	0.85	0.53
Subjective norms	0.59	0.82	0.70	0.78	0.90	0.82
Lack of availability & information	-	-	-	0.57	0.70	0.46
Time constraints	-	-	-	0.74	0.75	0.52
Price, routines & bad experiences	-	-	-	0.62	0.66	0.44

Notes: ⁽¹⁾ = only constructs with more than one item are included; ⁽²⁾ = Cronbach's alpha; ⁽³⁾ = Composite reliability;

⁽⁴⁾ = Average variance explained

Source: Own data (2013).

For the Indian models most variables comply with the expected minimum quality criteria. The only exception is the latent variable “trends & tradition motives”, which has a low Cronbach's alpha (0.47) and a low AVE (0.45). However the variable has an acceptable composite reliability index, and in the consumer model its indicators comply with the minimum required criteria.

Table 4: Accuracy, reliability and validity results in the Indian models

Construct (latent variable) ⁽¹⁾	Consumer model			Non-consumer model		
	Cr.A ⁽²⁾	CR ⁽³⁾	AVE ⁽⁴⁾	Cr.A.	CR	AVE
Fairness & environmental friendliness motives	0.83	0.89	0.67	0.82	0.88	0.64
Naturalness	0.71	0.83	0.62	0.72	0.82	0.61
Traditional food quality criteria	0.76	0.84	0.57	0.71	0.80	0.51
Trends & tradition	0.69	0.83	0.62	0.47	0.67	0.45
PCE	0.90	0.93	0.73	0.90	0.93	0.71
Subjective norms	0.67	0.86	0.75			
Lack of availability & information	-	-	-	0.77	0.75	0.53
Routines, bad experiences & price	-	-	-	0.88	0.91	0.67

Notes: ⁽¹⁾ = only constructs with more than one item are included; ⁽²⁾ = Cronbach's alpha; ⁽³⁾ = Composite reliability;

⁽⁴⁾ = Average variance explained

Source: Own data (2013).

Additionally, discriminant validity of the constructs was tested using the Fornell-Larcker criterion (Fornell and Larcker 1981). The results confirm discriminant validity between the constructs. Discriminant validity tables are included in the annexes section.

5.2 Structural model estimation

The R^2 , together with algebraic signs and the significance of path coefficients, was obtained in order to evaluate the goodness of fit of the structural models in China and India. Concerning China, the consumer's model explains 25% for intention and 15% for behaviour. The non-consumer's model in China explains 40% of the variance in intention to consume sustainable food.

In the case of India, 38% of the variance in intention to consume sustainable food is explained by the consumer's model; 10% of the behaviour variance is explained. The Indian non-consumer's model explains 27% of the variance in intention to consume sustainable food

In order to measure the significance of path coefficients, the bootstrapping option of SmartPLS was used. The bootstrapping procedure was carried out with 5,000 sub-samples and 216 cases for the Chinese consumer model. The bootstrapping sub-samples were reduced to 1,500 in the non-consumer model with 79 cases. In relation to India, the bootstrapping procedure was done with 5,000 sub-samples both in the consumer and non-consumer models (184 and 95 cases respectively). Direct and total effects- the sum of direct and indirect effects- of the independent variables were considered for significance evaluation.

5.3 Direct and total effects: China

Tables 5 and 6 present the direct and indirect effects of variables present in the Chinese consumer and non-consumer models. Regarding China's consumer model, health motives and subjective norms have a significant positive effect on intention to consume sustainable food. Thus, hypotheses H.-2 and H.-5 are supported. Concerning perceived consumer effectiveness

(PCE), no significant effect on intention is demonstrated; however PCE has a significant positive effect on consumption behaviour (frequency and quantity). Therefore, hypothesis H.-6a is rejected and H.-6b is accepted. Hypothesis H.-10 is also accepted, based on the results showing a significant and positive effect of intention on behaviour. The rest of the hypotheses for the China consumer model (H.-1, H.-3, and H.-4) are rejected since they are not significant within the levels of confidence stated.

In China's non-consumer model, price has a negative and significant effect on intention to consume sustainable food. Differing from the consumer model, PCE has a significant and positive effect on intention to consume sustainable food. Perceived barriers towards consumption do not have a significant effect on intention. Based on these findings, hypotheses H.-4 and H.-6 are supported; hypotheses H.-1, H.-2, H.-3, H.-5, H.-7, H.-8, and H.-9 are rejected.

Table 1 Estimated direct and total effects: China’s consumer model (N=216)

Construct (latent variable)	Intention				Behaviour			
	Path coefficient (direct effect)	T-value (direct effects)	Path coefficient (total effects)	T-value (total effects)	Path coefficient (direct effect)	T-value (direct effects)	Path coefficient (total effects)	T-value (total effects)
Ethical & innovation motives	0.07	0.92	0.07	0.92			0.01	0.70
Health motives	0.20	3.10***	0.20	3.10***			0.03	1.62
GMO free motive	0.08	1.25	0.08	1.25			0.01	1.05
Price motive	0.07	1.14	0.07	1.14			0.01	0.97
PCE	0.09	1.25	0.09	1.25	0.33	5.29***	0.34	5.79***
Subjective norms	0.23	2.79***	0.23	2.79***			0.03	1.54
Intention					0.14	2.06**	0.14	2.06**

Note: (***) Significant with 99% of confidence; (**) significant with 95% of confidence; (*) significant with 90% of confidence.
Source: own data (2013).

Table 6: Estimated direct and total effects: China’s non-consumer model (N=79)

Construct (latent variable)	Intention		
	Path coefficient (direct effect)	T-value (direct effects)	T-value (total effects)
Ethical & innovation motives	0.12	1.05	1.05
Health motives	0.05	0.46	0.46
GMO free motive	-0.11	1.07	1.07
Price motive	-0.18	1.93*	1.93*
PCE	0.41	3.29***	3.29***
Subjective norms	0.17	1.59	1.59
Lack of availability & information	0.05	0.31	0.31
Time constraints	-0.09	0.75	0.75
Price, routines & bad experiences	-0.08	0.55	0.55

Note: (***) Significant with 99% of confidence; (**) significant with 95% of confidence; (*) significant with 90% of confidence.
Source: own data (2013).

5.4 Direct and total effects: India

Table 7 shows the path estimates, and the significance of direct and total effects of the variables in the India consumer model. Product characteristics and subjective norms have significant and positive effects on intention to consume sustainable food. Moreover, PCE has a positive and significant effect on behaviour. Finally intention proves to also exert a positive and significant influence on behaviour. Therefore, hypotheses H.-2, H.-5, H.-6b and H.-10 are supported; contrarily hypotheses H.-1, H.-3, H.-4, H.-6a are rejected.

Table 7: Estimated direct and total effects: India’s consumer model (N=184)

Construct (latent variable)	Intention				Behaviour			
	Path coefficient (direct effect)	T-value (direct effects)	Path coefficient (total effects)	T-value (total effects)	Path coefficient (direct effect)	T-value (direct effects)	Path coefficient (total effects)	T-value (total effects)
Fairness & environmental friendliness motives	0.08	0.74	0.08	0.74			0.02	0.70
Naturalness	0.01	0.16	0.01	0.16			0.00	0.16
Traditional food quality criteria	0.14	1.66*	0.14	1.66*			0.03	1.55
Trends & tradition	0.02	0.36	0.02	0.36			0.01	0.34
PCE	0.09	1.43	0.09	1.43	0.14	1.87*	0.16	2.08**
Subjective norms	0.45	5.29***	0.45	5.29***			0.11	2.98***
Intention					0.25	3.75***	0.25	3.75***

Note: (***) Significant with 99% of confidence; (**) significant with 95% of confidence; (*) significant with 90% of confidence.

Source: Own data (2013).

Table 8 shows that for the non-consumer model in India, two barrier factors have a significant effect on intention: time constraint and social barriers. Time constraints have a positive influence and the social barriers have a negative influence on intention. H.-8 is partially supported, and the social barriers hypothesis (H. 9) is completely supported. The remaining hypotheses are not supported in the non-consumer model (H.-1, H.-2, H.-3, H.-4, H.-5, H.-6a, and H.-7).

Table 8: Estimated direct and total effects: India’s non-consumer model (N= 95)

Construct (latent variable)	Intention		
	Path coefficient (direct effect)	T-value (direct effects)	T-value (total effects)
Fairness & environmental friendliness motives	-0.11	0.82	0.82
Naturalness	0.13	0.99	0.99
Traditional food quality criteria	0.18	1.37	1.37
Trends & tradition	0.13	0.79	0.79
PCE	0.19	1.54	1.54
Subjective norms	0.17	1.51	1.51
Lack of availability & information	0.10	0.71	0.71
Time constraints	0.20	1.79*	1.79*
Routines, bad experiences & price	-0.31	2.20**	2.20**

Note: (***) Significant with 99% of confidence; (**) significant with 95% of confidence; (*) significant with 90% of confidence.

Source: Own data (2013).

6 Discussion

6.1 China

Regarding the explained variance of intention and behaviour in the Chinese models (consumer model 25%; non-consumer model 40%), the intention construct is well explained according to suggested values (15-56%) that can be found in the literature (Honkanen, Verplanken and Olsen 2006; Saba and Messina 2003; Tarkiainen and Sundqvist 2005). The behaviour construct has an explained variance of 15% by the consumer model. This R² value found for sustainable food consumption in China is smaller than in other studies which might be due to the fact that sustainable food consumption is still at an initial stage in China (Chan and Lau 2001; Zhu et al. 2013; Armitage and Conner 2001; Agriculture and Agri-food Canada 2010; Gomersall and Wang 2012; Sirieix et al. 2011).

For policy and business actors the results regarding the buying motives influence on Chinese sustainable food consumption are important for future marketing strategies. The results show that Chinese sustainable food consumption intention and behaviour are significantly influenced by health (consumers model) and price motives. Especially health motives have a long tradition in Chinese food consumption behaviour and nowadays there is a widespread common concern associated with food safety and linked health consequences in China (Liu, Pieniak and Verbeke 2013, Yin et al. 2010; Sirieix et al. 2011). At the same time, other studies for example on organic food sectors, suggest that the majority of the Chinese perceive sustainable food as being (too) expensive which can have a hampering effect on sustainable food consumption (Liu et al. 2013; Yin et al. 2010; Zhu et al. 2013). The latter confirms as well the negative effect of the price motive in the non-consumer model.

Subjective norms exert a positive and significant effect on the intention to consume sustainable food in the Chinese consumer model. The effect on intention is stronger in comparison with health motives. Despite some findings in the literature suggesting the poor contribution of subjective norms in TPB models in developed countries (Armitage and Conner 2001; Vermeir and Verbeke 2008), a study using a TPB based model in China also found this construct to positively and significantly affect intentions to consume sustainable food (Chan and Lau 2001). This result is most likely related to the collectivistic nature of the Chinese society (Chan 2001; Chan and Lau 2001).

Furthermore, perceived consumer effectiveness (PCE) is the construct with the strongest influence on behaviour in the consumer model, and on intention in the non-consumer model. This complies with the results obtained by Chan and Lau (2001). In the consumer model, the path estimates of PCE are even higher than those of intention towards behaviour. In this sense, according to Ajzen (1991) the explaining power of PBC decreases whenever an individual perceives himself or herself as having a high degree of control over certain behaviour. The less perceived control individuals feel to have over the performance of a specific behaviour (e.g. sustainable food consumption), the bigger the explaining power of PBC and its related constructs. This perceived lack of control can be associated with a lack of information concerning sustainable food products and their characteristics, and a distrust in the local food regulating entities (Liu et al. 2013; Sirieix et al. 2011).

6.2 India

The intention construct is well explained by India's consumer and non-consumer models (38% and 27% respectively); nevertheless, the behaviour construct (10%) is under-explained according to values suggested by the literature (Armitage and Conner 2001; Kumar 2012).

Traditional food quality criteria are a significant motivation for Indian sustainable food consumption intentions in the consumer model. They include taste, healthiness, price and convenience which relates to the findings by Ali, Kapoor, and Janakiraman (2010), who concluded that Indian consumers consider food freshness and cleanliness, price, quality and convenience as the most important food attributes.

Regarding subjective norms in the Indian consumer model, it is observed to be positive and significant which relates to the fact that the Indian culture is collectivistic in nature (Hofstede 1980; Sinha and Verma 1987). Moreover, subjective norms in the consumer model has a significant indirect effect on behaviour which gives the construct considerable importance.

Perceived consumer effectiveness (PCE) has a positive effect on sustainable food consumption behaviour; however the effect is not significant for intention. It seems that consumers perceive a limited degree of control over their behaviours, and this becomes more evident directly in the behaviour construct, rather than in intention (Ajzen 1991; Chan and Lau 2001).

In the Indian non-consumer model two perceived barriers have a significant effect on the intention to consume sustainable food: time constraints and social barriers. In relation to the time constraints barrier, it can be associated to the fact that convenience is an important aspect for Indian consumers, especially concerning food purchasing. Selecting a place to buy food or do grocery shopping in India is largely affected by distance of the marketplace, time, and other external aspects. This proposes a challenge for sustainable products since they are mostly sold in

supermarkets and specialised stores. Social barriers including issues such as price, trust, scepticism and previous experiences have also been reported in the literature as constraining Indian consumers (Jain and Kaur 2004; Kaufmann, Panni-Khan and Orphanidou 2012).

6.3 Implications

The present study about the determinants for sustainable food consumption in China and India reveals several similarities but also differences between the two countries that are important to be taken into account for future policy and marketing strategies in order to promote more sustainable food consumption.

The factors that actors in the field of sustainable food marketing need to address are on the one hand the analysed aspects of the here presented models like buying motives, subjective norms and perceived behavioural control. On the other hand there are their underlying economic, political and cultural reasons in both countries.

China as well as India belong to the fast growing emerging economies in terms of population, economic and consumption growth (OECD-FAO 2013). Their rising middle classes are promising target groups for sustainable food products, due to their increased interest in health, ethical and environmental issues.

In the collectivistic societies subjective norms tend to play an important role influencing consumers' sustainable food consumption intention / behaviour (Hofstede 1980; Singh, Zhao and Hu 2005). For marketing actors this means that they should address not only the individual consumers but also their families and friends. In the high-context society of China this implies to communicate subtle and not directly, while in the low-context society of India the opposite

strategy would be more effective (Singh et al. 2005). The results of this study also reveal differences in the motives for sustainable food consumption. While Chinese consumers seem to be very much health and price oriented, Indian consumers seem to be additionally demanding taste and convenience with regard to sustainable food.

Like in all emerging or niche markets policy and business actors are challenged to reduce the barriers and enable more sustainable food consumption. In the case of China and India this implies to guarantee safety and credibility of sustainable food. Based on these the specific benefits of sustainable food can be promoted so that their often higher price can be justified in a comprehensible way. Apart from this providing information and increasing the availability of sustainable food products are crucial for enabling more sustainable food consumption in both countries.

Supporting a more sustainable food consumption in these two countries would not only impact the individual consumers' but might also help to reduce some of the most pressing global challenges related to the today rather unsustainable food consumption patterns such as pollution, climate change, ongoing urbanisation or malnutrition.

7. Conclusion

The central aim of this study is to explore which factors significantly influence the consumption of sustainable food in China and India, based upon two models (sustainable food consumer / non consumer) closely related to the Theory of Planned Behaviour (TPB). A structural equation modelling approach is used in order to determine the effects of selected variables or constructs on intention and consumption behaviour of sustainable food.

The results vary within the analysed countries, since the models between them are not the same, due to cultural, economic and political differences. However, important similarities arise: a strong significant effect of subjective norms and perceived consumer effectiveness on intention and behaviour. Also, price emerges as a negative aspect affecting consumers' behaviour, whether it is in the form of a buying motive, or a barrier towards consumption.

The results of this study are therefore relevant considering the few studies available and the potential for market growth of sustainable food in both China and India. Consumers have stated having positive attitudes towards sustainable products; however the levels of information are still very low among the majority of the populations in China and India (Jain and Kaur 2004; Liu et al. 2013; Yin et al.2010; Yu et al. 2014).

8. Limitations and recommendations for future research

Finally, it is necessary to mention the present research faces some limitations. One of these limitations is a non-representative biased sample towards educated, urban males (the latter particularly in India). The use of an online survey can also lead to a positive bias from the

respondents. Another limitation was the scarce literature available in English journals concerning this topic in relation to China and India.

Future studies should consider the population sizes in China and India, and therefore try to analyse larger samples from different regions within the two countries. Moreover, since there are not many studies analysing sustainable food consumption in these two countries, and even fewer using a TPB approach, it might be recommendable to model including other commonly used factors such as values and quality criteria. This can also allow using only one model per country and thus, analyse barriers towards consumption and behaviour within the same country model. Another advantage of this would be the opportunity to carry out a statistical multi-group comparison between the countries. Finally, to have a more precise measure of behaviour, it should be considered using actual consumption measures that are not merely based on self-reported consumption.

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Appendix

Exploratory factor analysis (EFA) results for Attitudes (buying motives)

China: EFA results for attitudes (buying motives) towards sustainable food consumption

KMO = 0.93 Total variance explained = 57.34% Bartlett's test: sig.				
Items	Factor 1 "Ethical innovation motives"	Factor 2 "Health motives"	Factor 3 "GMO free motive"	Factor 4 "Price motive"
Animal welfare	0.78			
Reduced greenhouse gas emissions	0.75			
Fair payment of food producers	0.72			
Current trends	0.71			
Good working and living conditions for food producers	0.67			
Innovation	0.67			
No child labour	0.65			
Seasonal food	0.63			
Cronbach's Alpha	0.89			
Safety 19		0.76		
Healthiness 1		0.66		
Nutritional value 2		0.65		
Freshness 23		0.63		
Cronbach's Alpha		0.74		
No Genetically Modified Organisms			0.77	
Cronbach's Alpha (single-item scale)			1.00	
Price				0.76
Cronbach's Alpha (single-item scale)				1.00

Source: own data (2013).

India: EFA results for buying motives towards sustainable food consumption

KMO = 0.93 Total variance explained = 55.70% Bartlett's Test: sig.				
Items	Factor 1 "Fairness and environmental friendliness"	Factor 2 "Traditional food quality criteria"	Factor 3 "Naturalness"	Factor 4 "Trends and tradition"
No child labour	0.74			
Environmentally friendly packaging	0.70			
Environmentally friendly food production	0.64			
Good working and living conditions for food producers	0.61			
Cronbach's Alpha	0.83			
Taste		0.71		
Healthiness		0.62		
Price		0.60		
Convenience		0.56		
Cronbach's Alpha		0.73		
No synthetic fertilizers			0.73	
No Genetically Modified Organisms			0.71	
No artificial additives			0.63	
Cronbach's Alpha			0.72	
Current trends				0.72
Local production				0.62
Tradition				0.59
Cronbach's Alpha				0.64

Source data: own data (2013).

Exploratory Factor analysis results for PBC: perceived barriers

China: EFA results for perceived barriers towards sustainable food consumption

KMO = 0.73 Total variance explained = 56.59% Bartlett's test: sig.			
Items	Factor 1 "Time & scepticism barriers"	Factor 2 "price, routines & bad experiences"	Factor 3 "Lack of availability & information barriers"
I think preparing / cooking such products takes too much time.	0.75		
I think shopping for such products takes too much time.	0.71		
I do not think that such products really exist.	0.71		
Cronbach's Alpha	0.73		
I think such products are too expensive.		0.71	
For me, it is hard to change my consumption and shopping routines.		0.66	
I have had some bad experiences with such products.		0.60	
Cronbach's Alpha		0.60	
Such products are not available where I usually go shopping.			0.72
I do not know where to buy such products.			0.70
I do not know how to distinguish such products from conventional food.			0.62
Cronbach's Alpha			0.57

Source: own data (2013).

India: EFA results for perceived barriers towards sustainable food consumption

KMO = .87 Total variance explained = 70.32% Bartlett's test: sig.			
Items	Factor 1 "Routines, bad experiences & price"	Factor 2 "Lack of availability & information"	Factor 3 "Time constraints"
For me, it is hard to change my consumption and shopping routines.	0.82		
I think preparing / cooking such products takes too much time.	0.78		
My family / friends do not like such products.	0.75		
I have had some bad experiences with such products.	0.69		
I think such products are too expensive.	0.68		
Cronbach's Alpha	0.88		
I do not know where to buy such products.		0.83	
I do not know how to distinguish such products from conventional food.		0.75	
Such products are not available where I usually go shopping.		0.69	
Cronbach's Alpha		0.77	
I think shopping for such products takes too much time.			0.88
Cronbach's Alpha (single-item)			1.00

Source: own data (2013).

Discriminant validity analysis

China: consumer model

	Ethical & innovation motives	Behaviour	GMO-free motive	Health motives	Intention	PCE	Price motive	Subjective norms	AVE
Ethical & innovation motives	1.00								0.54
Behaviour	0.33	1.00							0.86
GMO-free motive	0.42	0.18	1.00						1.00
Health motives	0.35	0.14	0.35	1.00					0.56
Intention	0.33	0.24	0.28	0.37	1.00				1.00
PCE	0.49	0.37	0.27	0.26	0.31	1.00			0.57
Price motive	0.19	0.04	0.15	0.11	0.15	0.05	1.00		1.00
Subjective norms	0.44	0.28	0.28	0.40	0.41	0.46	0.14	1.00	0.70

Source: Own elaboration (2014).

China: non-consumer model

	Ethical & innovation motives	GMO-free motive	Health motives	Intention	Lack of availability & information	PCE	Price motive	Time and scepticism barriers	AVE
Ethical innovation motives	1.00								0.55
GMO-free motive	0.25	1.00							1.00
Health motives	0.44	0.33	1.00						0.57
Intention	0.34	-0.01	0.27	1.00					1.00
Lack of availability & information	-0.01	0.07	0.07	0.08	1.00				0.46
PCE	0.46	0.17	0.42	0.53	0.09	1.00			0.53
Price motive	0.09	0.17	0.29	-0.05	-0.09	0.31	1.00		1.00
Scepticism barriers	-0.02	0.07	-0.16	-0.21	0.18	-0.13	-0.02	1.00	0.52
Price, routines & bad experiences	-0.05	0.07	-0.15	-0.30	0.10	-0.27	-0.02	0.46	0.44
Subjective norm	0.28	0.12	0.28	0.44	0.05	0.46	-0.03	-0.16	0.81

Source: Own elaboration (2014).

India: consumer model

	Fairness & environmental friendliness	Behaviour	Intention	Naturalness	PCE	Traditional food quality criteria	Subjective norms	Trends & tradition	AVE
Fairness & environmental friendliness	1.00								0.67
Behaviour	0.18	1.00							0.79
Intention	0.41	0.29	1.00						1.00
Naturalness	0.61	0.16	0.39	1.00					0.62
PCE	0.28	0.22	0.32	0.31	1.00				0.73
Traditional food quality criteria	0.56	0.06	0.38	0.50	0.13	1.00			0.57
Subjective norms	0.47	0.24	0.59	0.50	0.40	0.39	1.00		0.75
Trends & tradition	0.46	0.22	0.30	0.40	0.35	0.40	0.34	1.00	0.62

Source: own elaboration (2014).

India: non-consumer model

	Fairness & environmental friendliness	Intention	Lack of availability and information	Naturalness	PCE	Traditional food quality criteria	Time constraints	Social barriers	AVE
Fairness and environmental friendliness	1.00								0.64
Intention	0.20	1.00							1.00
Lack of availability & information	0.10	0.10	1.00						0.52
Naturalness	0.48	0.32	0.05	1.00					0.61
PCE	0.25	0.33	0.17	0.26	1.00				0.71
Product characteristics motives	0.48	0.30	0.05	0.51	0.20	1.00			0.51
Time constraints	0.12	0.11	0.35	-0.06	0.01	0.02	1.00		1.00
Social barriers	0.06	-0.14	0.37	-0.14	-0.02	-0.02	0.51	1.00	0.66
Subjective norms	0.22	0.26	-0.02	0.20	0.31	0.14	0.27	0.21	0.78
Trends and tradition	0.48	0.19	0.12	0.29	0.25	0.31	0.02	0.22	0.45

Source: Own elaboration (2014).