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Consumer Preferences for Fruit and Vegetables with Credence-Based Attributes: A Review

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Abstract

The food marketing sector is responding to an increased level of interest to consumer demand for products with an increasingly wide array of attributes. As evidence, there has been double digit proliferation of offerings in the produce section of retailers on an annual basis. Differentiation claims include factors related to experiential eating quality as well as credence attributes related to environmental and other social outcomes. To establish the overall importance and willingness to purchase and/or to pay for such foods, a summary of selected studies on such credence attributes and a critique of the research methodologies encountered in those studies may be informative. This study aims to identify and rank a number of attributes, focusing on how their statistical significance across consumer studies of fresh produce buying decisions.

Keywords: credence goods, consumer preferences and attitudes, sustainable fruit and vegetables, consumer research.

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Introduction

Over the past two decades, consumer demand for niche products (including organic and locally grown foods) has grown substantially. Various sources suggest that both of these niche food sectors have seen double-digit annual growth (even though local foods were vaguely defined until the United State Department of Agriculture's (USDA) 2010 definition[1] in various grant and agency programs). While some studies suggest that the motivation to purchase organic and local products derives from environmental concerns, other production and quality concerns (nutrition, support for family or small farms, and treatment of animals) are increasingly reported as issues guiding consumer choices (Thilmany et al. 2008). In response, private industries have invested more in branding programs, while various international NGOs and national governments develop and oversee public certification programs meant to address asymmetric information in consumer product markets.

Consumers' perception of quality is influenced by the product's intrinsic attributes as well as by extrinsic indicators and cues provided by the seller of the product (Caswell et al. 2002). Food as a good can be classified into search, experience and credence goods according to the level of quality that can be discovered by the consumer at different stages (Nelson 1970; Darby and Karni 1973). A good is identified as a search good when consumers can evaluate relevant attribute information before the purchase (e.g., price, dimension, size, color), while it is defined as an experience good when relevant attribute information can be determined only after consumption (e.g. experiential eating quality such as taste and convenience) (Nelson, 1970 and 1974). Credence products are those whose relevant attribute information is difficult to ascertain directly by consumers at any stage of purchase, even after consumption of the food (Darby and Karni 1973; Torjusen et al. 2001; Grunert et al. 2004). For this reason, credence goods require a judgment or a certification by an authority figure such as a governmental agency, or organizations that consumers trust to lend information on credence attributes (Caswell and Mojduszka 1996; Becker 1999). Many agro-food goods fall into this category (Caswell and Mojduska 1996).

While experience and search good involves usually private good characteristics, credence good provides private benefits to those who consume the good, while its production often has "affiliated public dimensions" (Lusk et al. 2007). The credence good category incorporates a wide range of fairly intangible and often interrelated characteristics such as outcomes related to public health, environmental conservation, origin, creation of employment, supporting small-scale agriculture and local rural communities, farmers living and producing in marginal and/or disadvantaged conditions and workers' rights. All these attributes fully or partially fall under the realm of public goods (non-excludable, non-rivalrous) (Becker 1999; Midmore et al. 2005; Darby et al. 2006). An example is food produced according to organic or low impact environmental production systems (such as Integrated Pest Management (IPM)) because they not only are perceived by some as safer for consumption, but also reduce the impact on environment, may protect biodiversity and/or reduce greenhouse gas emissions.

[1]According to the definition adopted by the U.S. Congress in the 2008 Food, Conservation, and Energy Act, the total distance that a product can be transported and still be considered a "locally or regionally produced agricultural food product" is less than 400 miles from its origin, or within the State in which it is produced (Martinez et al. 2010).

Credence attributes play an increasingly important role in consumer preference formation (Zanoli 2003; Heuvel et al. 2007). Subsequently, the 'bundle of attributes' which constitute a good is evolving in the food system (Arunachalam et al. 2009) as evidenced by the emerging set of new certifications trying to establish themselves as market standards (Food Alliance, Ocean Trust Fish, Fair Trade). Thus, many agribusiness stakeholders could benefit from understanding patterns, consistencies and conflicting research on consumer values for these credence attributes (Travisi and Nijkamp 2008).

In recent decades, efforts to understand consumer attitudes, or overall buying behavior and the relative importance of various attributes in purchasing food have been widely explored (Kiesel and Villas Boas 2007), primarily with stated preference techniques such as Contingent Valuation (CV) and Choice Experiments (CE). Stated preference methods are grounded in consumer utility theory and, by employing econometric models, they allow one to measure the amount people would be willing to pay (WTP amount) for a good or for a specific attribute. But, there may be reasons to compare and contrast approaches that use the two. Both CV and CE methods ask people to express their preferences by choosing between a base case and another alternative in a hypothetical situation (Mitchell and Carson 1989; Naidoo and Adamowicz 2005). CV is more suitable to evaluate a good in its wholeness, while CE focuses on the 'bundle of attributes' which constitute a good, according to Lancaster's theory (1991). CE involves constructing multiple scenarios, presenting a choice set and asking respondents to choose the preferred option among different alternatives described by various attributes and prices (Naidoo and Adamowicz 2005). In short, it allows researchers to specifically investigate trade-offs between several competing product attributes and to determine the relative importance of various attributes in consumers' choice process (Hanemann and Kanninen 1998). More recently, the experimental approach has also been used by employing auction and lab experiments (Lusk and Shogren 2007; Combris et al. 2009). Finally, general information on consumer preferences and purchasing behavior can be collected through quantitative and qualitative (focus group or in depth interviews) surveys employing rating or ranking questions[2] and Likert scales.

Regardless of the approach, to conduct an effective study, correctly identifying the relevant attributes is key. The chosen attributes should be relevant for respondents, since the conclusions drawn about consumer choice would change if we ignore the existence of important factors (Lancaster 1991, 56). Moreover, the presence of either too many or irrelevant attributes may lead to an overly complex decision for respondents, and therefore, may result in more inconsistent and random choices (Bennett and Blamey 2001).

With this study we would like to contribute to the field by summarizing the existing research. Previous studies focus on understanding the cues between quality and credence aspects and investigating the role of specific labels or certifications (Marchesini et al. 2007). The choice to focus only on fruits and vegetables is driven by the fact that, as Gil et al. (2000) suggested, environmental attributes are more important in fresh and perishable products, (or at least it is easier to directly identify them in such products), and also, consumers are willing to pay a higher premium for organic fruits and vegetables. The contribution of this study is: 1) to identify and rank the attributes that have been shown to be relevant and decisive in purchasing and

[2] Rating questions ask respondent to compare different items using a common scale, while ranking questions ask respondent to compare different items directly to one another ordering them in order of preference.

willingness to pay (WTP) for IPM and organically grown fruits and vegetables (F&V); 2) to improve understanding of the differences and similarities across the USA, European and Asian regions; and 3) to inform future consumer research in this market sector.

The paper is divided into five sections following this introduction. The first section describes the data gathered and analytical methodologies used, followed by a summary of important attributes of consumers buying behavior of F&V as inferred from their significance. The next section compares preferences across countries, followed by a discussion of the relevance of credence goods in WTP and WTBuy decision processes. We conclude by drawing implications for sustainable food industry managers and noting limitations and methodological issues that could inform future research.

Data and Methodology

To explore consumer preferences for F&V, we focus on studies that try to understand the consumer-based key factors in purchasing sustainably produced fruit and vegetables including those that focus on methodological issues and that report these details within their empirical results.

The literature review conducted for this study relies on web-based scientific community databases. Different sources were considered ranging from scientific to popular studies written between 1998 and 2007, but more recent studies were used to motivate and draw conclusions on how the field is evolving. Since the aim of the review was to identify and rank attributes which affect buying decision and WTP on sustainable F&V, relevant studies include those reporting any evaluation, ranking, rating or estimates of attribute coefficients employing econometric or statistical models. This includes 13 studies based on CV, 9 on CE, 2 on experimental auctions and 16 based on quantitative (12) and qualitative (2) surveys.

The actual size of the database (40 publications) was determined by certain practical limitations – possibly excluding studies difficult to obtain or written in languages other than English and Italian – as well as by the usual budget and time constraints.

Our summary of final rankings was organized according to the food attribute's relevance in influencing consumer buying decisions, frequency of occurrence in the literature and absolute values reported for the attribute. Then the reviewed studies have been classified according to the geographic context to allow for comparative analysis.

Factors Influencing the Willingness to Purchase and to Pay Sustainable F&V

According to the database of 40 studies, numerous specific attributes were found to influence consumer buying behavior and the willingness to pay for IPM, organically grown and other sustainably produced F&V. In categorizing attributes, experience related attributes that are clearly present in all foods are common, as are credence attributes. Table 1 lists all attributes described in details in the next paragraphs. Moreover, it reports how many studies have considered a particular attribute, how many have employed an econometric model and how many found that attribute significant at 5% level (or higher). In general, results show that the

significance of attributes does not change using different evaluation techniques (quantitative methods, CV, CE). It seems that methodology affects the magnitude of these attributes, but not their significance.

Table 1. List of attributes, including credence subset, and frequency of inclusion

Attributes List	Studies that considered attribute	Studies with econometric model	Studies reporting attribute significant at 5% level
Visual, smell and taste	24	3	1
Quality	6	1	1
Credence attributes			
Health	27	11	8
Pesticide free	14	2	2
Organic	16	6	3
Environment	17	9	5
Support to farmers	5	1	-
Job creation	2	1	1
Origin	8	1	1
Local	9	-	-
Certification	11	8	6
Price	16	5	5
Brand	10	1	1
Packaging	2	1	-

Before spelling out the role of these attributes, it is important to keep in mind that consumer buying behavior and price sensitivity are also affected by other types of variables such as demographics (age, education, place of residence, income, marital status), neuro-sensory systems (Jacoby 2002) and habits and life style (Govindasamy and Italia 1998; Lohr 2000; Cranfield and Magnusson 2003; Magnusson and Cranfield 2005; Midmore et al. 2005; Darby 2006). As example, focusing on an important attribute, the organic one, some differences in WTP emerge according to whether the respondent buys organic F&V regularly or occasionally. In general, regular organic consumers are willing to pay a premium price that ranges from 17 to 67% for organic fruit, and from 13 to 37% for organic vegetables, while occasional or unlikely consumers accept premiums ranging from 3 to16% for organic fruit and vegetables. So, the segmentation of customers appears to be warranted.

Visual, Smell and Taste Components

A review of results shows that, among the full set of factors, perceptions about eating experience components are clearly among the most relevant and valued reasons for buying and being willing to pay more for sustainable F&V. Experiential eating quality of a product is made up of a composite of attributes whose relative importance varies with the product. The main components are flavor – defined as being made up of taste (sweetness, acidity, astringency, bitterness) and aroma – texture (defined as firmness, juiciness, succulence) and color and shape (Tan 2000). Visual, smell and aroma components were often top rated among attributes listed, which is

logical since they represent the basic components of eating pleasure (Zanoli et al. 2003; Ernst et al. 2006). These experiential attributes are more important, but less of a challenge for marketing professionals, since information is obtained and updated by consumers at each time of purchase. So, we chose to focus on the subset of credence attributes in this study.

However, there are some clear linkages across attribute types; organic and low environmental impact F&V are commonly bought since they are thought to be superior in terms of "flavor", better, intensive, and authentic taste, good texture, and freshness. Moreover, these components were commonly used as indicators about the overall product quality (Ness et al. 2010). The definition of "quality" is difficult to interpret as it involves various attributes that are closely interrelated with each other but go beyond taste, smell, color, size, firmness, and freshness. Only a few studies consider and define quality in all its meanings (Lohr 2000; Mabiso et al. 2005; Darby 2006; Akgüngör et al. 2007; Ghorbani et al. 2007; Lili and Tong 2007), while others introduce quality without defining it. Most researchers delineate a few specific aspects, but how these experience attributes are controlled for varies significantly across studies, and a more standardized approach may be warranted.

Credence Attributes

Health Related Components

Together with visual, smell and aroma components, health related attributes are perceived by consumers as the most significant reasons to buy sustainable food. According to this literature review, perceived personal health related differences in F&V can be linked to specific food components (artificial additives, genetically modified organisms), to the presence of nutritional components (rich in vitamins), and to the perceived risk associated with the use of agrochemicals. According to a large number of the studies, consumers perceive sustainable F&V as being natural, with higher vitamin and nutrient content, and containing fewer or no pesticides and additives compared to conventional F&V.

Overall, it seems that people are especially concerned with the potential harm that conventional food production practices may cause to their personal health, or to public health concerns (children, ill and elderly people; development of allergies in youth) (Midmore et al. 2005). Therefore, they are willing to pay a higher price to reduce the perceived direct and societal risk associated with the use of pesticides, GMOs and additives. According to Florax et al. (2005, 457), who conducted a meta-analysis, WTP for reduced risk exposure increases by approximately 15% and 80% in going from low to medium and high risk-exposure levels, respectively.

Related to risk concerns, "pesticide free" is perceived as another important attribute in consumer buying behavior as respondents were willing to pay a premium averaging 15% above the regular price to buy pesticide-free fresh F&V (Boccaletti and Nardella 2000; Onozaka et al. 2006). Yet, consumers seem to be unconcerned whether the risk source concerns just one or a multitude of pesticides (Florax et al. 2005).

Production Methods Related Attributes

Attributes related to production method differentially impact purchase decisions across consumer studies. Production methods evoke a bundle of attributes related to environment, risk concerns, and certification criteria, and in many cases, related to other attributes. For example, "organic" production appears to be similar, yet more far-reaching, to the pesticide free attribute since, by legal definition, no synthetic pesticides can be used in organic production. Yet, it was found to be less significant to the buying decision. One possible rationale for why the organic attribute seems to be less important in the consumer's eyes (compared to the less restrictive claim of pesticide free) may be the complexity surrounding organic certification processes (Rizzardi 1997). Past studies also concluded that consumer's perceptions that organic products are only food for babies or sick people (Piraccini 2000), or that poor product availability in supermarkets limited information and the consumption experiences at the time of studies (Boccaletti and Nardella 2000, 298). According to the latter study, consumers often doubt the existence of "truly organic" F&V.

Evidence on F&V produced with IPM is mixed. Some studies show that consumers who have knowledge of sustainable practices and have made previous purchases of such products are more likely to buy IPM grown F&V, and are willing to pay a premium of six percent or higher (Govindasamy and Italia 1998; Richter et al. 2000; Cranfield and Magnusson 2003); while others found that having prior familiarity with IPM concepts decreases the probability of buying IPM products (Blend and Van Ravenswaay 1999).

Environmental and Socially Oriented Attributes

A significant number of studies have specifically analyzed the relevance of environmentally related attributes (increased biodiversity, ecosystem protection and natural system conservation). They range from somewhat important to important across consumer studies. Louriero et al. (2001) - who studied the WTP for sustainable and organic apples versus conventional ones - found that consumers with strong environmental attitudes have the largest demand for food grown by producers with a strong commitment to environmentally friendly practices. However, other studies suggest that the coefficient on environmental concern is the least important (Scarpa and Spalatro 2001) or insignificant in the WTP regression, after controlling for consumption behavior and demographic characteristics (Hamilton et al. 2003).

Socially oriented attributes of production systems, such as job creation or support for farms, do not seem to affect the consumer decision in a significant way. Although consumers appear concerned with sustainability of local or small farmers and the creation of employment in rural areas, those who are more likely to pay a higher premium for sustainable products may not prioritize such claims. Across the findings reviewed, the magnitudes of the marginal effect of such factors are small (Cranfield and Magnusson 2003; Akgüngör 2007) or insignificant (Magnusson and Cranfield 2005). As one exception, when consumers are solicited about buying decisions and willingness to pay for local (Darby 2006; Henseleit et al. 2007), "help local farmers" was an important factor (Richter et al. 2000). In short, it appears that the support for farms may be nested into other product claims.

Local and Origin Related Attributes

Attributes referring to the products' origin was found to be either important, or somewhat important in a majority of the studies. Production origin (as made in USA, Italy, etc.) is generally ranked, rated or estimated among the somewhat or less relevant factors to the buying or paying decision (Zanoli et al. 2003; Campbell et al. 2004; Midmore et al. 2005; Darby 2006; Poole and Martínez-Carrasco 2007). Mabiso et al. (2005) found that origin labels garner a premium, while Scarpa et al. (2005) found that the WTP for origin depends on the product under question.

The attribute "local" involves a bundle of aspects, private and public, which a consumer may perceive to be interrelated with each other, such as aroma components, environmental concerns and the intention to support the local economy of the home region. According to our analysis, the attribute local generally seems to be relevant to the decision to buy fresh F&V. Local products are assumed to be fresher and better tasting and, most importantly, they may enhance the trust of consumers who personally know the producers of their fruit and vegetables (Midmore et al. 2005; Rodriguez-Ibeas 2007; Thilmany et al. 2008). Moreover, according to Marchesini et al. (2007, 7), the shorter the distance between producer and consumer (geographically and culturally speaking), the higher the effectiveness of local geographical indicators.

Certification and Other Labels

Consumers often use 3rd party certification and labels as safety and quality cues for attributes that require oversight by knowledgeable experts (Lohr 2000). Several studies suggest that the lesser importance placed on certification process could be due to the lack of clear procedures that implicitly guarantee the credence attribute, such as safety (Boccaletti and Nardella 2000; Midmore et al. 2005; Zanoli et al. 2007). For example, most Italian consumers do not trust labels because they do not perceive the existence of standardized certification procedures (Pirani and Re 1999). Also, due to past food scandals (BSE, dioxin contamination of Belgian food), labeling products to certify organic or low input production is no longer a guarantee in and of itself (Lohr 2000). In a broader context, the complexity and ambiguity behind a certification process may also be part of the rationale for this consumer response.

However, among different labels, eco-labels seem to provide the most effective market signal (Loureiro et al. 2001; Mabiso et al. 2005; Marchesini et al. 2007; Rodriguez-Ibeas 2007). Eco-labels for fresh apples and tomatoes showed a price premium of between $0.10 and $0.50 per pound (Loureiro et al. 2002; Mabiso et al. 2005).

Regarding production origin designation, Bureau and Valceschini (2003) report an interesting finding: higher demand for certification is requested by consumers who live further from the production site than those living closer (Marchesini et al. 2007). In short, 3rd parties may be more essential when distance makes information gathering more difficult. In contrast, proximity may support other credence attributes. Bond et al. (2007) note that intended support for farmland preservation is significantly linked to those who pay a premium for local produce, and one might believe that this preservation is more valued by buyers who are near protected lands.

Moreover, Marchesini et al. (2007) found that the appreciation of geographical labels varies significantly between countries: the premia attached to Geographical Indicators ranges from 10-30% and 10-50% (up to +100%), respectively. They report that the deciding factor explaining increased levels in WTP appears to center around a perceived increase in food safety and quality, especially for fresh and perishable products.

Other Attributes

Branding seems to be less important in determining consumer buying decisions given insignificant results for this attribute (Mellor et al. 2002; Darby 2006; Thilmany et al. 2006; Poole and Martínez-Carrasco 2007). Packaging is considered in only two studies with insignificant results.

Finally, price does still matter. According to the review's results presented in Table 1, although people do not mention price directly as an obstacle to purchases, the price of sustainable products might be a barrier (Roitner-Schobesberger et al. 2008), even if a higher prices could be seen as a signal of the higher quality given the relative importance of value in several studies (Zanoli et al. 2003).

Relevant Attributes and Countries

After the identification of the key factors of consumers buying and WTP for sustainable F&V, we analyze similarities and differences in attribute relevance that occur in different countries where studies have been done. All mentioned attributes were grouped into three categories - strongly determinant, somewhat determinant, and less determinant - according to the statistical relevance of the attribute in different types of survey, to the frequency of inclusion and when estimated, to the reported coefficient of the attribute.

Three different macro regions have been identified: USA, Europe (plus some countries of the Middle East) and Eastern Asia/Pacific Rim, including China and Thailand. According to our study, only the health-related attributes are found to be an important factor common to all the three areas. Otherwise, the relevance of attributes seems to be differentially valued depending on the area studied.

Most studies investigated US consumers' purchase and payment behavior, especially for apples, berries and vegetables. In the USA and Canada, willingness to buy and pay seems to be determined by both private (health and food) characteristics, and credence attributes (environment and support farmers) that, more or less, have the same weight. The organic seal, price, and 3rd party certification are somewhat important, while brand and origin are the attributes that least affect the WTB and WTP. A few things are interesting to note. First, US consumers perceive pesticide free and organic differently, and second, organic claims are only somewhat important (Table 2). This may suggest that organics are still not well understood by consumers.

Table 2. Relevance of attributes according the country where the study has been done.

Country	USA, Canada, Argentina, Australia	Europe	East Asia/ Pacific Rim (China, Thailand)
Attribute relevance[a]			
Strongly determinant	Health Visual & Smell Environment Pesticide free Local Farmers' support Quality	Health Visual & Smell	Health Environment
Somewhat determinant	Organic Price Certification	Environment Pesticide free Certification Origin Quality	Visual & Smell Pesticide free
Less determinant	Brand Origin	Local Organic Brand Farmers' support Price	Price
Not investigated	Creation of employment Packaging Availability	Creation of employment Packaging Availability	Certification Origin and Local Support farmers Creation of employment Brand Availability

[a] in decreasing order of importance

In Europe, greater significance is given to experience features and to health related components, while credence attributes (environment and support farmers, origin, local, organic) are of somewhat limited or little importance. This result is quite unexpected given the effort of European Union's Common Agricultural Policy (CAP) to introduce sustainable practices among growers and to increase people sensitivity to environmental and social issues linked to agricultural practices in rural areas.

Regarding the third region (Eastern Asia/Pacific Rim region), health and environment attributes constitute the key factors, followed by visual & smell components and the pesticide free attribute. It is worth noting that only a few attributes (6) are even taken into consideration by studies in this area when compared to the US (13) and European (12) areas, possibly signaling that developing countries with broader food security issues may consider credence attributes less essential than sufficient quantities and dietary needs.

Besides these macro regions differences, other differences exist inside each region, nevertheless a direct comparison is challenging to interpret given that these differences depend not only on the product evaluated - but also, on the diversity of attributes investigated and cultural and socio-characteristic of the sample. This latter aspect is particularly true for Europe, where each country has a unique food culture and tradition.

Implications for Sustainable Food Industry Managers

Assessing the Role of Private vs. Public Attributes

The review shows that, even if consumers assign a high value to credence attributes that are at least indirect related to public goods (environment and biodiversity conservation, economic support of local or small farmers, job creation in rural areas), their choice to buy and WTP for fresh F&V is primarily driven by attributes involving private good features associated with own health issues or food as enjoyment (Michelsen et al. 1999; Louriero et al. 2001; Cranfield and Magnusson 2003; Hamilton 2003; Canavari et al. 2005; Magnusson and Cranfield 2005; Midmore et al. 2005; Bond et al. 2007).

This result could be due to the fact that consumers are less familiar with credence public attributes, or uncertain that their buying choices will affect outcomes in the public realm. This uncertainty surrounding some product attributes at the time of purchase can lead to a mismatch between purchase and consumption preferences (Poole and Baron 1996; Poole et al. 2007). In addition, besides public good aspects being extremely difficult to evaluate, they are bound by highly subjective and often relatively vague consumer attitudes towards lifestyle and *raison d'etre*, including less explicit needs and wishes (Midmore et al. 2005, 8).

Marketing Challenges for Products with Credence Attributes

Credence attributes are characterized by a higher dependency on 3rd party information (Röhr et al. 2005) but this summary of findings suggests that the average consumer does not highly value the quality and safety certification processes (Blend and van Ravenswaay 1999; Zanoli et al. 2007; Roitner-Schobesberger et al. 2008).

Among credence features, "local" is always ranked higher than organic, certification, origin, even with no clear definitions or regulating body in place to monitor such claims. This result suggests that the attribute local might be interpreted by consumers as an implicit guarantee or direct assurance which they view as better than a 3rd party certification. For now, a personal assurance from the producers of fruit and vegetables appears to enhance the consumers trust in this type of food (Midmore et al. 2005; Rodriguez-Ibeas 2007; Thilmany et al. 2006) more than a certification. Therefore, improving the contact between the producer/seller and the consumer, for example, through marketing foods at the farm gate, at direct markets or specialty stores where consumers and producers may interact (Midmore et al. 2005; Thilmany et al. 2006) could be an effective strategy for small firms. Finally, comparing WTP motivations for organic food vs. local food, Bond et al. (2007) found that supporting local farmers is a more powerful motivator than supporting natural systems. The challenge associated with the attribute local is to better communicate interrelated aspects such as health nutrition, environmental concerns and the willingness to support the local economy of the home region that could indirectly increase a local claim's relevance in buying decision.

Mistrust in certification is reported by Röhr et al. (2005, 652) who found that German consumers perceive information provided by consumer or environmental organizations, nutritionists or physicians as more trustworthy than information from the Ag Ministry, food producers or the

media. It may due to recent food scandals that fueled a certain degree of uncertainty about the oversight of the food marketing system (Midmore et al. 2005).

Solutions to increase the value of certifications may include providing more reliable information about the certification processes' connection to sustainable outcomes (Hamilton et al. 2003; Röhr et al. 2005; Zanoli et al. 2007). Local could be viewed as a threat to more structured food certification programs that are based on scientific standards, production plans and regulatory oversight. But, marketing these new generations of grades and standards effectively may be challenging given what consumer research signals about current interest in these programs.

Lessons for Future Consumer Research

From the lessons drawn from this literature review, we can provide some guidance for future research. Preferences for organic food have been widely studied, while research into consumer response towards IPM or other sustainable practices is scarce in the literature (Govindasamy and Italia, 1998; Louriero et al. 2001, Scarpa et al. 2005). IPM agricultural practices are often neglected compared to the more commonly known organic standards, but in many circumstances, it remains the only feasible option for some producers[3], and may be more attractive to consumers given the clarity of its intended outcome. Similarly, given the literature's indication that clear outcomes may matter to consumers and growing interest in climate change, research on consumer valuation of products providing assurances about practices that result in low greenhouse gases emissions, or more generally, on consumers' perception and willingness to pay for carbon offsets seems warranted.

No direct attention has been devoted in the reviewed studies to the distinction between tangible and intangible attributes, especially in revealed vs. state preference studies; a shortcoming that could be addressed as auctions become more prevalent. As demonstrated by Horsky et al. (2004) in relation to wine preferences, tangible attributes (price and performance in their study) are weighted relatively more than intangible attributes (such as the prestige) in actual choice vs. stated preferences. When you ask people what they would like, they answer ideally by pointing to the label of high-price or high-prestige option, but in reality, they will proceed to do what makes most sense for their wallet (Horsky et al. 2004, 138). Choice experiments rather than contingent valuation methods may also make such comparisons of individual attributes possible.

Besides these research areas, the review identifies some limitations and methodological issues encountered in the analyzed studies, with particular attention devoted to CE (Adamowicz et al. 1998; Bennett and Blamey 2001). The following is a list of limitations and methodological issues noted in the studies.

[3] In Michigan, for example, most blueberry production is undertaken with conventional pest management, while organic production is around 0.1-0.4% of total production. Due to Michigan's specific climatic characteristics, it is impossible to adopt organic production without incurring huge losses and low quality. Thus, Michigan State University undertook a project, RAMP, designed to measure the changes in blueberry pest management systems when broad-spectrum insecticides are replaced by an IPM scouting program and reduced-risk insecticides (Mark Longstroth, Isaacs Rufus, Dave Trinka, June 2007, personal interviews).

1. Comprehension of environmental and social attributes by respondents depends on the definitions (or not) provided in the survey. Information does matter and should be as objective as possible. Varying definitions of credence attributes make comparative analysis difficult.

2. When designing any survey, and in particular a CE, this effect should be vetted in focus group processes to develop research instruments since WTP estimates highly depend on the amount of information presented to respondents in the survey. Wier (2007) highlighted that studies about sustainable food provide information about the sustainable practice before the CE is carried out, but they rarely measure the effect of the provision of this additional information.

3. Many attributes investigated in the studies interact with each other and might even overlap: (e.g. origin, production type, and taste). As these attributes are not separable in a controllable way, it becomes important to clearly present the attribute description and control for interactions in the statistical design. For example, a clearer definition of Local is needed in order to avoid some inferences that respondents could make and to improve efficiency of WTP values. Darby et al. (2008) addressed this issue by decomposing the local attribute into two degrees of distance and by distinguishing factors that are often associated with Local, such as farm size and freshness, and found that demand for locally produced food is independent of these attributes.

4. In specifying attributes in a CE, it also important to select appropriate levels, since they may capture hidden information and influence credibility in the eye of the respondents.

5. None of the reviewed studies, and in particular, those that employed a CE, addressed the role of processing information within consumers' food choices. However, it appears to be crucial to account for differences in attribute processing strategies, both across respondents and across choice tasks, since failure to account for such heterogeneity can lead to biased WTP estimates (Hensher 2006a, 2006b).

6. Quite surprisingly, few studies in the literature review examined the existence of lexicographic preferences[4]. In evaluating WTP for a credence good through a CE, lexicographic preferences should be taken into account, given the amount of evidence supporting their existence for public attributes such as environment and biodiversity conservation, or economic support of local or small farmers (DeShazo and Fermo 2002). Failure to account for lexicographic preference, will cause a violation of the continuity axiom for environmental goods (Rosenberg et al. 2003) and a departure from the use of compensatory decision-making, ultimately leading to biased WTP estimates (Campbell et al. 2006). One strategy to deal with lexicographic behavior is to use debriefing questions, probing further if respondents focused on only one or two of the attributes in the choice experiment (Alpizar et al. 2001; Rosenberg et al. 2003).

[4] According to Rosenberger et al. (2003), a person who has lexicographic preferences bases her response according to a hierarchy of values and she is generally unwilling to trade or accept compensation for changes in a good or for a specific attribute at all. That is, for this person there is not a reservation price at which he/she is willing to trade the good.

7. Stated preference techniques are likely to have some "hypothetical bias". Using a mixed approach that investigates both stated and revealed preferences could be very helpful in understanding actual consumer preferences for food and to test choice consistency.

Conclusions

This review provides a discussion on important consumer research questions and draws some implications useful for agribusiness researchers. Among 40 selected studies, this research provides a summary of attributes which likely drive consumers buying behavior of sustainable fruit and vegetables. The review confirms that the choice to buy and WTP for fresh F&V is primarily driven by privately-oriented attributes such as personal health or experiential eating quality. Analyzing differences across countries led us to conclude that only health related aspects are similarly valued across regions, while the importance of others attributes varies considerably by consumers' place.

Future research should be devoted to understanding the claims used for credence attributes, perceptions about the expected outcomes and marketing strategies that enhance trust and loyalty toward sustainable products. In short, targeting motivated consumers, positioning brands and communication strategies for organic and low environmental impact food should focus on convincing consumers that these attributes confer a value added to the consumer, even if the value relates to a broader public good aspect of the food and its production system.

Currently, direct marketing in localized food systems is "winning" this challenge in the eyes of consumers, but such direct marketing channels represent just a small share of the overall fruit and vegetables distribution. Interestingly, results show that the attribute "local" is increasing in relevance when compared to organic, certification, and origin. This may indicate that consumers interpret the attribute local as an implicit quality guarantee, or they have relatively greater confidence in a local than a 3rd party certification. As local claims become more common, and possible more challenged, new marketing efforts to communicate aspects that may relate to local sourcing, such as nutrition, environmental benefits and the willingness to support the local economy of the home region will be needed.

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