

Consumers' perceptions of stakeholder credibility: who has it and who perceives it

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RESEARCH ARTICLE

Abstract

Based on the case of US consumer choice of beef steak brands, this study investigates how individual perceptions of information source credibility influence food brand choices. In particular, it tackles the questions: which stakeholders inside or outside the food chain are perceived as credible information sources in promoting food quality? Which consumer segments perceive different stakeholders as credible? What is the relationship between consumers' perceptions of stakeholder credibility and their brand choices? Data are collected from a representative sample of 460 US citizens through an online survey in November 2009 and analyzed through a set of path models. Results provide evidence that: perceptions of stakeholder credibility overall influence their beef brand choices; consumer perceptions that a stakeholder is knowledgeable and has no vested interests are negatively associated; government and family & friends are the stakeholders that mostly influence consumer beef brand choice, although differences across consumer segments are substantial; age, gender, and education are factors that significantly influence consumer perceptions of stakeholder credibility. Marketing managers, policy-makers and their stakeholders in the food sector can use results and methods from this study to design both generic and brand promotion campaigns, especially to influence consumers' perceptions on intangible yet valuable attributes of food, such as locally grown, 'fair trade', or sustainable.

Keywords: stakeholders, credibility, consumer choice, beef, path modeling

1. Introduction

More than in the past, today's agri-food systems organizations both inside and outside the supply chain need to be recognized as credible by their stakeholders. First, larger segments of global consumers increasingly value intangible quality attributes of food that cannot be verified before or after consumption, such as if a product is indeed locally grown, 'fair trade', or sustainable (Darby and Karni, 1973; Grunert, 2002; Verbeke, 2005). Credible companies are more effective in claiming that their product does indeed have these intangible attributes, therefore their brand marketing creates value for their customers and for themselves (Erdem and Swait, 2004). Second, many stakeholders outside the supply chain nowadays highlight the intangible quality attributes through certifications or endorsements, therefore adding value for consumers and companies (Dentoni and Reardon, 2010; Teegen *et al.*, 2004). For example, credible government agencies, non-governmental organizations (NGOs) and universities can provide valuable third-

party information about the sustainability attributes of a food product from companies to consumers (Dentoni and Peterson, 2011; Hatanaka *et al.*, 2005). Third, agri-food systems are increasingly characterized by complex, dynamic challenges with uncertain and often uncontrollable outcomes such as sustainable development (Batie, 2008; Peterson, 2009). To manage these challenges and survive, organizations need to identify their influential stakeholders and interact, negotiate and adapt to their requests and needs (Freeman, 2010). In this context, credible organizations are more likely to influence society on the basis of the claims they make and, in the long run, to survive (Mitchell *et al.*, 1997; Rowley *et al.*, 1997).

This increased need to 'be believed' as a business in society, both inside and outside the supply chain, makes the study of stakeholder credibility crucial for today's firm managers in the food sector. Stakeholder credibility unarguably plays a key role in the effectiveness of communication in society (Hovland and Weiss, 1951; Manfredi and Bright,

1991; Sternthal *et al.*, 1978). Also defined as credibility of an information source (Frewer *et al.*, 1997; Pornpitakpan, 2004), stakeholder credibility refers to the extent that individuals believe the claims of a certain stakeholder in society (Grewal *et al.*, 1994; Sternthal *et al.*, 1978). Despite its growing importance in the literature across different domains, a notable gap remains about how stakeholder credibility, in its multiple dimensions, influences consumers' food brand choices (Frewer *et al.*, 1998; Pornpitakpan, 2004). Moreover, no empirical study has yet analyzed how different consumer segments have different perceptions of stakeholder credibility (Newell and Goldsmith, 2001; Pornpitakpan, 2004).

With a view to addressing these significant gaps, this research tackles the following two questions:

1. What is the impact of stakeholder credibility on consumers' intentions to purchase food products certified, labeled or endorsed by these stakeholders? For example, to what extent do consumers decide to purchase one beef steak brand rather than another depending on their perceptions of credibility of the certification accompanying the brand?
2. What is the impact of demographics such as age, gender, income and education on consumers' of the perception of credibility among different stakeholders? For example, do younger consumer segments consider NGOs or governments more credible in making claims about the quality of a beef steak brand? Or, do female consumers consider restaurants or supermarkets more credible in making quality claims on beef steak?

To tackle these questions, the present study focuses on the case of US consumers' perceptions and choice intentions in relation to beef steak brands. To do so, the research strategy takes four steps. First, a measurement model of stakeholder credibility through confirmatory factor analysis (CFA) is tested. Second, the study explores to what extent a set of pre-selected stakeholders inside or outside the beef supply chain is perceived as credible by US consumers. Third, it explores the relationships among US consumer demographics and their perceptions of stakeholder credibility. Finally, it tests the impact of US consumers' perceptions of stakeholder credibility on their beef brand choice intentions through a path model. Since the study is conducted only with US consumers, and only with questions about a pre-selected set of eight stakeholders and one food product (beef steak), the results are not widely generalizable. In markets other than the US beef steak sector, consumer perceptions of stakeholder credibility are likely to differ.

By tackling these questions and applying the above-mentioned research strategy, this study introduces a new method for food managers and policy-makers to assess the credibility of their stakeholders, the demographic drivers of stakeholder credibility and their effects on brand choices. Based on this method, managers and policy-makers can develop strategies to identify and engage with credible stakeholders and to gain credibility themselves.

The rest of this paper is organized as follows. In section two, the theoretical underpinnings of consumer brand choices and stakeholder credibility are discussed. Section three focuses on materials and methods. Results are presented in section four and are followed by a discussion in section five and conclusions in the sixth section.

2. Theory

Consumer food choice intentions

A wide body of literature in agricultural economics, agribusiness and marketing has analyzed the impact of different stakeholders' claims and certifications on consumers' food choice intentions. Among the different stakeholders, the literature focused heavily on the impact of public actors through certification, labeling and generic promotion programs. For example, it focused on the impact of Protected Denominations of Origin in the EU (Bonnet and Simioni, 2001; Loureiro and McCluskey, 2000; Verbeke and Ward, 2006) and Country-of-Origin Labeling in the US (Loureiro and Umberger, 2005; Lusk *et al.*, 2006; Verbeke and Ward, 2006) on consumers worldwide. Other studies focused on the impact of generic promotion programs (Alston *et al.*, 2001; Brester and Schroeder, 1995; Kinnucan *et al.*, 1997; Ward and Lambert, 1993) funded and implemented by public agencies or by food producers' associations. Common examples of generic promotion or advertising of food products (such as apples), sometimes related to a geographical location (such as Michigan apples), include check-off and dynamic programs (Alston *et al.*, 2001, 2003; Kaiser, 2005). Furthermore, the literature focused on the impact of information from private actors through standards and endorsements. Regarding the impact of private standards established by supermarkets and consortia of supply chain actors on consumers, notable studies include Farina and Reardon (2000), Giovannucci and Reardon (2000), Reardon *et al.* (2001), Jaffee and Masakure (2005), Konefal *et al.* (2005), and Hatanaka *et al.* (2005). Other studies focused on the impact of endorsements from stakeholders outside the supply chain – yet, still creating value for food within the chain – such as chefs, cultural associations, NGOs and celebrities – on retailer and

consumer choices, but did not assess stakeholder credibility vis-à-vis buyers (e.g. Andrews and Kim, 2007; Dean, 1999; Dentoni and Peterson, 2011; Dentoni and Reardon, 2010).

Within this established literature, though, only a few studies compared how different information sources, either public or private, influence consumers decisions (Mazzocchi *et al.*, 2008; Tonsor *et al.*, 2005). In a study on purchase intentions in the context of a salmonella scare, Mazzocchi *et al.* (2008) analyzed the role of public agencies and private companies within the supply chain in consumers' perceptions and trust of chicken products. In a comparative choice experiment on beef, Tonsor *et al.* (2005) compared the impact of public and private labels across Europe and North America. More specifically, no study has assessed how credibility of multiple information sources – that is, a range of public or private stakeholders – influences consumers' food choice intentions. This gap in the consumer choice literature requires a deep investigation of the concept of credibility as well as its drivers and antecedents.

Stakeholder credibility

Despite the length of this history, there has been still no agreement among scholars on the breadth of the stakeholder credibility concept (Pornpitakpan, 2004). Stakeholder credibility was first defined as the perceived expertise and trustworthiness of a stakeholder (Kelman and Hovland, 1953; Lafferty and Goldsmith, 1999; Pornpitakpan, 2004). Perceived expertise is the extent to which a stakeholder 'is perceived to be capable of making correct assertions' (Hovland *et al.*, 1953); trustworthiness is the extent to which a stakeholder is perceived as honest, integer, and believable (Mors *et al.*, 2009). However, the expertise and trustworthiness of a stakeholder may be measured differently by the person evaluating stakeholder credibility (Pornpitakpan, 2004; Wiener and Mowen, 1986). Further dimensions of stakeholder credibility were proposed in the 1960s, including competence, dynamism (Berlo *et al.*, 1969), objectivity (Whitehead, 1968), authoritativeness and character (McCroskey, 1969). However, these measures were criticized for the haphazard use of their scales, which did not guarantee generalizability (Cronkhite and Liska, 1976). In the 1980s, a number of credibility indexes were defined to meet the need for a functional, easy-to-use scale in the communication and journalism literature (Graziano and McGrath, 1986; McComas and Trumbo, 2001). The most popular was Meyer's (1988) index for media believability, which was built with five of the items (whether the source is fair, unbiased, tells the whole story, is accurate, and can be trusted). In the past decade, authors have conceptualized and measured credibility as a unique construct (Pornpitakpan,

2004; Roe and Teisl, 2007), while others have considered only its dimension of perceived trust in the information source (Eiser *et al.*, 2002; Frewer *et al.*, 2003; Poortinga *et al.*, 2003; Priest *et al.*, 2003; Siegrist, 2000). According to Sobel (2005), credibility reflects the expectation that an actor provides accurate and valuable information or performs useful services over time; that is, there is a reputational dimension of credibility. The broadest measure was proposed and employed by Frewer *et al.* (1996, 1998), who used 13 questionnaire items to capture consumers' perceptions on information source credibility. Although a factor analysis was not run, the thirteen items seem to reflect four key underlying dimensions of credibility considered previous literature, namely objectivity, reputation, expertise and trust.

Along with the debate on the breadth of the stakeholder credibility concept, a number of studies have also assessed both its causes and consequences (for a detailed review, see Pornpitakpan 2004). First, stakeholder credibility has a positive impact on the recipients' perceptions, attitudes, purchasing intentions and behavioral persistence (Dholakia, 1986). Second, there is a substantial difference between the effect of credibility of a company and the credibility of a company endorser on consumers' perceptions of a company brand (Goldsmith *et al.*, 2000; Lafferty and Goldsmith, 1999; Newell and Goldsmith, 2001). Third, the effect of source credibility on recipients' beliefs depends on source, message, channel and recipient factors (Pornpitakpan, 2004). Fourth, credibility is influenced by recipients' prior attitudes, knowledge and shocks (Frewer *et al.*, 1997, 1998; Kerstetter and Cho, 2004; Kozup *et al.*, 2003; Smith *et al.*, 1999). Despite this large bulk of literature, much of this research is based on lab experiments with convenient samples, while field studies on stakeholder credibility are still scarce (Mors, 2009). In relation to the food sector, a substantial strand of risk analysis studies focused on the effect of prior knowledge of health issues and attitudes towards food technology on the credibility of the information source (Frewer *et al.*, 1996, 1997, 1998; Roe and Teisl, 2007).

Although a large number of studies have analyzed drivers and antecedents of stakeholder credibility, the notable gaps discussed in the introduction across the literatures of consumer choices and stakeholder credibility remain. First, no study has so far analyzed the impact of credibility of multiple stakeholders inside and outside the food supply chain – such as supermarkets, restaurants and deli stores, NGOs, governments, or family and friends – on consumers' choices for food brands supported by competing claims from these stakeholders. Second, no study has analyzed

how the credibility of these stakeholders is influenced by consumer segments such as age, gender, income and education. Along with the need of managers and policy-makers to assess the credibility of their stakeholders vis-à-vis consumers, these gaps justify the research questions tackled in this study.

3. Materials and methods

Data collection

Data are collected from an on-line survey with a sample of 460 US residents representative of the US population in terms of age between 18 and 65 years old, education, gender, income, state and ethnic group criteria. Participants were contacted by the professional survey company E-Rewards providing lists of consumers in November 2009. This study was part of a larger survey in which participants were invited to take part to assess their preferences for meat products and their perceptions of meat product information. Respondents that do not consume meat were excluded from this sample as the product is irrelevant for them. The response rate was around 20%, while the on-line questionnaire completion rate was around 75%. To ensure that the sample was representative of the US population according to the established criteria, it took four days and one further sample draw to obtain a sufficient number of completed questionnaires from the less responsive population segments. Only one reminder was sent to the people belonging to the less responsive population segments that did not complete the questionnaires within two days of our first contact. On average, respondents took around 14 minutes to fill in the entire questionnaire.

Beef steak was chosen as a product of interest because it is a high-value product, relevant for many US representative residents and allows comparison with other studies in agricultural economics and agribusiness (e.g. Froelich *et al.*, 2009; Loureiro and McCluskey, 2000; Lusk *et al.*, 2003; Tonsor *et al.*, 2005). The questionnaire was designed as follows. First, participants were asked about their demographics, frequency of meat consumption and evaluations of different dimensions of food quality. Second, respondents answered a set of questions about their perceptions on eight pre-selected stakeholders as information sources. The eight stakeholders were pre-selected based on the literature review and on interviews with five beef sector experts (including one market analyst at Michigan State University, one USDA officer, one NGO manager and two US beef company managers). The aim of this pre-selection was to choose stakeholders that were relevant for both current food policy-makers and business

managers in the beef steak sector. The eight pre-selected stakeholders were: (1) government agencies; (2) chefs and food experts; (3) producer associations; (4) NGOs certifying the quality and the sustainability of food products; (5) NGOs advocating and pressuring the industry and the governments on sustainability issues (6) retail grocers; (7) food service restaurants or deli stores; and (8) other consumers, namely friends and relatives through word-of-mouth. With the support of the five beef sector experts, we also crafted a brief definition of the stakeholders to be included below each question. In the case of certifying NGOs and advocating NGOs (Dentoni *et al.*, 2010; Teegen *et al.*, 2004), two examples were added for each case to help consumers understand the difference among the two NGO categories. The two examples of certifying NGOs were the Humane Society of the United States (HSUS) and the Rainforest Alliance, while the People for the Ethical Treatment of Animals (PETA) and Greenpeace were examples of advocating NGOs. By providing examples of existing NGOs a bias is introduced in the experiment, as respondents are primed to think about the mentioned organizations and their responses will also be driven by their prior knowledge and perceptions of them. On the one hand this decreases the external validity of the study; on the other, it allows the introduction of a distinction among NGOs which is of rising importance in current agri-food markets (Dentoni and Peterson, 2011; Teegen *et al.*, 2004).

For each of these eight stakeholders, respondents answered four seven-point Likert scale questions measuring their credibility perceptions. Among the large and debated number of measures developed in the literature (see Section 2), four measures are adapted from Frewer *et al.* (1998). Specifically the four questions are:

1. To what extent do you think the following information sources are *knowledgeable* about food quality?
2. To what extent do you think the following information sources *have a vested interest* in promoting food quality?
3. To what extent do you think the following information sources are *trustworthy* in promoting food quality?
4. To what extent do you think the following information sources have been *proven wrong in the past* when promoting food quality?

The selection of these four measures has four key reasons. First, no previously used measures of credibility were established in the literature over the others. Therefore, the measures were selected to reflect the four prevailing dimensions of stakeholder credibility that emerge from the analyzed literature: perceived expertise, objectivity, trustworthiness, and past behavior. Second, respondents can accurately respond only to a reasonable number of questions

of the same format and topic (Crawford *et al.*, 2001). By asking four questions for each of the eight stakeholders, respondents responded to 32 items. Third, it is outside the scope of this study to establish a measure of credibility that reflects the broadest definitions in the literature (Frewer *et al.*, 1998; Pornpitakpan, 2004). Instead, the aim of this study is to have a set of acceptable measures of credibility to confidently assess which stakeholders are perceived as credible and by which consumer segments. Finally, the four measures reflect stakeholder credibility when promoting 'food quality' to adapt to the case of consumer food brand choices. The concept of 'food quality' rather than of specific food quality attributes was chosen to give respondents the freedom of evaluating the various attributes implicitly in their responses (Caswell, 1998; Caswell and Mojduszka, 1998; Fishbein, 1967; Lutz, 1991). In the online survey tool, the four questions and the eight stakeholder items within each question were randomized.

After a set of tasks taking six minutes on average, respondents were simply asked to indicate their intended best choice from a set of eight beef steak brands, each one promoted, certified and/or endorsed by one of the eight pre-selected stakeholders. Again, a brief definition of the stakeholder was added and the order of the eight brands was randomized. There was no option for not choosing any of these eight brands, or for choosing a brand with no third-party verification or endorsement. By not providing the 'none chosen' and the 'not verified/endorsed' option, there is a risk of overestimating the impact of stakeholder credibility on consumer brand choice, which is taken into account in the discussion of this study.

Data analysis

Data were analyzed first with structural equation models (SEM) and then with path analysis (Hair *et al.*, 2006; Kaplan, 2009). Through principal component analysis (Kaplan,

2009), SEM involved a step-by-step analytical approach including the following: (1) assessing the proposed measurement model of the latent factor 'stakeholder credibility' through the four selected measures through CFA; (2) testing a generic model for the impact of demographic variables on stakeholder credibility and ultimately on consumer brand choice; (3) testing a specific model for the impact of demographic variables on the credibility of each stakeholder and on consumer brand choice endorsed/verified by each stakeholder. As a first step of the analysis, CFA is essential since no previous study in the literature has analyzed if the four selected items of perceived expertise, objectivity, trustworthiness, and past behavior are effective measures of stakeholder credibility, both in terms of convergent and discriminant validity (Kaplan, 2009). For the following steps of the analysis, relative to discrete choice models and regressions, SEM and path analysis allow a set of relationships among variables simultaneously rather than in separate analyses (Hair *et al.*, 2006; Kaplan, 2009). In this study, SEM and path analysis allow the simultaneous analysis of demographic variables, stakeholder credibility, its four selected measures, and consumer brand choice.

As result of the CFA, it was found that the four measures (perceptions of stakeholders as knowledgeable, with no vested interests, trustworthy and not proven wrong in the past) do not achieve convergent validity as four measures of stakeholder credibility. The overall fit of the confirmatory factor model with four reflective measures is poor as the four measures are not highly and positively correlated with each other (Table 1). This means that the four proposed measures are more effectively analyzed as separate concepts than as a reflection of a latent factor such as stakeholder credibility. This result from the test of the measurement model of stakeholder credibility contributes to past literature (Cronkrite and Liska, 1976; Kelman and Hovland, 1953; Pornpitakpan, 2004; Sobel, 2005) since no previous study tested whether the concept of stakeholder

Table 1. Results of the Confirmatory Factor Analysis (CFA): stakeholder credibility.

Reflective measures	Stakeholder credibility factor loadings	T-test
Perception that stakeholder has no vested interest (NVI)	-0.311	15.143**
Perception that stakeholder is trustworthy (TRU)	1.013	39.416**
Perception that stakeholder is knowledgeable (KNO)	1.216	51.292**
Perception of not proven wrong in the past (NPW)	0.295	11.653**

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=56.19$ on 1 d.f.; P -value for $\chi^2<0.001$.

CFI=0.855; RMSEA=0.210; RMSEA 90% Confidence Interval = (0.123, 0.365).

credibility could be effectively reflected as a latent factor with these proposed four measures. Instead, past literature operationalized stakeholder credibility as an 'index' rather than a latent factor (Lafferty and Goldsmith, 1999; Meyer, 1988; Pornpitakpan, 2004). In contrast to a latent factor, an index is built as a sum, average or other mathematical transformation of a set of measures (McComas and Trumbo, 2001; Meyer, 1988), therefore it allows the aggregation of measures that are not highly correlated with each other in a unique concept. In particular, consumer perceptions that stakeholders have no vested interests is negatively correlated with their perceptions that stakeholders are knowledgeable and trustworthy (Table 2). This confirms that a trade-off among measures does not allow stakeholder credibility to be a latent factor reflecting the measures.

Given the outcome of the CFA, a path analysis was undertaken for the two following steps rather than SEM. In contrast to SEM, path analysis allows a model of simultaneous equations to be tested in the absence of any latent factor but with individual measures as constructs only. Path analysis involves a confirmatory and an exploratory component. As a confirmatory analysis, path models were used to test the impact of consumer perceptions of credibility on beef steak brand choice in general, that is, across all eight pre-selected stakeholders. Based on previous literature on credibility, it would be expected that the four measures are highly associated with each other; that the measures have a positive impact on consumer choice; and that consumers' demographics have an impact on their perceptions of stakeholder credibility. As an exploratory analysis, path models were used to gauge the relationship between consumers' demographics and their perceptions of stakeholder credibility. No pre-imposed hypotheses were formulated here, for example, researchers have no

expectations whether younger or older consumers consider NGOs or governments more credible in making claims about the quality of beef steak. Nevertheless, methods and results from this exploratory component of path analysis lead to managerial and policy-making implications.

4. Results

The general model

The general model analyzing the relationships among demographic variables, the four individual measures of stakeholder credibility and brand choice has an excellent overall fit with the data. The Root Mean-Square of Approximation (RMSEA) <0.1 and the Comparative Fit Index (CFI) >0.095 (Table 3). Consumer perceptions that stakeholders have no vested interest are negatively associated with their perception that they are knowledgeable. This means that some stakeholders are perceived as highly knowledgeable but with vested interests while others as not knowledgeable but with no vested interests. Instead, the other three measures of stakeholder credibility are positively associated with each other. Finally, as expected, there is a significant positive relationship between consumer perceptions of stakeholder trustworthiness and their choice of beef steak brands verified/endorsed by that stakeholder (Figure 1). As for the relationship between demographic variables and the measures of stakeholder credibility, the results provide three insights: (1) females and highly educated respondents overall perceive stakeholders to have more vested interests; (2) respondents consuming beef more frequently believe overall that stakeholders are more knowledgeable; (3) elderly respondents are less trusting of information sources.

The models of the eight pre-selected stakeholders

Descriptive statistics

Descriptive statistics provide evidence of which stakeholders are perceived as credible and which third-party verified/endorsed beef steak brands are chosen by US consumers (Figure 2). First, respondents on average perceive chefs and food experts (4.66 points out of 7) as the most trustworthy in promoting food quality, then retailers (4.23) and deli stores (4.16). Government (4.03), producers associations (3.99), certifying NGO (4.02) and family and friends (3.97) enjoy almost the same level of trust. Second, respondents perceive chefs to be the stakeholders who have been proved wrong the least in the past (4.53), followed by producers associations (4.23), certifying NGOs (4.23), retailers (4.21) and deli stores (4.27). Third, chefs and

Table 2. Covariances among hypothesized measures of stakeholder credibility.

	NVI	TRU	KNO	NPW
NVI	1			
TRU	-0.86	1		
KNO	-1.49	1.22	1	
NPW	0.01	0.39	0.28	1

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

Table 3. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice – general model across stakeholders.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
Education	male	0.18**	0.06
	age	0.15**	0.02
Freq. consumption	male	0.20**	0.04
	age	-0.05**	0.01
Number children	education	-0.10**	0.01
	male	-0.14**	0.05
	age	-0.35**	0.02
NVI	education	-0.04**	0.02
	male	0.17**	0.06
KNO	freq. consumption	0.06**	0.02
	NVI	-0.51**	0.01
NPW	number of children	0.03	0.01
	KNO	0.11**	0.01
TRU	KNO	0.47**	0.01
	NPW	0.14**	0.02
	male	0.11**	0.04
	age	-0.12**	0.01
CHOICE	Trust	0.04**	0.01

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=123.63$ on 27 d.f.; P -value for $\chi^2<0.001$.

CFI=0.971; RMSEA=0.031; RMSEA 90% confidence interval = (0.026; 0.037).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

food experts (5.11 points out of 7) are considered the most knowledgeable source, while producers' associations (4.78) are considered the second most knowledgeable source. Consistent with the path analysis of the general model in section 4.1, respondents' perceptions of the vested interest of stakeholders in promoting food quality are significantly different. Family and friends are perceived as having the lowest vested interest in providing information on beef brand choices (3.92), followed by certifying and advocating NGOs (3.52 and 3.58 respectively) and the Government (3.47). Deli stores (3.10), chefs (3.08) and retailers (2.92) are considered the sources with the highest vested interests. Finally, the majority of respondents intend to choose a beef brand certified by the US Government (23% of respondents) or recommended by a family and friends by word-of-mouth (23%). Smaller segments of consumers intend to choose beef brands recommended by chefs or food experts (138%), certified by a beef producers' association (12%) and endorsed by the retailer (10%). Only a small number of respondents intended to choose a beef brand endorsed by a certifying NGO (9%), an advocating NGO

(7%) and a deli store (3%). As there is a strong variation in consumer perceptions across the selected stakeholders, it is worth exploring consumers' demographics, perceptions of information sources and brand choices for each of the eight pre-selected stakeholders.

Consumer perceptions of government as information source

The path analysis of consumers' choice of beef brands with Government quality certification provides three key insights (Table 4). First, elderly respondents are more likely to choose a brand with Government claims. Although they are less likely to trust Government as a source of information than younger respondents, this negative indirect effect on brand choice ($-0.11 * 0.21 = -0.02$) is much smaller than the direct effect (0.13). The indirect effect is computed by multiplying all the coefficients of the effects from the independent variable to the dependent variable, including the mediators (Kaplan, 2009). As the mediator between age and brand choice in this case is one (trust), the multiplication involves the coefficient of age on trust (-0.11) times the coefficient of trust on brand

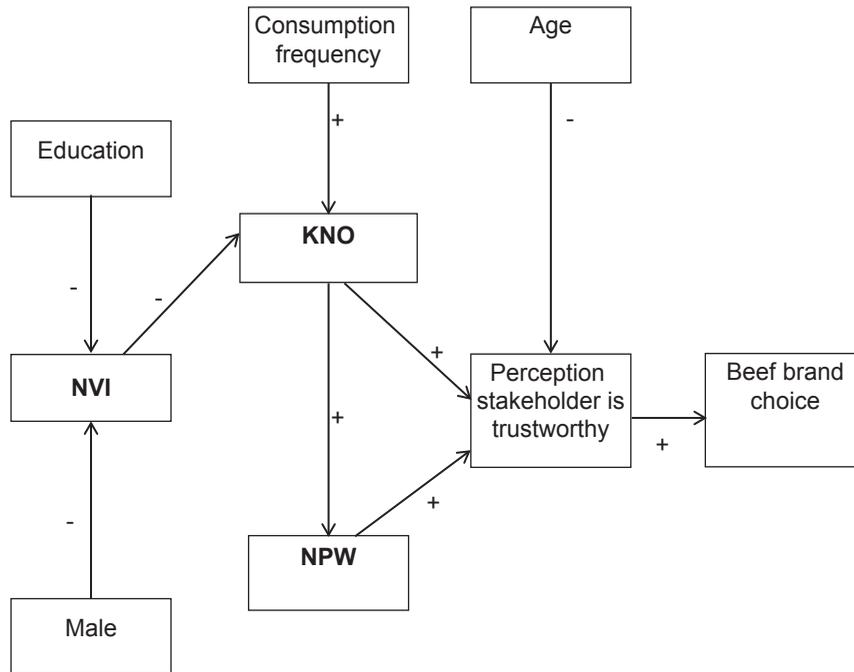


Figure 1. Demographic variables, measures of stakeholder credibility and brand choice: path model across stakeholders.
Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

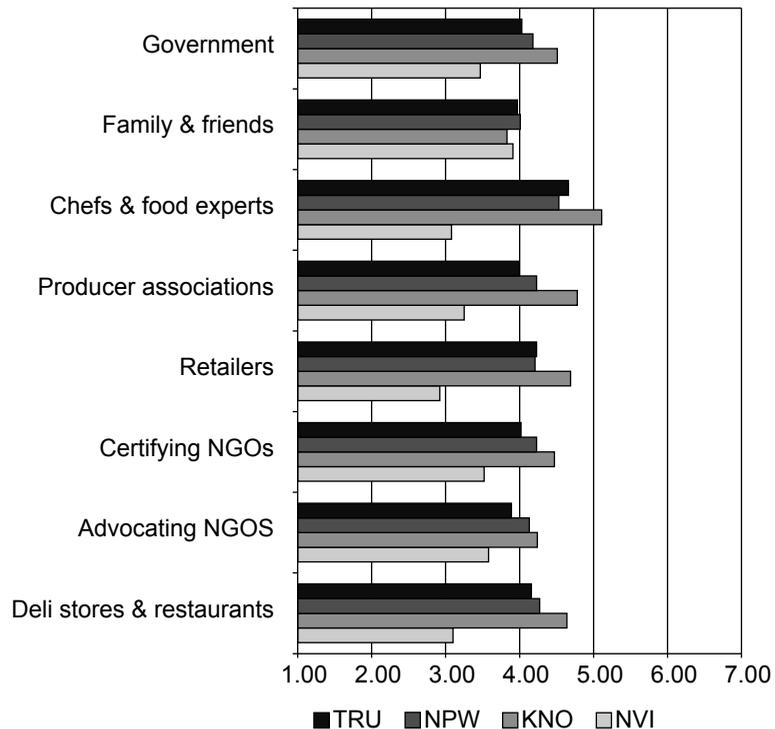


Figure 2. Descriptive statistics: consumer perceptions of eight pre-selected stakeholders.
Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

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Table 4. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for government.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
Value origin	male	-0.15**	0.05
	age	0.21**	0.07
	education	0.11**	0.05
Value naturalness	value origin	0.49**	0.04
	male	-0.11**	0.05
	age	-0.09	0.06
Value sustainability	frequency consumption	-0.34**	0.08
	number of children	-0.03	0.04
	value origin	0.32**	0.04
	value naturalness	0.41**	0.04
	male	-0.02	0.04
Value flavor	age	-0.08	0.04
	frequency consumption	-0.15**	0.07
	value sustainability	0.15**	0.04
NVI	value origin	0.08**	0.03
	value origin	0.16**	0.04
KNO	frequency consumption	0.20**	0.09
	NVI	0.57**	0.03
NPW	KNO	-0.16**	0.05
	NVI	0.10**	0.05
	male	-0.08**	0.04
TRU	age	-0.11**	0.05
	NPW	-0.16**	0.04
	KNO	0.12**	0.04
CHOICE	age	0.13**	0.05
	trust	0.21**	0.04
	value origin	0.06	0.03

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=74.77$ on 61 d.f.; P -value for $\chi^2=0.109$.

CFI=0.982; RMSEA=0.024; RMSEA 90% confidence interval = (0.000; 0.039).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

choice (0.21). Second, males perceive more than females that the Government has been proven wrong in the past, but this results only in a very limited positive indirect effect on trust (-0.08*-0.16=0.01) and on brand choice. Moreover, they attribute less value than females to food origin (-0.09) and naturalness (-0.11) and so indirectly also to sustainability and flavor. Third, respondents consuming beef more frequently have a stronger perception that the Government has vested interests, which ultimately leads to a positive although limited indirect effect (+0.03) on brand choice.

Consumer perceptions of family & friends as information source

First, demographic variables do not have a direct effect on respondents' perceptions of family and friends as information sources for beef brand choices, while indirect effects mediated by food values are very limited (Table 5). Second, respondents valuing food origin are less likely to choose brands recommended by family and friends (-0.08). In turn, people valuing food origin are mainly elderly individuals (+0.11), females (-0.15) and highly educated

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Table 5. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for family & friends.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
KNO	NVI	0.40**	0.05
NPW	KNO	-0-06	0.05
	NVI	0.14**	0.05
TRU	NPW	-0-08	0.05
	KNO	0.43**	0.05
CHOICE	TRU	0.19**	0.04
	value origin	-0-08**	0.03

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=81.53$ on 61 d.f.; P -value for $\chi^2=0.034$.

CFI=0.953; RMSEA=0.034; RMSEA 90% confidence interval = (0.013; 0.044).

Legend: NVI = consumers’ perception that stakeholder has no vested interest; TRU = consumers’ perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

(+0.21) (Table 4). Third, respondents’ belief that family and friends are knowledgeable has a significant impact on trust, while the effect of their perception of vested interest and of being proven wrong in the past does not affect trust significantly.

Consumer perceptions of chefs and food experts as information source

Elderly people are less likely to choose beef brands advertised by chefs (-0.15) and trust chefs less than younger individuals (-0.10), even if they think they have not been proven wrong in the past (+0.13) (Table 6). Moreover, more

Table 6. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for chefs & food experts.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	frequency consumption	0.11	0.08
	value origin	0.06	0.04
KNO	male	0.09**	0.03
	NVI	0.49**	0.04
NPW	age	0.13**	0.05
	NVI	0.07	0.06
	KNO	-0.08	0.06
TRU	age	-0.10**	0.04
	KNO	0.38**	0.04
	NPW	-0.16**	0.03
CHOICE	age	-0.15**	0.04
	value origin	0.02	0.02
	TRU	0.11**	0.04

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=88.43$ on 61 d.f.; P -value for $\chi^2=0.022$.

CFI=0.951; RMSEA=0.037; RMSEA 90% confidence interval = (0.022, 0.049).

Legend: NVI = consumers’ perception that stakeholder has no vested interest; TRU = consumers’ perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

males than females consider chefs more knowledgeable (+0.09), and so indirectly trustworthy too (0.38*0.09=0.03).

Consumer perceptions of beef producer associations as information source

First, elderly respondents are more likely to choose these beef brands (+0.13), although elderly individuals trust them less than younger individuals (-0.07) (Table 7). Second, people valuing food origin (+0.13) and elderly people (+0.15) have a greater perception that beef producers' associations have no vested interests. Third, respondents consuming beef more frequently trust beef producers' associations more than low frequency consumers (+0.16).

Consumer perceptions of retailers as information source

Respondents with higher evaluations for food origin (mainly female, elderly individuals and individuals with a higher level of education) are less likely to choose beef brands recommended by retailers (-0.05) (Table 8). Second, elderly people have a lower level of trust in retailers (-0.07), but the indirect effect on their beef brand choice is very limited (-0.01). Third, individuals consuming beef more frequently perceive retailers as more knowledgeable (+0.17).

Consumer perceptions of certifying non-governmental organizations as information source

The effect of trust in the certifying NGO on beef brand choice is not significant at a 95% level, in contrast to the other sources of information (+0.05 with standard deviation = 0.03) (Table 9). This may be interpreted to mean that individuals on average do not necessarily need to build up personal trust in this type of organization certifying beef brands to direct their choice. Second, elderly people are less likely to choose a beef brand with an NGO certification (-0.10) and they have less trust in this type of organization (-0.15).

Consumer perceptions of advocating NGO as information source

Respondents who consume beef less frequently are less likely to choose brands endorsed by advocating NGOs (-0.09) (Table 10). Second, elderly people trust advocating NGOs less than younger individuals (-0.10), even if they think that these organizations have not been proven wrong in the past (-0.11). Third, there is a negative relationship between respondents' perceptions of advocating NGO being proven wrong in the past and trust in them (-0.15). That is, there is a large group of respondents that do not trust advocating NGOs even if they believe that they have not been proven wrong in the past.

Table 7. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for producer associations.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	age	0.15**	0.06
	value origin	0.13**	0.04
KNO	NVI	0.56**	0.03
	male	-0.05	0.04
NPW	NVI	0.10**	0.04
	age	-0.13**	0.05
TRU	frequency consumption	0.16**	0.07
	KNO	0.37**	0.04
	NPW	-0.13**	0.05
CHOICE	age	0.13**	0.04
	value origin	0.02	0.03
	TRU	0.09**	0.04

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=85.44$ on 62 d.f.; P -value for $\chi^2=0.026$.

CFI=0.969; RMSEA=0.029; RMSEA 90% confidence interval = (0.010; 0.043).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

Table 8. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for retailers.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	frequency consumption	-0.05	0.06
	value origin	0.07**	0.03
KNO	frequency consumption	0.17**	0.06
	NVI	0.42**	0.04
NPW	NVI	0.08	0.05
	NPW	-0.05	0.05
TRU	age	-0.07**	0.04
	KNO	0.46**	0.04
	NPW	-0.20**	0.04
CHOICE	age	0.04	0.04
	value origin	-0.05**	0.02
	TRU	0.10**	0.04

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=80.67$ on 62 d.f.; *P*-value for $\chi^2=0.056$.

CFI=0.973; RMSEA=0.026; RMSEA 90% confidence interval = (0.000; 0.040).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

Table 9. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for certifying NGOs.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	frequency consumption	-0.08	0.09
	value origin	0.14**	0.04
KNO	NVI	0.56**	0.03
NPW	age	0.12**	0.03
	NVI	0.16**	0.05
	KNO	0.17**	0.05
TRU	age	-0.15**	0.04
	KNO	0.55**	0.04
	NPW	-0.04	0.04
CHOICE	age	-0.10**	0.03
	TRU	0.05	0.03

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=97.62$ on 63 d.f.; *P*-value for $\chi^2=0.053$.

CFI=0.961; RMSEA=0.035; RMSEA 90% confidence interval = (0.020; 0.047).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

Table 10. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for advocating NGOs.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	male	-0.11**	0.05
	frequency consumption	-0.12	0.09
	value origin	0.16**	0.04
KNO	male	-0.09**	0.04
	NVI	0.50**	0.04
NPW	age	0.11**	0.05
	NVI	0.11**	0.04
	KNO	0.15**	0.05
TRU	age	-0.10**	0.05
	KNO	0.57**	0.04
	NPW	-0.15**	0.04
CHOICE	frequency consumption	-0.09**	0.04
	TRU	0.06**	0.02

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=72.70$ on 60 d.f.; P -value for $\chi^2=0.126$.

CFI=0.985; RMSEA=0.021; RMSEA 90% confidence interval = (0.000; 0.037).

Legend: NVI = consumers' perception that stakeholder has no vested interest; TRU = consumers' perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

Consumer perceptions of restaurants & deli stores as information source

The effect of trust in deli stores and restaurants on beef brand choice is not significant at a 95% level (Table 11). This may be interpreted to mean that individuals on average do not necessarily need to build up personal trust in restaurants or deli stores to influence their choice. Second, female respondents are more likely to choose beef brands with information from restaurants and deli stores (-0.03) and to perceive them as trustworthy (-0.06). Third, elderly individuals trust deli stores and restaurants less than younger people (-0.10), but the negative indirect effect on their final beef brand choice is very limited (less than -0.01).

5. Discussion of results

Overall, the results provide implications for company managers, policy-makers and other stakeholders in the US beef industry, based on: (1) how consumers link their perceptions of credibility to their choices; and (2) which consumer segments perceive and choose brands endorsed and/or certified by a certain stakeholder. As far as the latter is concerned, the results demonstrate that:

- Consumer perception that a stakeholder has no vested interests in promoting food quality is the key driver,

leading to perceptions that the stakeholder is also knowledgeable and trustworthy and ultimately leading to the beef brand choice (Tables 3-10). This is not in contrast with the results of the path model across stakeholders (Table 3; Figure 1). In contrast to the model across stakeholders, within each stakeholder category the relationship between perceptions of no vested interests and perceptions that the stakeholder is knowledgeable is positive. Accordingly, stakeholders as Government and family and friends, which are the most influential on consumers choosing beef brands, are also the ones mostly perceived to have no vested interests in promoting food quality (Figure 2). This implies that, independently of their role within the beef chain, stakeholders willing to influence US consumer beef brand choices should first aim to convince those consumers that they have no vested interest in promoting food quality.

- Surprisingly, consumer perceptions that the stakeholder was proven wrong in the past are negatively correlated with perceptions of trustworthiness (Tables 3-10, apart from the case of certifying NGOs and family & friends). This means that being proven wrong in the past does not undermine consumer trust in a stakeholder. Instead, making mistakes and recognizing them can strengthen trust. However, this negative effect is weaker than the previous point (although significant) and the conditions

Table 11. Results of the path analysis: demographic variables, measures of stakeholder credibility and brand choice –model for deli stores & restaurants.

Dependent variable	Independent variable	Std. parameter estimates	Std. deviation
NVI	Value origin	0.08**	0.03
KNO	NVI	0.46**	0.04
NPW	male	-0.05	0.04
	NVI	0.08	0.05
TRU	KNO	-0.11	0.06
	male	-0.06**	0.03
	age	-0.10**	0.04
	KNO	0.48**	0.03
CHOICE	NPW	-0.10**	0.03
	male	-0.03**	0.02
	age	0.04	0.02
	value origin	-0.02	0.01
	TRU	0.02	0.02

** = variables significant at 5%.

Goodness to Fit Indices: $\chi^2=74.21$ on 61 d.f.; *P*-value for $\chi^2=0.119$.

CFI=0.981; RMSEA=0.022; RMSEA 90% confidence interval = (0.000; 0.037).

Legend: NVI = consumers’ perception that stakeholder has no vested interest; TRU = consumers’ perception that stakeholder is trustworthy; KNO = perception that stakeholder is knowledgeable; NPW = perception of not proven wrong in the past.

under which making mistakes strengthens trust should be explored in future research. Based on existing research, handling a mistake by admitting it to the general public rather than ignoring or minimizing it can reduce consumer animosity and the risks of market loss (Hearit, 1995). Furthermore, it can be the opportunity to revitalize brands (Andrew and Kim, 2007) and to establish a more transparent and stronger relationship with the general public (Tybout, 1978).

- In the case of some stakeholders, namely certifying NGOs and restaurants/deli stores, consumer trust is has no significant impact on consumer choices for beef brands (Table 9 and 11). This implies that some consumer segments choose or do not choose beef brands recommended by restaurants/deli stores or certified by NGOs independently of their credibility perceptions of these stakeholders. For NGOs and restaurant managers investing in the promotion of food quality, this implies that they may want to consider focusing only on communicating with consumer segments that choose brands advertised by them rather than attempting to change the perceptions of other consumer groups.

In relation to consumer segments perceiving and choosing brands with endorsement/certification from different stakeholders, the results demonstrate that:

- Age is a key variable segmenting US consumers’ perceptions of stakeholder credibility. Overall, elderly consumers trust stakeholders promoting food quality less than younger consumers, therefore younger consumers are more influenced by stakeholder recommendations and certifications when making their beef brand choices. Elderly consumers are more likely to choose brands with Government and producer association certifications, while younger consumers choose brands endorsed by chefs and food experts. Moreover, elderly consumers perceive advocating NGOs and deli stores/restaurants as less trustworthy than younger consumers.
- Gender also matters to some extent. Overall, more women than men perceive stakeholders that promote food quality as having higher vested interests. Women are more likely to trust and choose beef brands endorsed by deli stores and restaurants. Moreover, they consider advocating NGOs as more knowledgeable. Men, on the other hand, perceive chefs and food experts as more knowledgeable.
- Frequent beef consumers perceived stakeholders promoting food quality as more knowledgeable. As regards the specific stakeholders, they choose beef brands that are not endorsed or certified by advocating NGOs and the Government, which is perceived to have higher vested interests.

- Consumer evaluations of food origin as quality attribute matter. The higher the evaluation of food origin, the more consumers choose beef brands with producer association certifications and the less they choose brands recommended by retailers and by family and friends. Consumers with higher evaluations of food origins are mainly women, the elderly and the higher educated.

These results provide managers of the pre-selected stakeholders with key demographic information to orient their brand marketing communication strategy in promoting food quality. Depending on their mission and market role, stakeholders may consider focusing only on consumer segments already perceiving their credibility and choosing beef brands recommended by them or instead on persuading the consumer segments that do not perceive such a credibility.

For policy-makers, these results imply that:

- The US Government as certifying information source plays an important role in US beef consumer choices and is regarded as a more trustworthy, knowledgeable stakeholder with limited vested interests relative to other actors. Therefore, it is recommended that policy-makers continue to play such a certifying role in the beef sector.
- As consumer perceptions of stakeholder credibility overall influence their choices of beef brands, it is recommended that policy-makers encourage information flows (such as consumer reports, investigations and scientific surveys) helping consumers to build and update their perceptions on credibility of stakeholders when promoting food quality.

6. Conclusions and implications

The growing role of actors outside the chain signaling intangible yet valuable attributes of food (Dentoni and Reardon, 2010; Grunert, 2002,) and the stronger interrelationships among organizations needed to tackle complex and dynamic societal challenges (Batie, 2008) make further research on stakeholder credibility in agri-food systems timely. This study takes the perspective of US consumer choice of beef steak brands, and investigates: (1) which stakeholders inside or outside the food chain are perceived as credible information sources in promoting food quality; (2) which consumer segments perceive different stakeholders as credible; and (3) what the relationship between consumers' perceptions of stakeholder credibility and their brand choices is.

The results can be summarized in two key points. First, perceived credibility is a multi-dimensional concept that

cannot be operationalized as a latent factor with measures of perceived expertise, trustworthiness, objectivity and past behavior of a stakeholder (Kelman and Hovland, 1953; Pornpitakpan, 2004; Sobel, 2005). Measurement models of credibility including a larger number of items may lead to different results (Pornpitakpan, 2004), as this study used single items for the four dimensions of credibility. With the four-item measure used, the results provide evidence that some stakeholders are perceived to have no vested interests but not to be knowledgeable in promoting food quality, and vice versa for other stakeholders. For each stakeholder, perceptions of past behavior are negatively associated with the extent to which consumers trust them in promoting food quality. Consistent with the existing literature (Dholakia, 1986; Pornpitakpan, 2004), US consumers' perceptions of stakeholder credibility overall influence their beef brand choices.

Second, consumers' perceived credibility of eight pre-selected stakeholders in the US beef steak market influences their choice of beef steak brands. Government and word-of-mouth from family and friends are the most influential credible and information sources for US consumers, although a number of other stakeholders (chefs and food experts, producer associations, retailers) are influential too for large segments of US consumers. Furthermore, US consumers are significantly segmented in terms of age, gender, education, frequency of beef consumption and evaluations of food origin when they perceive and choose beef steak brands. As a point of caution, in the choice task the stakeholder claim was the only information available about the beef steak alternatives, while in the real world consumers are exposed to multiple claims and information about the product simultaneously. This may possibly lead to an overemphasis on the impact of stakeholder claims on consumers' beef brand choices.

These two key results contain implications that managers, their stakeholders and policy-makers can directly apply in their marketing and promotion campaigns in the US beef sector. First, the results suggest that beef brand managers should choose their third-party information sources depending on the consumer segment that they are targeting. If they are targeting young consumers, managers should stimulate word-of-mouth about the beef brand, for example through social media and entrepreneurial forms of marketing. Also, chefs and retailers are influential stakeholders for promotion to youth. If they are targeting elderly consumers, managers should acquire Government-issued labels such as USDA or state-owned labels 'Ohio Proud' (not used on meat yet, though), or alternatively producers' association labels. Second, stakeholders

are recommended to take into account the trade-off between consumers' perceptions of vested interest and knowledgeability. On that basis, they can also identify the target groups that they can influence more, depending on their strategy. For example, certifying organizations can decide if they want to keep influencing mainly younger consumers or instead target an elderly segment of population. Third, policy-makers along with beef producer associations may decide to raise awareness on their beef labels among younger consumers. For example, (local or federal) Government and producers' associations could design tailored generic promotions that reach and influence younger consumers in particular. As part of this strategy, policy-makers can facilitate the interaction and network development among managers in the beef sector and the other influential stakeholders so that effective promotion campaigns can be designed for consumers. Beyond this specific case of US consumers assessing beef brands and stakeholder credibility, the path model introduced in this paper represents a new method for food managers and policy-makers to assess how the credibility of their stakeholders influences their brand choices, while taking into account the demographic segmentation. By replicating this method, managers and policy-makers in the food sector at large can develop strategies to identify and engage with credible stakeholders and to gain credibility themselves.

Overall, these results may open new directions of research in the food marketing literature. A number of studies analyze the impact of stakeholders' claims and certifications on consumer choices and willingness to pay for food products (Bonnet and Simioni, 2001; Loureiro and McCluskey, 2000; Loureiro and Umberger, 2005; Lusk *et al.*, 2006; Mazzocchi *et al.*, 2008; Tonsor *et al.*, 2005; Verbeke and Ward, 2006), but none has examined the role of perceived stakeholder credibility on consumers' food purchasing intentions. Future research may analyze the impact of consumers' perceptions of different stakeholders on their willingness to pay for food products promoted or certified by them.

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