

Structural equation modelling of consumer acceptance of organic food in Spain.

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ABSTRACT

This paper place together all the relevant variables identified by previous studies developing a complex behavioral model on consumers' organic decision making process. It investigates the role of personal, economic and social elements in predicting Spain consumers' attitudes and purchase intentions toward organic food. A conceptual model is developed and tested via structural equation modeling on a sample of 338 consumers. Results shown that attitudes toward organic food can be explained by risk perception and trust in market agents and institution. Knowledge, as well as environmental and health concern partially mediates the effects of trust in market agents and risk perceptions to attitudes toward organic food. And finally, attitudes toward organic food, price and subjective norms explain purchase intention.

KEYWORDS: Organic food, consumer behavior, Spain, structural equation modeling, purchase intention.

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1. Introduction

The growing interest of European consumers on the environmental effects of conventional agriculture placed sustainable agriculture as an interesting alternative for consumption (Chen, 2007, FACUA, 2008). Sustainable agriculture can be defined as a way of production that causes less degradation of the agro-ecological system than conventional agriculture (Quenum, 2010). This designation encloses organic agriculture. Organic farming has been identified as a production system that combines the best environmental practices and the application of high-animal welfare standards, as well as prohibiting the use of synthetic agrochemicals, drugs and hormones and restricting the use of chemical fertilizers and pesticides (Magistris and Gracia, 2008; Michaledou and Hassan, 2009; Miret, 2004).

Worldwide land devoted to organic farming has experienced an important growth during the last decade, with a total of 37.5 million hectares of agricultural land devoted to organic production in 2009. From that, only a quarter is devoted to cropped area¹ (Lockie, et al., 2004; Michaledou and Hassan, 2009; Willer and Kilcher, 2010). Oceania, Europe and Latino America are the territories with major organic production area, and within Europe the country with more hectares dedicated to organic production is Spain with more than 25,000 producers (FiBL, 2010). For the Spanish case, the organic area represents a 5.26% of total agricultural land (about 1,330,000 ha), and its organic production growth has exceeded 25% annually (Willer and Yussefi, 2008; Briz and Ward, 2009; Willer and Kilcher, 2010). In addition of the land devoted organic agriculture, the market value for organic food and feed has also increased during the last years. Europe domestic sales of organic food and feed in 2008 was estimated at 18 billion Euros, also important is the domestic market for countries such as Germany (almost 6 billion Euros) U.K. (about 2 billion Euros), France (more than 3 billion Euros) and Italy (1.5 billion Euros) (Willer, 2011). The opposite happens in the Spanish case with a value of only 905 million Euros (Willer and Yussefi, 2008; Willer and Kilcher, 2011, Michaledou and Hassan, 2009). This can be explained because, although devoting a lot of land to organic production, the Spanish consumption of organic food is only of 1% of the total food consumption in Spain. The rest of organic production is supposed to be redirected to the export market. In fact,

¹ Arable land and permanent crops.

Italy and Spain concentrate more than the 87% of the European export market for organic food and feed, 900 and 315 million Euros respectively (FiBL, 2010).

The potential development of organic agriculture and food in the Spanish market is still very large. Previous studies detected that the current situation that domestic demand growth is lower than supply, can be explained, among others, by the existence of very high prices of organic food, export orientation of the Spanish producers, lack of availability in conventional establishments and low level of knowledge about what exactly are organic products, are responsible among other things of the current situation (Tarkiainen and Sundqvist; 2006; Fotopoulos and Krystallis, 2002). Therefore, a better understanding of consumers' behavioural process for organic food purchasing as well as consumers' awareness on the subject of organic production is needed. The aim of this research is to understand the role of specific factors that conform the behavioral process or mechanism that determine consumer attitudes and purchase intention toward organic food. To do that a specific survey was developed, and conducted in Barcelona, Catalonia.

The food choice process is a complex phenomenon to analyze, since it constitutes a significant part of individuals' everyday life. This process is determined by cognitive factors, which emphasize the development of mental structures and thought may vary among individuals (Magistris and Gracia, 2008; Peter and Olson, 2005). However, environment and social factors must also be considered (Bell and Meiselman, 1995; Eertmans et al., 2001; Rozin and Tuorila, 1993). An important contribution of this work to previous literature is that it puts together both behavioral and social elements such as: the influence of knowledge, trust on dealers and retailers, risk perception, price relevance... to better understand the formation of consumer attitudes toward organic food and its final purchase intention.

We have structured the paper in five sections. The first section describes the conceptual model and the research questions examined based on previous literature. Next, in the second section the specification of the research methodology are specified. A third section is devoted to the results and finally, the paper ends with a concluding section.

2. Theoretical framework and development of hypothesis

To better understand the behavioural process underlying Spanish organic food consumption we have developed a conceptual model that intends to describe the reasoning process that supports organic food acceptance (see Fig. 1). Briefly, it attempts to identify the most influential constructs in the decision making process concerning to the organic food purchasing (health and environmental concern, trust in organic markets agents and institution, perceived risk, subjective norms, knowledge, price, attitudes toward organic food and purchase intention). This study based on previous literature such as Magistris and Gracia (2008), Tarkianen and Sunqvist (2006), Chen (2007), Chen and Li (2007), Costa-Font and Gil (2009) and Lobb, Mazzochi and Trail (2007).

Our basic conceptual framework is related to the Theory of Planned Behavior (TPB) defined by Ajzen (1991). It maintains that the intention of the behavior (e.g., purchase intention) is based primarily on three factors: the attitude a person has to participate in the behavior (e.g., purchasing attitude), the social pressure felt by the person with respect to the behavior (subjective norm) and the degree of control that the person feels about performing the behavior (e.g., perceived behavioral control). These three factors predict the intention and subsequent behavior. The first two factors reflect the perceived desirability of conducting a behavior, while the third reflects the perception of whether personal behavior is controllable or not (Chen, 2007). The TPB provides the analysis by separating beliefs and attitudes, and recognizing the gap between intention to act and behavior. The TPB allow the relationship between beliefs, attitudes, normative factors, intention and behavior; this relationship can also be expressed in mathematical terms (Ajzen, 1991). We next try to define the constructs underlying the formation of attitudes toward organic food by means of the inclusion of environmental and health concern, perceived risk, trust in organic market agents and institution and the subjective norms define the attitudes and the purchase intention. Whereas that trust in organic market agents and risk is define for knowledge. Finally, the price is another construct for the purchase intention.

- **Insert Figure 1 about here** –

Magistris and Gracia (2008) noticed that health consciousness and subjective norms influence attitudes toward organic foods. In the same way, Tarkianen and Sunqvist (2006) observe that healthy diet, balanced life and organic knowledge are elements that influence individuals' attitudes toward organic food. Furthermore, these authors also perceive a causal relation between attitudes towards the environments and purchase intention of organic food. In the same way Chen (2007) conclude that not only exists a relation between individuals' organic food choice and individuals' attitude towards environment protection, health, natural content, etc but also that elements such as perception of control when purchasing or the influence of social norms are also important in building the intention to purchase organic foods. Other important factor affecting purchase intention has been detected by Chen and Li (2007), who states that trust as well as general attitude and knowledge have influence in building risk and benefit perceptions and therefore attitudes towards food. In the same way Costa-Font and Gil (2009) noticed the relevance of perceived risk and benefit as well as trust for the case of GM food acceptance, highlighting the importance of certification in the food market. Moreover, Lobb et al., (2007) states that the intention to purchase is determined by subjective norms, perceived behavioural control, attitude towards the behavior and trust on institutions.

2.1 Subjective Knowledge

The concept of consumer knowledge is defined as the measure of experience and understanding that consumer has of a product before occurs an external search (Alba, 1983; Brucks, 1985; Rao and Monroe, 1988; Sujana, 1985). It is considered a relevant and meaningful construct to the model since it influences how consumers collect and organize information (Alba and Hutchinson, 1987). In addition, it affects how and what consumers decide to buy. There are three main types of knowledge: subjective knowledge, objective knowledge and experience (Dodd et al. 2005). Experience is defined as the sum of the activities related to past consumption of a product, including information search for the product, use or consumption and the property (Alba and Hutchinson, 1987). On the other hand, objective knowledge is defined in terms of real content and organization of knowledge that are in memory. The subjective knowledge has been defined as the individual perception of consumers about their own knowledge and confidence in

themselves (Dodd et al. 2005). The objective and subjective knowledge are interrelated (Raju et al., 1993), there seem to be a relationship between subjective knowledge and the sources of information used in a purchase decision (Dodd et al. 2005).

Although there is a general awareness about the concept of organic production, the literature also suggests that consumers have inconsistent interpretations about what is 'organic'. For example, in a survey of consumers in three California counties, Jolly *et al.* (1989) found that respondents associated organic production with no pesticides, no artificial fertilizer, no growth regulators, and residue-free products. Similarly, survey respondents in the UK perceived 'organic farming' to imply absence of chemicals, 'absence of growth hormones', and 'not intensively grown' or 'products grown naturally' (Hutchins and Greenhalgh, 1997). In a more recent study for the UK, respondents described organically produced food as one that is more natural and healthy, compared to conventional food (Hill and Lynchehaun, 2002).

Furthermore, it is important to remark that knowledge about organic products may not necessarily translate into direct purchase intention, because of barriers that could limit the ability of consumers to transform such knowledge into actual demand. This is partly because many potential organic consumers, especially in Western industrialized countries, are skeptical about organic labels (Giannakas 2002); stemming from reported cases of mislabeling (e.g., Bonti-Ankoma and Yiridoe, 2006), and misrepresentation of conventionally produced food as organic (e.g., Groves, 1998). Recently, Padel and Foster (2005) indicate that there is a lack of knowledge about certification and labeling and about the guarantee that organic standards really offer to consumers. This implies a lack of confidence when it comes to claims made about organic food that ultimately will prevent them from buying it.

Finally, the knowledge that consumers believe they have about the danger is also very important in defining consumers perceptions and intention towards food (Stefani, et al. 2008). Siegrist and Cvetkovich (2000) conclude that a relationship exists between knowledge about risk, trust in public authorities and the perception of risk. So in the absence of knowledge, confidence in public authorities will be increased, while the perception of risk will be lower. The Gianluca et al. 2008 model raises the hypothesis that

risk perception should be affected by the confidence and knowledge of the dangers. The result of this investigation shows that a knowledge of the risks makes people more aware of the dangers and increase the perception of risk. They also find that risk perception is diminished when there is confidence in the distributors. Consequently the hypothesis are the following:

H1. Consumers that have a higher organic food knowledge, he or she will show more trust in organic market agents and institutions.

H2: As higher is the knowledge on organic the higher is the perception of risk associated to food production technologies.

2.2 Trust in Organic Market Agents and Institution

An important element in defining the attitudes of consumers in relation to food is confidence. According to Earle and Cvetkovic (1995) and Trumbo and McComas (2003), there are two types of confidence: interpersonal trust and social trust. Interpersonal trust refers to the relationship between information source and the target audience (trust in sources of information.) By contrast, social trust is a property of the multifaceted social processes underlying people's choices and how people or organizations are assigned responsibilities for the administration (trust in institutions). According to Siegrist, et al., (2000, p. 354), social trust is defined as "the willingness to trust those who are responsible for decisions and actions related to the administration of public health and security".

Another issue affecting the purchase of organic food is the level of trust that consumers have toward the certification of organic products, because consumers distrust of the veracity of the certification (Shaw et. al., 2007). The distribution, certification and labeling are related in some way with the level of trust and confidence of consumers when buying organic food (Aarset et al., 2004; Canavari et al., 2002; Hamzaoui and Zahaf, 2006).

Lobb et al. 2007 proposed in their investigation a relationship between trust and purchase intention, however their findings suggest a significant relationship between trust and attitude towards the consumption of chicken, plus a positive and reciprocal relationship between the level of trust and subjective norms. Dierks and Henning (2006) investigated

the trust as a determining factor in consumer behavior in Germany and concluded that there is a significant relationship between trust and attitudes. The results of Yin, et al. (2009) show that consumers' degree of trust for organic food has a positive effect on their willingness to purchase. Some researches (Lobb, et al. 2007; Chen and Li, 2007; Stefanni et al., 2008; Costa-Font and Gil, 2009) propose the inclusion of a set of causal relationships that tries to explain the perceived risk. In particular that risk perception maybe affected by trust. The results of these studies conclude that trust is found as a negative impact on perceived risk. Therefore the following hypotheses are proposed.

H3: Consumers that trust on organic market agents and institution have a positive intention to purchase organic food.

H4: Consumers that trust on organic market agents and institutions perceive a fewer risk associated to food production.

H5: Consumers that trust on organic market agents and institutions will have a positive attitude toward organic food.

2.3 Perceived Risk

In 1960 Bauer was the first to propose the idea that consumer behavior should be considered in terms of taking risks (Taylor, 1974). The perceived risk has been analyzed in numerous ways and it is applied to different market segments, making it suitable for study (Arnold, 2008). Even within the technical-scientific advances or cognitive perspective, risk perception could be regarded as a mere result of beliefs (Lupton, 1999). Other approaches to highlight are the social and cultural processes that mediate the perception so the risk perception is (as in Bredahl, Grunert and Frewer, 1998) treated separately like the construction of other results of beliefs (Lupton, 1999).

The way consumers are coping with the perception of risk can be better understood if the risk is not approached as a construction of a dimension, otherwise as a multifaceted construction. For example, the perception of risk can be divided into six dimensions: 1) personals and physicals, 2) economics, 3) functional and performance dimensions/ risk, 4) risk convenience, 5) social risk, 6) psychological risk (Murray, 1991; Yeung and Morris, 2001). According to Vos Arnold, (2008), often these six dimensions are considered

independent. Organic food can have all the items mentioned above. They are probably related to personal risk, because of the benefits and drawbacks of health; financial risk due to the possibility of "premium" prices for organic products; functional risk because people are assessing whether a product meets their expectations (taste, texture); the risk of convenience that comes from having to search for food in specific places, the social risk can occur when the circle of friends and relatives of a person are for or against organic food; and finally the psychological risk of buying organic food involves the way in which the consumer thinks about himself based on made purchases. In summary, organic food can contain all the basic elements of risk perception, so this concept is important and must be addressed within the current research (Vos Arnold, 2008).

Recent research shows that there is a causal relationship between risk perception and buying behavior: the first is an important explanatory variable of the latter (Yeung and Morris, 2001). For example Huang (1993) reports on an empirical study of waste-free products that consumers have a tendency to avoid foods that from their point of view are potentially contaminated. In the model proposed by Gianluca et al. 2008, establishes the hypothesis of an occasional relationship between the perception of risk attitude and purchase intention, and conclude that the attitude is determined by the beliefs and perceived risk, indirectly affecting purchase intention. Moreover, Lobb et al. (2007) in their investigation of chicken conclude that the perception of risk does not appear to affect purchase intention but it does affect attitudes. Therefore the following hypothesis is proposed.

H6: Consumers that perceive more risk associated to agricultural production will have a positive attitude toward organic food.

2.4 Environmental and Health Concern

Another personal factor that influences in the definition of attitudes is lifestyle. It is understood as the result of an ideology derived from a system of values, especially those that are related to health and the environment, which affect individual assessments, consumer attitudes and behavior (Scheifferstein and Ophiusa, 1998; Cicia et al., 2002).

Fotopoulos and Krystallis (2002) identified that consumers buy organic food because they perceived them as healthier food, more healthful, tasty and as safe as conventional ones.

Consumers perceive organic food as safer food because they use production systems that avoid the use of pesticides, fertilizers, chemicals, preservatives, hormones and antibiotics, among others (Jolly, 1991; Scheifferstein and Ophiusa, 1998; Shaw et. al., 2007). Another key reason for consumers choosing organic food is health, this is because in recent years have seen health problems such as bovine spongiform encephalopathy (BSE), salmonella and those relating to genetically modified foods, which has led certain consumers to buy organic food as a protective measure (Makatouni, 2002; Zanolli and Naspetti, 2002; Kotler et al., 2005; O'Donnovan, 2002; Ougthon and Ritson, 2007).

Another relevant element of individuals' lifestyle is the concern for the environment. A positive attitude toward environmental issues is positively related to the purchase of organic foods and their frequency (Grunert and Juhl, 1995). After Padel and Foster (2005); Chryssohoidis and Krystallis (2005) and Chen (2007) confirm that attitudes towards the environment account for the purchase of organic food, although in smaller percentages than those related to health. Magistris and Gracia (2008), and Kuhar and Juvanic (2005) conducted studies with organic fruit and vegetables reaching the same conclusion about the relationship of the environment and the purchase of organic food. Therefore the following hypothesis is offered.

H7: As less different organic food is perceived from conventional food as negative is the attitude of individuals towards organic food.

2.5 Subjective norms

According to the TPB, intention to perform or not a behavior is determined by two factors, one personal and one social. In other words, subjective norms are the own perception of the social pressure to perform or not perform a target behavior (Francis, J. et al., 2004). The subjective norm is estimated by: 1) the normative beliefs about the possibility that certain individuals or significant groups expect to play or not on a conduct in question, and 2) the individual motivation to satisfy those expectations. Generally, an individual perceives social pressure when he believes that most of the relevant social referents think he should carry out that behavior (Ajzen, 1980; Chen, 2007; Haugtvedt et

al., 2008). It means that people try to do something when they believe that it is important to others and therefore think that they should do it (León, 2004).

But not only subjective norms affect behavior, but also affect attitudes, which is why some authors have proposed a revision of the TPB. For example Arvola, et al. (2008), Tarkiainen (2006), Chang (1998), Shepherd and O'Keefe (1984) have found evidence that there is an important causal link between subjective norms and attitudes. Chang (1998), Arvola, et al. (2008), Lobb et al. (2007), Tarkiainen (2006) assessed the relationship between subjective norms and attitudes towards a behavior, finding a significant relation among them. Chang (1998) suggests that the link could be explained as the influence of social environment on the formation of individual attitudes and concludes that subjective norms positively influence on the purchase intention through attitudes.

Specifically Lobb et al. (2007) conclude from their research with chicken that there is a significant relationship between subjective norms and attitudes, as well as a positive relationship between trust and subjective norms. For its part Tarkianen (2006) not only noticed that the relationship between subjective norms and attitudes towards buying organic food is significant, but also that attitudes towards buying organic food and subjective norms are not independent. Their research shows that subjective norms influence attitudes, differing from the original theory proposed by Ajzen (1977). Therefore, the following hypotheses are proposed.

H8: There is a positive relation between Subjective Norms and trust on organic market agents and institutions.

H9: Subjective norms have a positive relation with attitudes toward organic food.

H10: There is a positive relation between subjective norms and intention to purchase organic food.

2.6 Attitudes toward Organic Food

Intentions are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior (Ajzen, 1991). The intentions are the best individual predictors of planned behavior and are an impartial predictor of an action (Bagozzi et al., 1986). According to the TPB proposed by Ajzen and Fishbein

(1977), the intention of performing or not a behavior is determined by a personal factor. TPB theory assumes that each factor has a relative weight to be determined, and that these weights depend on the intention that we are studying as well as the person in question (León et. al, 2004).

In relation to personal matters, a key element to highlight is the beliefs held by the person about the probability that the realization of a particular behavior is the result of a number of specific consequences. Consequently, a favorable attitude is when most of the beliefs about own behavior are based on positive consequences, and will be unfavorable when most of these beliefs are substantiated in negative aspects (Ajzen, 1977; Ajzen, 1980). In conclusion, according to the TPB when individuals' attitude towards the participation of a behavior is positive, is more committed with that behavior. Therefore, when consumers' attitude towards organic food is positive, consumers have greater intentions to purchase organic foods (Chen, 2007).

H11: Consumer with a positive attitude toward organic food will exhibit a positive intention to purchase organic food.

2.7 Price

Regarding the importance of prices, in this market the information is scarce and partial. However, as a general rule, it is admitted that organic food prices are superior to those of conventional products. The difference varies between countries, product types and processing degree (Michelsen et al. 1999). Thus, in products such as fruits and vegetables the differences may vary between 50% and 100%, sometimes up to 250% (Thompson, 1999, Glaser and Thompson, 1999), while the surcharges are between 15% and 50%, although with large variations in the case of dairy products (Menghi, 1997, Glaser and Thompson, 2000).

The main group of works related to the demand for organic agriculture has focused on measuring consumer willingness to pay a premium for a green product and its relationship to socioeconomic variables and lifestyle (Byrne et al., 1991, Groff et al., 1991, Collins et al, 1992, Sánchez et al., 1998a, Sánchez et al. 1998b; Gracia et al., 1998), assuming the hypothesis of price consideration as the primary obstacle to the market growth for these products. Thus, Misra et al., 1991 found a significant positive relationship between those

consumers concerned about the health effects caused by the presence of residues in food and their willingness to pay more for the product certificate. In the case of a particular product such as tomatoes, Weaver et al. (1992) exposed that over 50% of respondents would pay at least 10% more for pesticide-free tomatoes. For its part, Blend and Van Ravenswaay (1998) found that between 50 and 60% of respondents would buy apple certified free of pesticides, if comparing the prices levels of conventional products, the price of these would equal to the prices of the certified products.

Krystallis and Chryssohoidis (2005) concluded in their research that the among the factors that affect the willingness to pay for organic foods in Greece are specific factors, such as food quality and safety, trust in certification, and, for some products, brand name. Familiarity with the concept of organic products is a determining factor at the time to consider the consumer's willingness to pay. In this sense (Underhill and Figueroa, 1996), 45% of consumers who profess to be familiar with organics products (about 80%) were willing to pay more than 10% or even 15% of them would pay more 20%. On the other hand, Sanchez et al. (1998a) and Gil et al., (2000) detected a significantly higher willingness to pay for a segment of consumers who qualify as regular buyers of these products. Govindasamy and Italia (1999) obtained results consistent with the latest. Therefore, the following hypothesis is proposed.

H12: The price has an effect on purchase intention of organic food.

3. Research methodology

3.1 The Sample

The data in this study were collected from a survey conducted in spring 2011 to sample of 338 adult's representative of Barcelona population. Respondents were recruited by a professional market research company and they had to meet two criteria: a) to be the primary food purchaser of its household and b) to be a frequent organic food purchaser.

3.2 Measures

The survey instrument was based on prior literature with purchase intention measure developed based on Ajzen (2006), Magistris and Gracia, (2008) and Lockie et al. (2004). The subjective norms statements were based on Ajzen (2006). The measures of

environmental and health concern were based on Botonaki (2006) and Magistris and Gracia (2008). The measures of price were adapted from measures contained in Botonaki (2006). Attitudes toward organic food were based on the items of Magistris and Gracia (2008). The items of the variable trust in market agents and institutions were adapted from Chen and Li (2007), while the measures of risk were adapted from Lockie et al. (2004). The measures of subjective knowledge were based on previous literature on knowledge (Alba, 1983; Rao and Monroe, 1988; Alba and Hutchison, 1987 and Dodd et al. 2005) (See Table 1). The survey also contained question on socio-demographic characteristics (gender, income, education level, age). All question were measured on a 6-level Lickert scale, where “tend to agree” responses are codified by ordinal value of 3, “undecided or indifference” by 0 and finally, “tend to disagree” by ordinal value -3.

- **Insert table 1 about here** –

3.3 Analyses procedures

Structural equation modeling has been used in this study in order to test the causal links specified in the theoretical model, what is not possible via regression analysis. Indeed, the structural regression (SR) model has been tested following a two-step modeling approach (Anderson and Gerbing, 1988), where we first define an acceptable confirmatory factor analysis (CFA) and next an adequate SR model.

Following Jöreskog and Sörbom (1996), we have specified a Structural Equation Model which consists of three main types of relationships. First, a measurement model is identified after performing confirmatory factor analysis. The outcome relates, on one hand, observed indicator with the exogenous latent variables:

$$x = \Lambda_x \xi + \delta$$

where x , is a $q \times 1$ vector of observed exogenous or independent variables, Λ_x is a $q \times n$ matrix of coefficients of the regression of x on ξ , ξ is an $n \times 1$ random vector of latent independent variables and δ is a $q \times 1$ vector of error in x .

On the other hand, observed indicators are related with the endogenous constructs:

$$Y = \Lambda_y \eta + \epsilon$$

where y , is a $p \times 1$ vector of observed endogenous or dependent variables, Λ_y is a $p \times m$ matrix of coefficients of the regression of y on η , η is a $m \times 1$ random vector of latent dependent variables and ϵ is a $p \times 1$ vector of measurement errors in y .

A third equation defines the structural model, which specifies the causal relations that exist among the latent variables, describes its causal effects and assigns the explained and unexplained variances (Jöreskog and Sörbom, 1996).

$$\eta = B\eta + \Gamma\xi + \zeta$$

where B is a $m \times m$ matrix of coefficients of the η variables in the structural relationship, Γ is a $m \times n$ matrix of coefficients of the ξ - variables in the structural relationship, and ζ is a vector of errors.

This study uses ordinal data, arguably a rudimentary measurement of continuous variables where the scale is considered as thresholds of the continuous variables (Jöreskog and Sörbom, 1996). Correlations among ordinal variables are called polychoric correlations, which are theoretical correlations of continuous versions (Jöreskog and Sörbom, 1996). In order to perform the analysis we have used the General Weighted Least-Squares (WLS) method instead of Maximum Likelihood (ML) since both the data present a non-normal distribution and because ML do not allow us to employ the weight matrix for the analysis, which is the inverse of the estimated asymptotic covariance matrix E of the polychoric correlations (Kline, 2005).

$$F(\theta) = (s - \sigma)'W(s - \sigma)$$

where s' is a vector of the elements in the lower covariance matrix s of order $k \times k$, σ' is the vector of corresponding elements of $\Sigma(\theta)$, W^{-1} is the positive definite matrix of order $u \times u$ where $u = k(k + 1)/2$. The WLS function is the weighted computation of the squares residuals.

Finally, we will assess the goodness-of-fit of the model by analyzing factor loading which relate each indicator with the constructs. Reliability will be measured by means of composite reliability and Cronbach's α . Moreover, the extracted validity for each construct will be also measured (Hair, Anderson, Tahtan and Black, 1999).

Regarding the structural model, we begin with an assessment of the significance of the estimated parameters in the structural equations (Hair et al., 1999). We proceed with estimating the reliability coefficients of each equation and the associated correlation matrix among constructs examined in our model (Barrio and Luque, 2000). Finally, diagnostic parameter such as Chi-square (χ^2); Root Mean Square Error of Approximation (RMSEA); Goodness-of-Fit Index (GFI); the Adjusted Goodness of Fit Index (AGFI); the Comparative-Fit-Index (CFI); the Normed-Fit-Index (NFI) and the Non-Normed-Fit-Index (NNFI) will ne also considered as indicator of the model goodness-of-fit for the CFA and SR model.

4. Results

4.1 Sample characteristics and Descriptive analysis

The main socio-demographic characteristics of the sample are shown in Table 2. The sample was made up of 225 (67%) women and 113(33%) men. Almost 70% of the respondents were between 35 and 65 years old. As expected, the majority of the sample (more than 80%) had finished secondary school and had a medium household income level (from 1000 to 5000 €/month family). The majority of the sample (70%) has Childs at home and almost the 70% bought organic food occasionally.

-Insert Table 2 about here-

Considering survey responses, we can state that Spanish consumers revealed considerable confidence in the organic market agents and institutions (see Figure 2). It is notable that more than 50% of the sample was concerned for the environment and for their health. Nearly 40% of the participants have positive attitudes toward organic food and almost of 60% did not consider any of the three sets of opinions (familiar, friends or important people influence) when deciding on organic food consumption. More than 50% of the sample revealed to perceived the risks associated to consume food produced and processed using synthetic chemicals, additives or fertilizers. Finally for the majority of the sample is very important the role of the factor price and almost 60% of the respondents affirm that if the price of organic food decreases they will purchase organic food.

- Insert Fig. 2 about here –

4.2 Measurement model (confirmatory analysis)

As mentioned in Section 3, the first step of the study has been to carry out a confirmatory factor analysis for the whole set of constructs: subjective norm, environmental and health concern trust in market agents and institution, perceived risk, subjective knowledge, attitudes toward organic food, price and purchase intention assuming all errors to be correlated. The confirmatory factor analysis with all indicators results suitable for the Multi-Sample Model. The correlation matrix among all variables by country is presented in Table 3. All constructs were measured by three or two construct indicators as proposed by Kline (2005) among others.

- **Insert Table 3 about here** -

The main parameters to test for the robustness of the constructs, following Hair et al. (1999) and Kline (2005) appear to show acceptable results for the Multi-Sample Model as shown in Table 4. The parameters that are important for examining the internal consistency of the model are composite reliability (which must be >0.7), internal consistency reliability, measured by Cronbach's α (which must be >0.7) and extracted validity (which must be >0.5) (Bagozzi and Yi, 1988; Hair et al., 1999). For every construct, all composite reliabilities are greater than 0.7 and all Cronbach's α are over 0.7 but for C2, C5 and C7 which is above 0.5, thus we can say that the reliability is acceptable. Regarding the variance extracted, it is higher than 0.50 (Table 4).

The model meets the widely accepted goodness of fit standards for the Multi-Sample confirmatory model (unconstrained model) indicating that the conceptual model satisfactory fits the data (see Table 4). However, it must be pointed that the Chi-square was significant, $\chi^2 / df = 2.25$ is smaller than 3, demonstrating a good model fit (Carmines and MacLver, 1981). The Root Mean Square Error of Approximation (RMSEA) is 0.061 which is in the 0.5-0.8 limit interval offered by Hair et al., (1999) and Kline (2005). The Goodness of Fit (GFI) was 0.98, the Normed-Fit Index (NFI) 0.95 and the Non-Normed Fit Index (NNFI) 0.95, all were greater than 0.90 as offered by Marcoulides and Schumacker (1996) and Chen and Li (2007).

- **Insert Table 4 about here** -

4.3 Structural model

In testing the model using a Structural Equation Model we find that a satisfactory fit has also been obtained, see Table 5. Fig. 3 show the path diagrams obtained. Of the relationships hypothesized across the context 8 hypothesis have been supported. Hypothesis 1 and 2 are supported with path significant at $p=0.05$ level. Therefore we can state that there is a direct and positive relation between knowledge and both trust in organic agents and the perception of risk, being the first important.

- **Insert Table 5 about here –**
- **Insert Fig. 3 about here –**

Regarding to Hypothesis 4 is clear that the trust in market agents and institution has a negative impact on risk perceptions. Moreover the estimated path is -0.19. The Hypothesis 3 has not been supported, the estimated path is lower than 0.05 with a $p=0.05$. However the Hypothesis 5 has been supported with an estimated path coefficient of 0.16. The positive relation between perceive risk and attitudes toward organic food is partial supported, the estimated path is of 0.09.

Next, Hypothesis 7 has not been supported the path diagram shows a negative impact in the attitudes toward organic food by the environmental and health concern. Also, the Hypothesis 8 and 9 has not been supported because exists a negative relation between subjective norms and trust with a path diagram coefficient of -0.47.

The estimated paths coefficients also suggested a confirmatory evidence of the Hypothesis 10, with a 95 percent of confidence, indicating that the consumers with positive subjective norms will exhibit a positive intention to purchase organic food. The positive relation between the attitudes toward organic food and the intention to purchase organic food (Hypothesis 11) has been supported with a path coefficient of 0.83. Finally, the association between the price and intention to purchase has been supported with a $p = 0.05$ and path coefficient of 0.82.

5. Discussion and conclusions

In this paper, we have tested our claim that consumer intentions towards organic food are the result of a complex decision-making process that results from a specific cumulative interaction of subjective norms, environmental and health concern, subjective knowledge,

trust in market agents and perceived risk. Particularly, we have examined the behavioral model resulting from the introduction of organic food in Spain. Given that some of the underlying choice dimension are simultaneously formed and exhibit interactions among constructs, traditional decision making models that assume parameter exogeneity are not meaningful. To overcome this methodological problem we taken advantage of structural equation modeling which allows for endogeneity. This study has implied design a suitable empirical model to carefully understand the process of attitude formation, which defines our structural equation to be tested.

The structural equation model tested 12 hypothesis, 8 of the 12 hypothesis has been supported while the other four have not been supported (See Table 6). Contrary to previous research (e.g. Michalidou and Hassan, 2009), health and environmental consciousness does not explain the attitude toward organic food but concords with the results of Michalidou and Hassan, 2009. However, in this study we found a positive relation between health and environmental concern with the perceived risk and trust in organic market agents and institutions. This relations means that if consumers have a high concern for environmental and health will influence in the perceive risk and trust in market agents. In others studies did not consider subjective knowledge, trust or risk as antecedents of the attitudes toward organic food. In our study, the three of them shown be significant determinants of consumer's attitudes and intention purchase in the organic context.

- Insert Table 6 about here-

Also we found a negative relation between subjective norms and attitudes toward organic food contrary to Tarkiainen and Sunqvist, 2005; Tarkianen, 2006, Lobb et al., 2007 and others who found a positive relation between subjective norms and attitudes toward organic food. But we found a positive relation between subjective norms and intention to purchase. It is likely that the subjective knowledge, perceived risk ant trust in market agents in our model diminished the direct effect of a more distal construct that of environmental and health concern and as the subjective norms. Our finding is in line with Michalideou and Hassa, 2009 and Tarkiainen and Sundqvist, 2005 who refute a health and environment consciousness as a key driver for shaping attitudes toward organic products. On the other

hand the positive relation between subjective norms and purchase intention is in line with the research of Chen, 2007.

The relationship between subjective and trust in organic market agents results negative, contrary to the research of Lobb et al., 2007. This could be explained for the inclusion of the subjective knowledge and environmental and health concern, constructs that shown be significant determinants of the consumer's trust in organic market agents and institutions. Our findings suggest that, consistently with previous studies (Chen, 2007; Costa-Font and Gil, 2009), perceived risks are an important construct underpinning attitudes toward organic food and purchase intention. Consumers perceived that the price affects the purchase intention this could be happening because in Spain the prices of the organic food is higher than the conventional ones. Finally, our findings are in line with the so-called TPB, which state that attitudes toward organic food clearly predict purchase intentions.

In summary, the aim of this paper is to analyze consumer's organic decision making process for Spanish consumers. As a conclusion it can be stated that this study went a step further from previous literature on analyzing individuals' decision process towards purchase organic food. It shows that purchase intention towards organic food is based in both personal and social factors. The study has placed together all the relevant variables identified by previous studies developing a complex behavioral model on consumers' organic decision making process. Results provide evidence on factors that determine the intention to purchase organic food, especially on the role of 1) knowledge about organic food production on forming risk perception associated to food production as well as on building trust in organic markets and institutions. This means that education and information are key elements for a successful development of the organic market. 2) subjective norms, 3) price relevance and finally 4) attitude towards organic food.

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Fig.1. Consumer conceptual model.

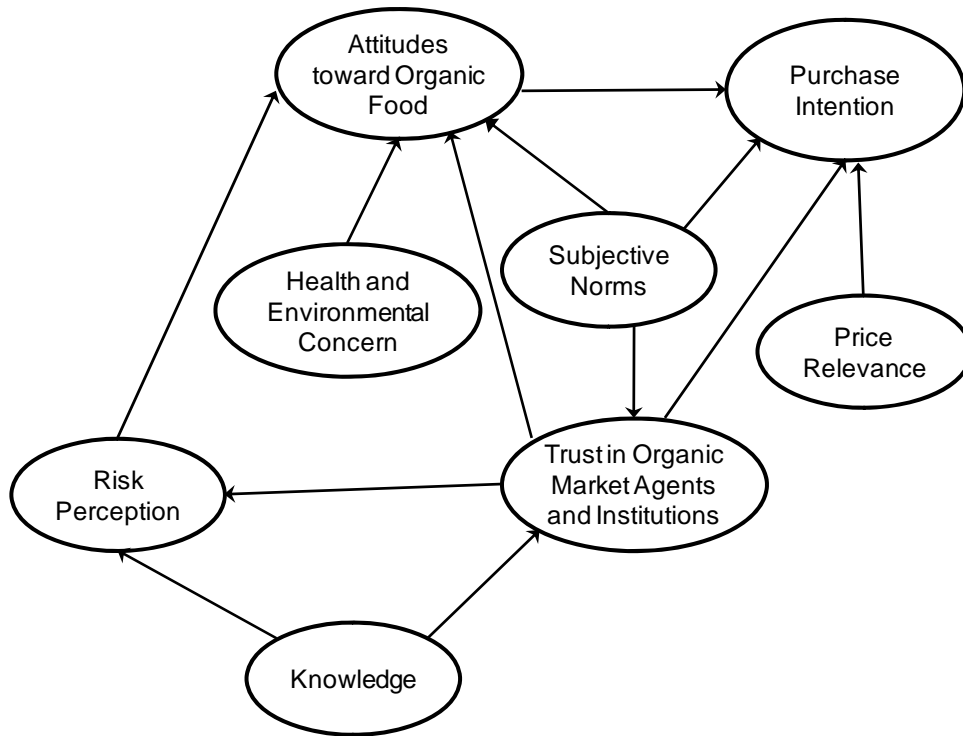


Table 1. List of indicators used for each construct

Construct	Indicators
Subjective Norms (C1)	X1: The people who is important to me believe that I should buy organic food X2: My family believe that we should include in our diet organic food X3: My friends advise me to buy organic food
Environmental and Health Concern (C2)	X4: Current food production systems are destroying the environment X5: For me is important to produce the food in a friendly environment X6: For me is important to be that the food I eat have to be rich in vitamins and proteins
Trust (C3)	X7: I trust on the veracity of the certification organic food labeling X8: I trust in the market agents that sell organic food
Risk (C4)	X9: Could you tell me which is the perceived health risk for consume regularly food grown with pesticides and other chemicals? X10: Could you tell me which is the perceived risk for consume food from animal origin treated with hormones and antibiotic? X11: How informed do you consider yourself about organic food?
Subjective Knowledge (C5)	X12: from my friends. I consider myself an expert in organic food
Price (C6)	X13: I put attention to the products on sale when I buy food X14: At the time to purchase I contrast the possible alternatives
Attitudes toward Organic Food (C7)	X15: Organic food are as safety as conventional. X16: Organic food have the same content of vitamins and minerals than conventional ones
Purchase Intention (C8)	X17: I have the intention to purchases organic food if the price decreases

Table 2.Demographic distribution of the sample

Demographic	N = 338	%	Official Population distribution*
Gender			
Female	225	67	51
Male	113	33	49
Age in years			
18-34	125	37	30
35-49	102	30	29
50-64	93	28	21
65 or older	18	5	20
Education			
Primary school unfinished	1	0	12
Primary school finished	25	7	26
Secondary school unfinished	29	9	25
Secondary school finished	116	34	23
University degree	148	44	14
Post graduated degree	19	6	
Income in Euros			
1000 or less	53	16	No available data
1001-2000	110	33	
2001-3000	81	24	
3001-5000	46	14	
5001 or more	34	12	
NC	14	4	

Structural equation modelling of consumer acceptance of organic food in Spain

Childs at home

Yes	236	70
No	102	30

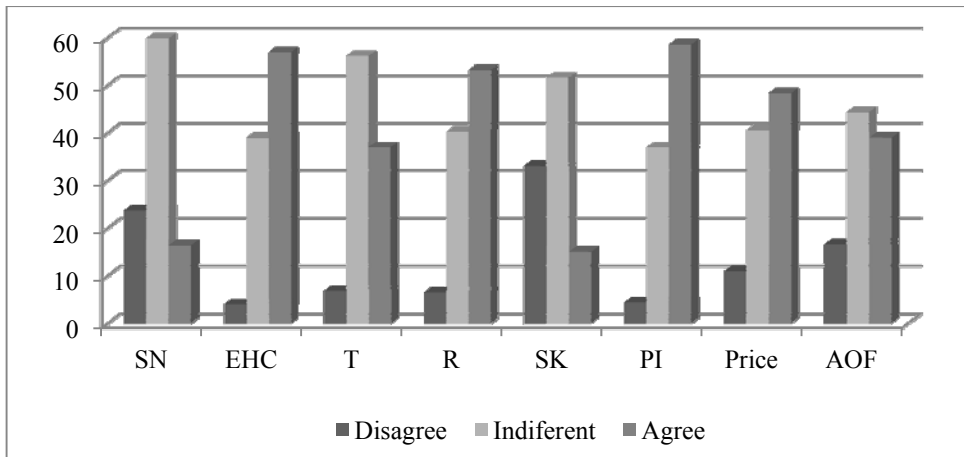
Consume organic food

Usually	36	11
Sometimes	189	56
Never	112	33

*IDESCAT 2009

Fig. 2 Descriptive Statistics

Structural equation modelling of consumer acceptance of organic food in Spain



SN: Subjective Norms; EHC: Environmental and Health Concern; T: Trust in market agents and institutions; R: Perceived Risk; SK: Subjective Knowledge; PI: Purchase Intentions; AOF: Attitudes toward organic food.

Table 3 Correlation matrix among indicators

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X1	1													
X2	0.697	1												
X3	0.541	0.532	1											
X4	0.185	0.206	0.202	1										
X5	0.266	0.296	0.318	0.300	1									
X6	0.196	0.186	0.138	0.238	0.367	1								
X7	0.233	0.182	0.216	0.146	0.152	0.034	1							
X8	0.172	0.195	0.220	0.158	0.164	0.002	0.577	1						
X9	0.180	0.235	0.212	0.340	0.309	0.152	0.078	0.101	1					
X10	0.217	0.305	0.260	0.330	0.306	0.240	0.073	0.135	0.650	1				
X11	0.319	0.347	0.368	0.083	0.147	0.117	0.196	0.140	0.088	0.037	1			
X12	0.283	0.280	0.401	0.163	0.147	0.062	0.323	0.219	0.219	0.163	0.394	1		
	-	-	-		-		-	-			-			
X13	0.142	0.123	0.075	0.010	0.005	0.093	0.092	0.015	0.021	0.031	0.133	0.014	1	
X14	-	0.037	-	0.018	0.084	0.149	-	0.073	0.133	0.121	-	-	0.086	1

Structural equation modelling of consumer acceptance of organic food in Spain

	0.015		0.038				0.033			0.055	0.097				
	-	-	-	-				-		-					
X15	0.055	0.009	0.005	0.001	0.039	0.106	0.116	0.072	0.014	0.033	0.033	0.005	0.069	0.248	1
	-	-	-	-	-				-	-					
X16	0.072	0.141	0.104	0.128	0.092	0.012	0.065	0.037	0.068	0.117	0.001	0.061	0.118	0.162	0.26
X17	0.267	0.310	0.309	0.208	0.253	0.092	0.211	0.176	0.263	0.217	0.166	0.193	0.136	0.156	0.09

Table 4. Reliability of standardized confirmatory factor analysis (CFA).

Construct	No. of items	Cronbach's α	Composite Reability	Variance Extracted	Measurement Model
C1	3	0.81	0.91	0.81	$\chi^2 = 207.65$
C2	3	0.60	0.81	0.68	df = 92
C3	2	0.73	0.83	0.83	$\chi^2 / df = 2.25$
C4	2	0.78	0.87	0.85	p = 0.00
C5	2	0.57	0.77	0.79	RMSEA = 0.061
C6	2	0.70	0.72	0.76	CAIC = 1043.93
C7	2	0.52	0.77	0.70	CFI = 0.97
					GFI = 0.98
					NNFI = 0.95

Note about parameters for a better fit: pvalue>0.05; NC<3; RMSE<0.08; GFI, AGFI and PGFI more than 0.9; NFI, NNFI and CFI close to 1.(Lomax and Schumacker,2004; Kline, 2005; Costa-Font& Gil,2008)

Fig. 3 Path diagram of the estimated model for organic food

Table 5. Goodness of fit for the structural equation model

χ^2	250.07	
df	99	
χ^2 / df	2.53	< 3 (Carmines and McIver, 1981)
RMSEA	0.067	<0.5-0.8 (Browne and Cudeck, 1992; Kline 2005)
GFI	0.96	>0.90 (Bollen, 1998; Marcouliders and Schumacker, 1996)
AGFI	0.96	>0.90 (Bollen, 1998; Marcouliders and Schumacker, 1996)
CFI	0.96	>0.90 (Bollen, 1998; Marcouliders and Schumacker, 1996)
NFI	0.93	>0.90 (Bollen, 1998; Marcouliders and Schumacker, 1996)
NNFI	0.94	>0.90 (Bollen, 1998; Marcouliders and Schumacker, 1996)

Table 6. Summary of results

Hypothesis		
	Subjective Knowledge →Trust in organic markets agents and	
H1	institution	Supported
H2	Subjective Knowledge →Perceived Risk	Supported
	Trust in organic market agents and institutions →Purchase	Not
H3	Intention	Supported
H4	Trust in organic market agents and institutions →Perceived risk	Supported
	Trust in organic market agents and institutions →Attitudes toward	
H5	organic food	Supported
H6	Risk →Attitudes toward organic food	Supported
		Not
H7	Environmental and Health concern →Attitude toward organic food	Supported
		Not
H8	Subjective Norms →Trust in organic markets agents and institution	Supported
		Not
H9	Subjective Norms →Attitude toward organic food	Supported
H10	Subjective Norms →Purchase Intention	Supported
H11	Attitude toward organic food →Purchase Intention	Supported
H12	Price →Purchase Intention	Supported