Advance Journal of Food Science and Technology 8(10): 751-757, 2015
DOI:10.19026/ajfst.8.1602
ISSN: 2042-4868; e-ISSN: 2042-4876

Submitted: January 19, 2015 Accepted: February 14, 2015 Published: July 10, 2015

Research Article

Trust in Online Food Purchase Behavior: An Exploration in Food Safety Problem for Produce E-retailers

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Abstract: This study develop a theoretical framework describing the trust-based decision making process when a consumer makes a purchase from a given food website. Online food safety problems have become increasingly prominent, which has brought great harm to online food shopping. Survey data from 374 subjects were used to test the proposed model and structural equation modeling was performed to analyze the measurement and structural models. The findings show that trust in the website and trust in the vendor are critical determinants of perceived risk and intention to purchase. Furthermore, the majority of the antecedents are positively affecting consumer trust. These findings show that the food vendor and website managers can enhance trust by providing a secure and user-friendly food shopping environment.

Keywords: Consumer trust, food safety, online food shopping, perceived risk

INTRODUCTION

Nowadays, with the growth and associated advantage of e-commerce, online food retailing is growing at an unprecedented rate and the volume of transactions in food websites is expending. Offering benefits such as convenience and low price, food websites are able to provide high quality food to consumers. Examples of online food retailing websites include Ocado (ocado.com in Europe), Sfbest (Sfbest.com in China) and AmazonFresh (amazonfresh.com in US).

However, in online food purchasing, it has become difficult for the general consumers to build effective trust mechanism using traditional methods such as smell, taste or other physical attributes of food. With the safety of food now commonly recognized as credence attribute, which is hard to be assessed online (Ramus and Nielsen, 2005; Zaohong and Huiyuan, 2013). Related studies have examined the effect of trust in e-commerce (Gefen *et al*., 2003; Kim *et al*., 2008; McKnight *et al*., 2002). Given that buyers face realistic concerns, we seek in this study to understand what steps can be taken to increase buyers' trust and reduce their food risk perceptions so as to build effective online food websites.

Trust in online marketing involves a consumer's perceived reliability on the brand, products, or services of vendors (Gefen *et al*., 2008). Specifically, pervious research suggest that, depending on the stakeholders in an online transaction, trust can be classified into a variety of types (Hsu and Chen, 2014; McKnight *et al*., 2002). In online food purchasing environment, there will typically be two parties involved, the online food marketplace and the online food suppliers (Hong and Cho, 2011). However, relatively little specific attention has been paid for these two types of trust in online food shopping. Therefore, one of the interests of this study is to identify the two types of trust which would affect consumers' purchase intention.

Furthermore, understanding the antecedents to the two types of trust in online food shopping also constitutes an important research issues. Prior studies focusing on different IT tools which can reduce customers' perceived risk and promote consumers' trust in online purchasing behavior. For example, Pavlou and Gefen (2004) proposed that website mechanisms are significant predictors of consumer trust in the e-marketplace. Chen and Huang (2013) argued that perceived effectiveness of food traceability mechanism is major determinant of consumer trust in food purchasing. Therefore, it is believed that understanding the antecedents to the two types of trust in online food shopping context would provide meaningful insights into the trust formation process.

This study explores the trust formation process and the impact of buyer's trust in food shopping context on consumer purchase behavior. It focuses on the following two research questions which will be answered through an empirical study:

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- What are the different types of trust involved in online food shopping and do they exert any affect on consumers' perceived risk and purchase intention?
- In food e-marketplace, how do the antecedents identified in this study affect trust in vender and trust in food seller? To answer these questions, we focus on an online food-buying site in China (i.e., Taobao Fresh website) to examine our research model.

MATERIALS AND METHODS

In this section, the hypotheses that pertain to the new research model are developed. Based on the above discussion, Fig. 1 provides a pictorial depiction of this research framework. The first hypotheses specify the expected relationship between perceived risk and purchase intention. Hypotheses 2a, b and 3a, b specify the expected relationships among two types of trust, perceived risk and purchase intention. Finally, the rest of hypotheses specify the expected relationships between the antecedents and trust.

Perceived risk: Perceived risk is an important barrier for the customers who are considering whether to buy food online. Perceived risk is defined as a consumer's belief about the potential uncertain negative outcomes from the online transaction (Cho, 2011). This concept appeared in the marketing literatures various types of risk have been identified. A consumer's perceived risk has been found to influence his or her online decisions (Antony *et al*., 2006). It is common for a customer who is making an online transaction to be reluctant to purchase on the website because the sense of risk may be too much when compared to the traditional mode of shopping. Thus, it should not be surprising that consumers will be attentive to risk in online transactions and such risk may influence their decisions about whether or not to purchase from an online vendor. Therefore, we hypothesize that.

Hypothesis 1: A consumer's perceived risk negatively affects a consumer's intention to purchase online food.

Trust: According to Chen and Huang (2013), positive effects of trust in an online merchant on a buyer's intention to purchase from that merchant can be hypothesized under three preconditions. First, making a purchase can be considered to be a form of perceived risk. Second, making a purchase can be considered to constitute a form of relationship. Third, purchase intention is a strong proxy of making an actual purchasing. In general, customer's trust can reduce perceived risk and increases the intention of purchase (Pavlou and Gefen, 2004). According to Hsu and Chen (2014), trust can be separated by stakeholders, such as website, group members, consumers and sellers. In online food shopping environment, the target of trust can be categorized into two types: trust in the website (Hsu and Chen, 2014) and trust in the vendor (Kim *et al*., 2008). As a result, it is reasonable to state the two type of trust will affect consumers' intention to purchase.

Hypothesis 2a: A consumer's trust in vendor positive affects the consumer's intention to purchase online food.

Hypothesis 2b: A consumer's trust in the website positive affects the consumer's intention to purchase online food.

Based on the Hsu and Chen (2014) trust leads to positive intention towards transaction behaviors in online shopping. In addition, Pavlou (2003) argued that trust in the vendor can positively affect shoppers' attitude and intention towards the online sellers. Following.

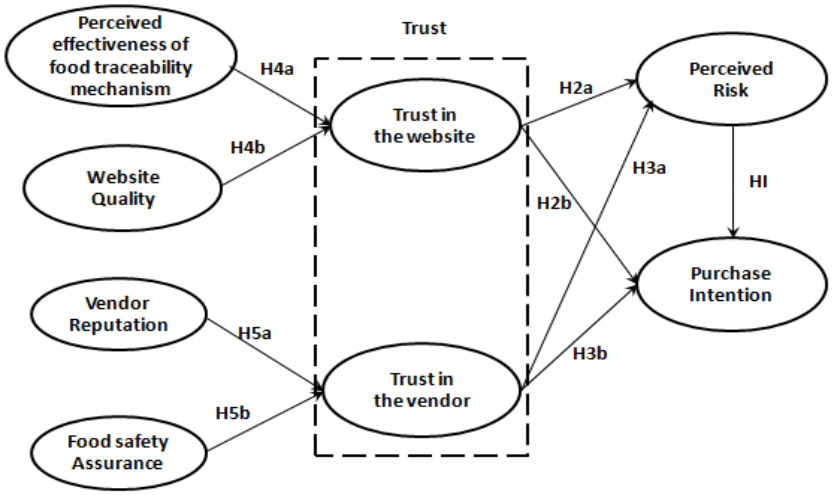

Fig. 1: Research model

At the same time, trust can increase the perceived benefit (Hong and Cho, 2011; Kim *et al*., 2008). Hsu and Chen (2014) concluded that there is negative relationship between seller trust and attitude toward perceived risk. Meanwhile, in the online food shopping environment, a trusted site with sufficient security and information protection mechanisms can reduce the risk and enhance consumers' confidence in purchasing. Hsu and Chen (2014) suggested that trust in the website is negative related to consumers' perceived risk. Based on these findings, we propose the following hypotheses.

Hypothesis 3a: A consumer's trust in vendor negative affects the consumer's perceived risk of online food purchase.

Hypothesis 3b: A consumer's trust in the website negative affects the consumer's perceived risk of online food purchase.

Perceived Effectiveness of Food Traceability Mechanism (PEFTM): The food traceability mechanism in the website can provide detailed information on food production, processing, transfer and distribution, such as the birthplace of food, date of sale and other food-related information (Chen and Huang, 2013; Du and Zhu, 2013). Though food traceability mechanism itself cannot preclude the possibility of food safety crises, it can help online food buyers to discover the crux of a food safety problem promptly and mitigate the perceived risk in the online food purchase. Because of high risk of food purchase, many people rely on the food traceability mechanism to prompt their trust in the online food purchase. Thus, it is hypothesized that.

Hypothesis 4a: A consumer's perceived effectiveness of food traceability mechanism is positive related to his/her trust in the website.

Website quality: Website quality is defined as the degree to which a website offers information and service buyers perceived as useful (Hsu and Chen, 2014). To enhance consumer's trust in online food purchase, online marketplace send signals that reveal their true characteristics, products and selling practices and information policies. If the information conveyed by these signals is deemed useful, these signals enhance the buyer's perception of online food website quality (Cho, 2011). Therefore, website quality captures the information conveyed by signals that is trustworthy to potential buyers. While applying these views to online food shopping contexts, it is believed that website quality can enhance consumer's perceived trustworthy in website, because food website with high quality can send signals that aim to reduce online food consumer's perceived risk. Accordingly, the following hypothesis is proposed.

Hypothesis 4b: The online food website quality is positively related to his/her trust in the website.

Reputation: The reputation of a vendor is the perception a customer has about an organization (Barnes and Hinton, 2007; Gefen *et al*., 2008). In the offline world, reputation is a valuable asset that requires a long-term investment of resources, effort and attention to customer relationships and indicates past forbearance from opportunism which in turn generates trust. This trust emerges from the belief that firms with a good reputation are reluctant to risk their good will by acting opportunistically as the costs of untrustworthy behavior are perceived to be higher for firming that already have a good reputation. In e-commerce, a company's reputation is perhaps even more critical to the customer's evaluation of the company's credibility and greater risks in a virtual environment.

Hypothesis 5a: A consumer's perceived reputation in the vendor positively affects the consumer's trust in the vendor.

Food safety assurance: The presence of an Internet food vendor provided by a third-party certifying such as consumer union, or food safety administration department (Hsu and Chen, 2014; Kim *et al*., 2008). Recently, a wide variety of safety assurances have been introduced to help reduce consumer risk in online food shopping context. The purpose of food safety assurance is to help promote consumers' perceived trust in online food buying (Liang and Lim, 2011). An example of food safety assurance is ISO 22000, a non-profit comprehensive assurance program which control the food safety along the food chain. The display of a food safety assurance such as ISO 22000 indicates to consumers that the online vendor will make a sincere effort to uphold its transactional obligations, which should increase the buyers' trust in the vendor. Based on the above arguments, we propose that.

Hypothesis 5b: The presence of a food safety assurance is positively related to a buyer's trust in the vendor.

Following the above hypotheses, Fig. 1 describes the proposed model of this study.

RESULTS AND DISCUSSION

Data collection and research methodology: To test the theoretical framework, we chose members of an online food site, "Taobao fresh" (www.chitaobao.com) as our research subjects. The reason for choosing this site is that it is one of the most well-known online food marketplace in Asia. To date, the site's number of food sellers has grown to 2500,000 and site's food sales volume has exceeded US$5 billion. By the time the

Table 1: Descriptive statistics

Construct	Item	Factor loading	Composite reliability	AVE	Cronbach's α
Purchase intention	PI1	0.908	0.906	0.771	0.849
	PI2	0.911			
	PI3	0.808			
Perceived risk	PR1	0.771	0.832	0.589	0.748
	PR2	0.884			
	PR3	0.813			
Trust in the website	TW1	0.905	0.907	0.766	0.846
	TW2	0.901			
	TW3	0.810			
Trust in the vendor	TV1	0.831	0.815	0.595	0.862
	TV2	0.749			
	TV3	0.859			
Perceived effectiveness of food traceability mechanism	SU1	0.838	0.892	0.675	0.844
	SU2	0.851			
	SU3	0.772			
	SU4	0.822			
Website quality	WQ1	0.862	0.886	0.662	0.827
	WQ2	0.885			
	WQ3	0.777			
	WQ4	0.716			
Vendor reputation	RE1	0.814	0.872	0.581	0.823
	RE2	0.822			
	RE3	0.862			
	RE4	0.674			
	RE5	0.604			
Food safety assurance	FSA1	0.865	0.889	0.668	0.832
	FSA2	0.846			
	FSA3	0.850			

survey was completed, 374 valid questionnaires had been collected for data analysis.

In order to ensure the validity and reliability of the scales, measurement items were adapted from prior literature. Perceived effectiveness of food traceability mechanism was measured with four items from Choe *et al*. (2013), website quality was assessed with four items from Liang and Lim (2011) and vendor reputation was adapted from Jarvenpaa *et al*. (2000). Four items for food safety assurance were adapted from Popper *et al*. (2003). Trust in the website was assessed using three items adapted from Pennington *et al*. (2003), trust in the vendor was adapted from Jarvenpaa *et al*. (2000) and perceived risk was adapted from Gefen (2002). At last, intention to purchase was measured using three item developed from Gefen (2002). All the items were measured using a five-point Likert scale.

Data analysis results and discussion: Partial Least Squares (PLS) analysis, a component-based Structural Equation Modeling (SEM) technique, was applied to test the measurement model and research hypotheses. PLS is more amenable for analyzing complex relationships and model under development our study than covariance-based SEM techniques such as LISREL.

The sample included 144 men and 230 women and the mean age is 32.4 with a range from 20-51 years. About 81.4% of subjects showed some college and above as their highest education comp.

Measure model: To assess the internal consistency of each construct, Composite Reliability (CR) and Cronbach's α were calculated. Fornell and Larcker (1981) suggested that the commonly acceptable threshold level for these tests is 0.7. As shown in Table 1, all the values of CR and Cronbach's α exceed 0.7.

Further, we test the discriminate validity and convergent validity. To test convergent validity, we exam the Average Variance Extracted (AVE). Table 1 illustrates that for each construct, the AVE values was greater than the cut-off value of 0.5 (Fornell and Larcker, 1981). To test discriminate validity, we compared the squared root of AVE for each construct with its cross-correlation with other constructs. As shown in Table 2, all the diagonal values exceed the inter-construct correlation, thus satisfying the criteria to establish discriminate validity (Fornell and Larcker, 1981).

Structural model: The proposed tested through the PLS structural model. To test the significance for all paths, the bootstrap procedure with replacement using 1000 was implemented. Path estimates and t-statistics were calculated for hypothesis testing. The results are presented in Table 3 and Fig. 2.

In Table 3 and Fig. 2, we see all the hypotheses were supported. Consumers' perceived risk toward online food shopping significantly and negatively affects intention to purchase, with a path coefficient of -0.183 ($p<0.01$), supporting H1. Moreover, trust in the website, trust in the vendor are both positively affect intention to purchase, with path coefficients of 0.236 ($p<0.001$), 0.253 ($p<0.001$), supporting H2b, H3b. In terms of perceived risk, the two types of trust are both

Table 2: Discriminate validity

Construct	PI	PR	TRW	TRV	PEFTM	WQ	RE	FSA
PI	0.878							
PR	-0.296	0.767						
TRW	0.275	-0.246	0.875					
TRV	0.351	-0.291	0.412	0.771				
PEFTM	0.145	-0.108	0.222	0.334	0.821			
WQ	0.114	-0.090	0.403	0.274	0.251	0.814		
RE	0.177	-0.101	0.452	0.465	0.302	0.305	0.762	
FSA	0.118	-0.155	0.258	0.285	0.114	0.174	0.259	0.817

Table 3: Result of hypothesis testing

Hypothesis	Path	Supported	Path coefficient (t-value)
H1	Perceived risk→purchase intention	Yes	-0.183 (2.99)**
H2a	Trust in website→perceived risk	Yes	-0.152 (2.71)**
H2b	Trust in website→purchase intention	Yes	0.236 (3.81)***
H3a	Trust in vendor→perceived risk	Yes	-0.228 (3.44)***
H3b	Trust in vendor→purchase intention	Yes	0.253 (4.53)***
H4a	PEFTM→trust in website	Yes	0.372 (6.91)***
H4b	Website quality→trust in website	Yes	0.128 (2.49)*
H5a	Vendor reputation→trust in vendor	Yes	0.177 (3.01)**
H5b	Food safety assurance→trust in vendor	Yes	0.419 (8.37)***

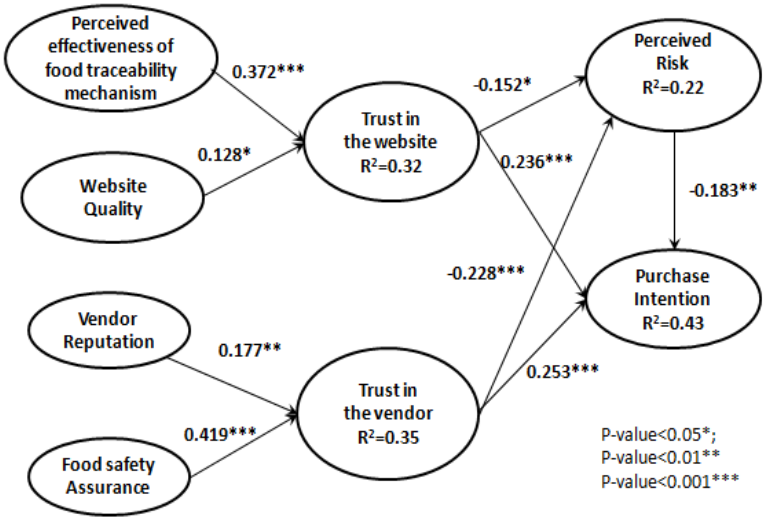

Fig. 2: Result of path coefficients

negatively associated with perceived risk, with path coefficients of -0.152 ($p<0.05$), -0.228 ($p<0.001$), thus supporting H2a, H3a, in that order.

Turning now to the antecedents of the two types of trust, perceived effectiveness of food traceability mechanism and website quality both exert a positive effect on consumers' trust in the website, with path coefficients of 0.372 ($p<0.001$) and 0.128 ($p<0.05$), supporting H4a, H4b. Vendor reputation and food safety assurance are both positively associated with consumers' trust in the vendor, with path coefficients of 0.177 ($p<0.01$) and 0.419 ($p<0.001$), thus supporting H5a, H5b.

The explanatory power of the research model is also displayed in Fig. 2. Our research model explained 32% of the variance in trust in the website and 35% in trust in the vendor. Moreover, R^2 was 22% when the two type of trust were used to predict perceived risk. In addition, R^2 values indicate that together, the two types of trust and perceived risk explained 43% of the variance in consumers' purchase intention, showing that they are powerful predictors.

CONCLUSION

The purpose of our study is to provide a better picture of factors influencing behavioral decisions in online food shopping. Based on the model of "antecedents-trust-outcomes", we proposed and empirically tested a model of behavioral intention in a food-buying website and, by doing so, understanding the important of the two types of trust and the antecedents of each type of trust. Overall, the results provide robust support for the fitness of the proposed model and a number of findings are worth discussing:

- The study shows that trust in the website and trust in the vendor directly affect perceived risk. Also,

perceived risk is found to be negatively associated with purchase intention. This is consistent with scholar's arguments (Hsu and Chen, 2014), that trust has positively effect on the consumers' purchase intention. The empirical results suggest that a consumer's trust directly and indirectly affects his or her purchasing intention. In other words, those food e-marketplaces and vendors should undertake all practicable initiatives to alleviate consumers' perceived risk and promote consumers' trust.

- Both perceived effectiveness of food traceability mechanism and website quality exert a positive effect on consumers' trust in the website. Additionally, PEFTM has a stronger direct influence on consumers' trust in the website than website quality. One plausible explanation for this might be that consumers pay more attention to food safety than website quality. As long as the e-marketplace is able to satisfy their particular needs in these online mechanisms, website quality is not a major concern for them when buying food online.
- Regarding the antecedents to the trust in the vendor, our results indelicate that both vendor reputation and food safety assurance are major enabling factors for trust in the vendor. To our surprise, the food safety assurance has a stronger direct influence on consumers' trust in the website than vendor reputation. This result adds to the food safety literature by addressing the call for identifying the relationship between food safety certificate and consumers' trust (Kim *et al*., 2008).

There are some limitations of this research to consider. First, we only collect the data from a special food-buying website which already enjoys a reputation as an established site. Future research can replicate this study across a wider variety of food-buying websites to verify the generalizability of our findings. Second, as an exploratory study, this study explored the antecedents behind consumers' trust and purchase intention; however, the model does not consider other aspects of these antecedents such as service quality, website security and privacy protection. Future research is encouraged to consider how these alternative antecedents affect consumers' trust in the website and trust in the vendor.

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