

Consumers value healthy eating and environmental responsibility: how negative food contexts aid decision-making

Huy Duc DANG^{1*} , Giang Thanh TRAN¹

Abstract

The research aims to explore consumers' intention toward traceable food in the dual context of the animal disease outbreak (i.e. African Swine Fever - ASF) and the current food safety issues. An extended Theory of Planned Behavior (TPB) model was used to predict purchase intention/attitude toward traceable pork. The study employed the structural equation modeling (SEM) to extract insights from the dataset of 230 students in Vietnam. The current detrimental context of food safety deemed promoting the consumption of traceable food, a risk-mitigating alternative. Healthy and environmentally responsible consumers held positive standpoints toward traceable pork as a solution to fulfill their responsibility with the environment and healthy eating lifestyle. The extended model was promising in explaining 52% of the variance of the purchase intention. The study confirmed both the positive impacts of the long-lasting unsafe food issues and the short-term animal disease outbreak on intention toward traceable food. To promote traceable food, industry food marketers should tailor their marketing and communication strategies to target healthy and responsible eaters.

Keywords: food safety concern; risk perception; healthy eating; environmental responsibility; theory of planned behavior.

Practical Application: Provide suggestions to promote traceable food in negative food contexts.

1 Introduction

Food contamination and food poisoning have been causing serious problems (My et al., 2017; Nga & Tuan, 2019) and deteriorate consumers' confidence in Vietnam (Ifft et al., 2009; Dang et al., 2019). Food safety incidents and scandals in the pig rearing industry have been reported with unsafe practices such as the use of beta-agonists and antibiotic residues (Nguyen et al., 2015; Nga & Tuan, 2019). Also, evidence was found on the severe impact of pig farms on the environment. For example, the practice of releasing contaminated animal waste into the environment leads to environmental contamination, specifically the surface or underground water, or the discharge of excessive unprocessed biogas directly into the air could be a contribution to climate change. Thus, the environmental sustainability aspect of producing food emerges in Vietnam as well as in many other territories around the world (My et al., 2017). Moreover, the contemporary food safety concerns in Vietnam could be exacerbated with the presence of the health risk of contracting animal diseases (e.g. the African Swine Fever – ASF) during its outbreak commenced in February 2019 and later spread over 63 cities and provinces in Vietnam and ended up with the culling of 4.5 million infected pigs (BBC News, 2019). In late May 2020, the recurrence of the ASF disease was reported in 20 provinces in Vietnam. In this escalating food safety-related context, experts recommended the investigation of consumers' perceptions into the health and safety-related aspects (My et al., 2017) due to the increasing concern of consumers worldwide about the quality, safety, and environmental friendliness of foods (Teng & Lu, 2016). While a myriad of studies has analyzed health- and environmental relevant

factors for the purchase intention of organic and functional food, no attempt was made toward traceable food, which was believed to be trustworthy, transparent, accurate (Chen & Huang, 2013), and a potential solution to food safety issues (Dang et al., 2019). Furthermore, limited studies examine consumers' purchase intention toward traceable food, particularly in the context of animal disease outbreak. This study sets out to bridge these gaps. The results of this article could assist traceable food marketers in developing pertinent marketing and communication strategies.

1.1 Theory of planned behavior

The TPB is proven to be a useful tool and widely applied in studying consumers' behaviors and intentions in multiple fields. The TPB was expanded with new variables such as risk perception (Lobb et al., 2006, 2007; Spence et al., 2018); health consciousness and environmental concerns (Wee et al., 2014; Yazdanpanah & Forouzani, 2015; Yadav & Pathak, 2016). The extended TPB model was successful in explaining consumers' behavioral intentions in food choices regarding traceable food (Menozzi et al., 2015; Spence et al., 2018) and organic food (Teng & Wang, 2015; Yadav & Pathak, 2016; Demirtas, 2019). However, studies that applied these valuable antecedents of behaviors in the dual context of long-lasting food safety issues and the outbreak of animal diseases (e.g. ASF) remain scarce. In addition, the impacts of mentioned determinants in predicting purchase behavior are likely to be distinct contingent on various commodities, specifically for traceable food. For this reason,

Received 24 June, 2020

Accepted 08 Aug., 2020

¹Economics Faculty, Nong Lam University, Ho Chi Minh, Vietnam

*Corresponding author: ddhuy@hcmuaf.edu.vn, simon.hdang@gmail.com

this research aims to fill this gap in examining the impacts of mentioned variables in the dual context of food safety on the purchase intention/attitude toward traceable food and can contribute to the mentioned body of literature.

The core variables of the TPB namely attitude, subjective norms, and perceived behavioral control were often found to have positive influences on consumers' intention (Menozzi et al., 2015; Spence et al., 2018; Demirtas, 2019). Among those variables, studies have highlighted attitude as the main determinant of consumers' purchase intentions (Lobb et al., 2007; Choi et al., 2013; Menozzi et al., 2015; Spence et al., 2018). Positive attitudes towards organic food (Teng & Wang, 2015; Yazdanpanah & Forouzani, 2015; Yadav & Pathak, 2016) and traceable meat (Spence et al., 2018) are likely to prompt a growing intention to purchase these products. Although the effects of subjective norms and perceived behavioral control on intention, significant or non-significant, vary across different researched population (Yazdanpanah & Forouzani, 2015; Yadav & Pathak, 2016), a positive relationship is generally expected (Menozzi et al., 2015). Hence, three first hypotheses on the effects of attitude, subjective norm and perceived behavior control on intention were built as followed:

H1: Attitude has a positive effect on intention to purchase.

H2: Subjective norms has a positive effect on intention to purchase.

H3: Perceived behavioral control has a positive effect on intention to purchase.

In general, risk perception affects negatively consumers' attitude (Lobb et al., 2007; Choi et al., 2013), and their food purchase intention (Choi et al., 2013) towards common food consumption because consumers perceive health-related risks from these food products (Lobb et al., 2006). A greater level of risk perceived could drive down the consumption of high-risk products. As shown by Lobb et al. (2006), the amount of chicken consumed decreased significantly owing to the avian flu. Consumers also act to mitigate risks through purchasing products with quality assurance or finding advice from reliable sources, thus reducing risks perceived by consumers and promoting the purchase likelihood (Yeung et al., 2010). Similarly, fast-food stores that adopted the traceability system tended to be safer in the eyes of the consumers, thus promoting a greater purchase intention (Chen & Huang, 2013). Consumers are also willing to pay more for traceable food (Choe et al., 2009; Dang et al., 2019). Consequently, traceability system is considered as a safer alternative (Buaprommee & Polyorat, 2016). Therefore, a reduction in perceived risks towards traceable food leads to a positive intention to purchase the food. On the other hand, the connection between risk perception, attitude, and intention was confirmed by (Lobb et al., 2007; Choi et al., 2013). Although consumers develop a negative attitude toward risky common food, on the contrary, traceable food-a risk-mitigating option- should be corresponding to a positive attitude. Hence, we hypothesize that risk perception affects positively on both attitude and intention towards traceable food.

H4: Perceived risk has a positive impact on attitude towards traceable food.

H5: Perceived risk has a positive impact on intention towards traceable food

Next, the disease outbreak and the appearance of food safety incidents raised consumers' concern about food safety (Hsu & Chen, 2014), along with motivating them to opt for safe food sources to minimize the negative impact on their health (Teng & Lu, 2016). As such, food safety concern is one of the important factors promoting the positive intention toward a healthy food option (i.e. organic food) (Hsu et al., 2016; Teng & Lu, 2016). As traceable food is also healthy food, we thus expect an analogous relationship between food safety concern and the intention toward traceable food.

H6: Food safety concern has a positive effect on intention.

An extensive body of literature identified the importance of health concern driving behaviors related to food (Hoek et al., 2017), and food purchase intention (Yadav & Pathak, 2016). The awareness and the growing concern about health-related issues could lead to a compliance of a healthy lifestyle (Chen, 2009), which encourage consumers to prioritize healthier products (e.g. organic food) (Yadav & Pathak, 2016; Singh & Verma, 2017). Also, the consumers, who are conscious about environmental protection, often develop the intention to pay for environmentally friendly products (Magnusson et al., 2003; Prakash & Pathak, 2017) or a positive attitude to high-quality rice as well as safe vegetables (My et al., 2017). While a large body of literature focused on the health- and environment-related factors elucidating purchase decision toward organic food (Hsu et al., 2016; Teng & Lu, 2016; Yadav & Pathak, 2016), none examines the impacts of these elements on traceable food choice. It is worth discussing that traceable food is often associated with good agricultural practices, which results in unarguable benefits regarding quality, health, and environmental protection (Buaprommee & Polyorat, 2016), identical to that of organic food. For the mentioned rationale, we hypothesize that consumers, who pay heed to the importance of healthy eating and the related environmental consequences, would develop optimistic intentions toward traceable food.

H7: Perceived importance of healthy eating has a positive effect on intention.

H8: Perceived importance of environmental consequences has a positive effect on intention.

The conceptual model can be seen in Figure 1.

2 Methodology

2.1 Sampling method and respondents' descriptive statistics

The stratified random sampling method was employed to collect data through a closed-end questionnaire in June 2019 during the ASF disease outbreak. Student respondents participated in the survey voluntarily without any monetary perks. On average, it took the participants 15-20 minutes to complete the survey. Each questionnaire was collected and thoroughly checked on-site to make sure all answers were valid and there was no missing data. The participants were recruited and filled out the questionnaire on campus.

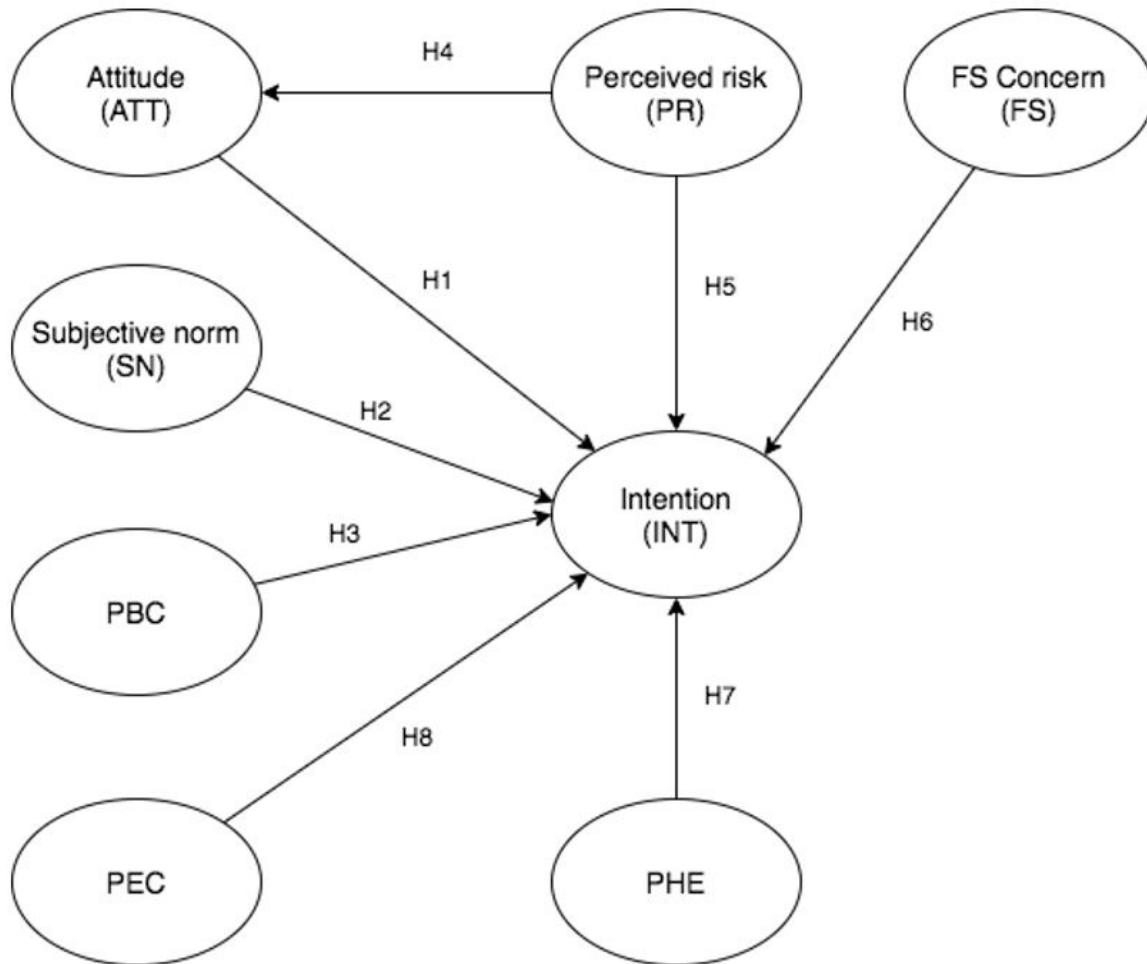


Figure 1. Conceptual framework.

A total of 230 students from Nong Lam University, in Ho Chi Minh City, participated in the study. 81 (35.22%) were male and 149 (64.78%) were female. There were 35 freshmen (15.21%), 76 sophomores (33.04%), 78 juniors (33.91%), and 41 seniors (17.82%). The majority of students earn less than 5 million VND/month (68.26%), while the rest earn 5-9.9 million VND/month (14.34%), 10-14.9 million VND/month (9.13%), and above 15 million VND/month (8.26%). Most students participated in the survey were not from Ho Chi Minh City (88.26%), only 11.74% were local students. All were aware of the existence of the ASF outbreak, either via family/friends, or the media. Those who did not know about the mentioned animal disease occurrence or never cook (or purchase pork) were excluded.

2.2 Description of traceable pork and the tracking system

To ensure the consistent understanding of terminologies and definitions, the interviewers first introduced the definition of traceable pork: "Unlike the traditional pork, traceable pork contains the history of the meat from farms to retailers. Tracking details can be retrieved through the QR code attached to the product by multiple compatible tracking apps (e.g. Te-food, iCheck, VietCheck)". An illustration showing the sample of the traceable

pork with the Te-food app was printed on the questionnaire before section two (Figure 2).

2.3 Variable measures

Items listed in Appendix A were rated on a 7-point Likert-type scale (1 'absolutely disagree', 7 'absolutely agree') except for attitude with a 7-point semantic differential scale with 5 different nuances.

Perceived healthy eating

Adapted from My et al. (2017, p. 77), the construct was measured using three statement items "It is important to me that the pork I eat on a typical day [...]" (1) is good for my physical and mental health; (2) keep me healthy; (3) is nutritious.

Perceived environmental consequence

Adapted from My et al. (2017, , p. 77), four measurement statements were used "[...] when you purchase/would purchase traceable pork how important is it that this helps to [...]" (1) improve the general state of the environment; (2) eliminate the

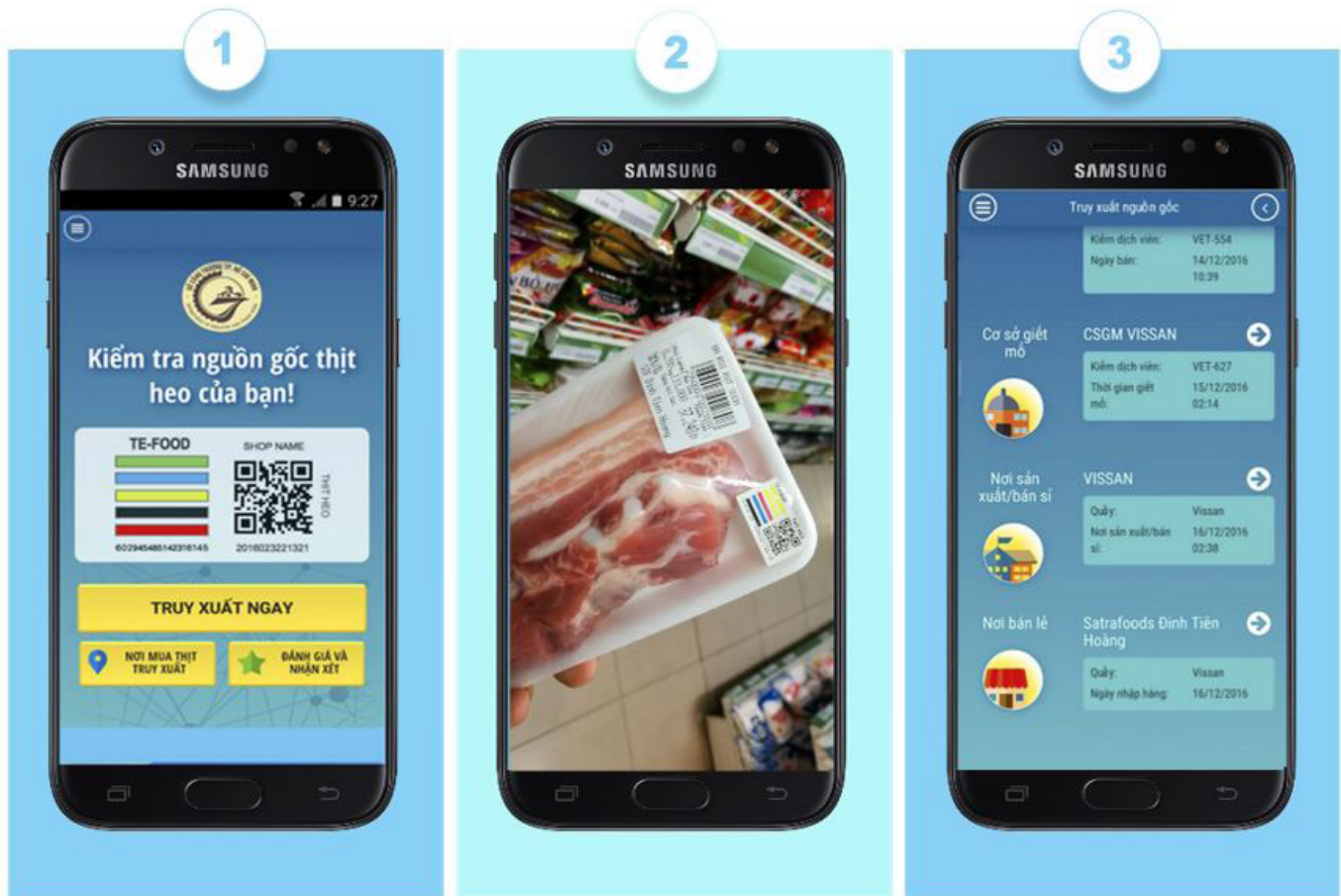


Figure 2. Traceable pork and Te-food app interfaces for pork. Three steps of traceability: (1) download the Te-food app from Appstore for iOS or Playstore for Android and open the app; (2) locate the Te-food stamp/QR code on the product; (3) retrieve traceability information of the product involving farms/slaughterhouses/wholesalers/retailers.

use of beta-agonist (super lean substance) in livestock farming; (3) reduce the over-use of antibiotics in livestock farming; (4) reduce contaminated waste in livestock due to the use of illegal or overdose substances (i.e. beta-agonist, antibiotics, hormone...).

Food safety concern

Adapted from My et al. (2017, p. 76) and Michaelidou & Hassan (2008), consumers' food safety concern was measured using three statements: "I am very concerned about the residue amount of beta-agonist (super lean substance) in pork", "[...] the quality of safety of pork nowadays concern me", and "I am very concerned about the residue amount of antibiotics in pork".

Perceived risk

Extended from Muringai & Goddard (2018), consumers' self-report risk perception of consuming meat from ASF infected pork was assessed with four possible consequences/symptoms: "high fever", "intense headache", "nausea", "gastrointestinal toxicity", and "meningitis". ASF does not cause zoonotic diseases. However, ASF contracted pigs are likely to be infected with other opportunistic diseases such as blue ear, swine flu, and typhoid fever, which can lead to mentioned symptoms once consumes.

Subjective norm

Adapted from Spence et al. (2018, p. 141), the social influence was measured using five statements "I would buy traceable pork because [...]" (1) my family, partner and friends approve; (2) university scientists are in favor of it; (3) the media (TV, radio) are in favor of it; (4) the food industry and/or food supermarkets promote it; (5) people important to me buy this type of pork.

Perceived behavioral control

Followed Spence et al. (2018, p. 141), this construct gauged the perception of the capability to comprehend information regarding the production process and origin of traceable pork. Six statements were used "[...] regarding the additional information about the production process and origin of traceable pork (obtained via the QR code)" (1) it will be easy to find the additional information; (2) I will be confident that I will find the additional information; (3) I will be able to find the additional information without help from others; (4) It will be easy to understand the additional information; (5) I will be confident that I will understand the additional information; (6) I will be able to understand the additional information without help from others.

Attitude

Consumers' attitude toward buying traceable pork compared to the conventional one available in the supermarkets was evaluated by five semantic differential scales under two categories of affectional (bad-good, unpleasant-pleasant, negative-positive) and cognitive perspective (foolish-wise, harmful-beneficial) (Van Loo et al., 2013; Spence et al., 2018).

Intention

Intention to shop traceable pork was assessed by diverse degrees of willingness to purchase or to increase the chance of buying.

2.4 Data analysis

The SEM analysis was performed using the partial least square (PLS-SEM) with WarpPLS software version 7.0. PLS-SEM is more superior than CB-SEM in dealing with non-normal data, small sample sizes, and the inclusion of formative indicators (Hair et al., 2014).

To test the reliability and validity of constructs, Cronbach's α , individual item loadings, the cross-loading matrix, and the square root of the average variance extracted (AVE) were employed. All Cronbach's α surpass 0.7 (Table 1), indicating adequate internal consistency (Hair et al., 2010). All items' loadings for constructs with values greater than 0.5 were considered acceptable (Table 2) (Hair et al., 2010). Significant convergent validity was confirmed as items load more internally rather than with other constructs in the cross-loading matrix (Kock, 2015). Adequate discriminant validity was evaluated using the AVE, which all exceeds the value of 0.5 for all constructs. Also, all the diagonal values of the square root of the AVEs of specific constructs were larger than the remaining correlation values with other constructs (Fornell & Larcker, 1981; Kock, 2015). The common method bias is also investigated, which is often originated from the measurement method rather than from the causality assessment of the studied model (Kock, 2015). The full collinearity test (FCT), which combines the classical collinearity and lateral collinearity to test both the predictor-predictor and predictor-criterion connections, was performed (Kock & Lynn, 2012; Kock, 2015). The combined variance inflation factor (VIF) greater than 3.3 signals the presence of the common method bias (Kock, 2015). The common method bias was not a problem as all full collinearity VIFs were smaller than 2.3.

3 Results

The model explains 15% of the variance for attitude, and 52% for intention to purchase traceable pork. Figure 3 exhibits the results of the hypothesized model. The results of the hypotheses investigation can be found in Table 3.

For H1-H3, while attitude ($\beta = 0.01$, $p = 0.418$) and subjective norm ($\beta = 0.03$, $p = 0.338$) presented no significant impacts on intention, perceived behavioral control ($\beta = 0.32$, $p < 0.001$) exhibited a significantly positive impact on intention. H4 supported the positive influence of perceived risk ($\beta = 0.38$, $p < 0.001$) on attitude, whereas H5 rejected the linking between perceived risk and intention. Regarding food safety concerns, H5 exhibited the positive impact of consumers' concern over food safety issues ($\beta = 0.32$, $p < 0.001$) on intention. H7 provided evidence on the positive relationship between the perceived importance of healthy eating ($\beta = 0.11$, $p = 0.042$) and purchase intention. H8 indicated that the impact of customers' perceived importance of environmental consequences on intention was significantly positive.

Model fit indices indicated the model was well-fitted, average path coefficient – APC (0.177, $p = 0.002$), average R-squared – ARS (0.334, $p < 0.001$), average adjusted R-squared – AARS (0.325, $p < 0.001$), average block VIF – AVIF (1.701), and goodness of fit – GOF (0.495), standardized root mean squared residual – SRMR (0.078) (see Table 4) (Kock, 2011a).

4 Discussion

4.1 Summary

The results of our research unveil that, for Vietnamese consumers, the perceived risk of consuming infected meat and the food safety concern positively influence attitude and intention, respectively. While attitude and subjective norms do not influence purchase intention, perceived behavioral control exhibits a significantly positive impact on intention. Besides, perceived the importance of healthy eating and environmental consequences have positive impacts on purchase intention toward traceable meat.

4.2 Theoretical implications

The findings from this paper contribute to the present body of literature by extending various antecedents of purchase

Table 1. Variance Inflation, Reliability measures (internal consistency) and correlations with square root of AVEs.

Construct	VIF	CR	CA	AVE	PR	FC	PHE	PEC	ATT	SN	PBC	INT
PR	1.982	0.919	0.889	0.693	0.833							
FC	2.078	0.940	0.904	0.839	0.601	0.916						
PHE	1.817	0.942	0.908	0.845	0.495	0.337	0.919					
PEC	2.231	0.944	0.920	0.807	0.571	0.486	0.606	0.898				
ATT	1.377	0.907	0.872	0.663	0.335	0.429	0.323	0.451	0.814			
SN	1.704	0.893	0.848	0.626	0.361	0.440	0.306	0.443	0.304	0.791		
PBC	1.312	0.932	0.912	0.697	0.225	0.162	0.368	0.267	0.084	0.393	0.835	
INT	1.796	0.916	0.884	0.686	0.368	0.539	0.356	0.485	0.308	0.546	0.270	0.828

Note: Full Collinearity Variance Inflation Factor (VIF), Composite Reliability (CR), Cronbach's Alpha (CA), Average Variance Extracted (AVE).

Table 2. Mean, standard deviation, and loadings.

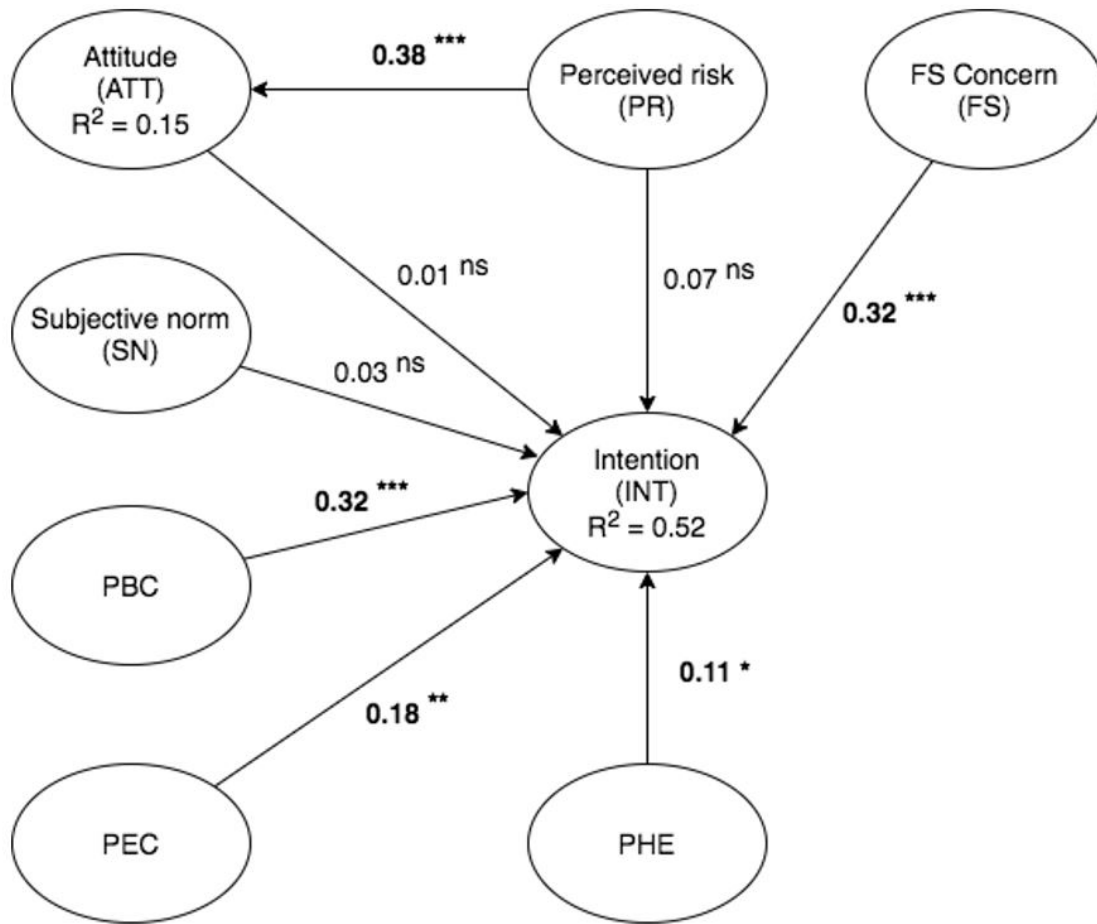
Construct	Item	Mean	SD	Load	P-value
PR	PR1	5.1	1.846	0.781	<0.001
	PR2	5.0	1.801	0.885	<0.001
	PR3	5.2	1.665	0.866	<0.001
	PR4	5.4	1.669	0.847	<0.001
	PR5	5.0	1.796	0.779	<0.001
FS	FS1	5.3	1.787	0.899	<0.001
	FS2	5.5	1.673	0.922	<0.001
	FS3	5.5	1.644	0.927	<0.001
PHE	PHE1	5.2	1.728	0.918	<0.001
	PHE2	5.3	1.568	0.943	<0.001
	PHE3	5.2	1.710	0.896	<0.001
PEC	PEC1	5.2	1.730	0.858	<0.001
	PEC2	5.4	1.619	0.915	<0.001
	PEC3	5.5	1.560	0.927	<0.001
	PEC4	5.5	1.604	0.892	<0.001
ATT	ATT1	5.4	1.599	0.796	<0.001
	ATT2	5.6	1.380	0.849	<0.001
	ATT3	5.7	1.323	0.841	<0.001
	ATT4	5.8	1.286	0.856	<0.001
	ATT5	5.6	1.526	0.723	<0.001
SN	SN1	5.2	1.811	0.742	<0.001
	SN2	4.8	1.582	0.858	<0.001
	SN3	4.8	1.585	0.857	<0.001
	SN4	4.8	1.655	0.797	<0.001
	SN5	4.7	1.828	0.688	<0.001
PBC	PBC1	4.5	1.857	0.766	<0.001
	PBC 2	4.4	1.816	0.842	<0.001
	PBC 3	4.3	1.751	0.867	<0.001
	PBC 4	4.3	1.745	0.866	<0.001
	PBC5	4.4	1.749	0.872	<0.001
	PBC6	4.3	1.968	0.791	<0.001
INT	INT1	4.9	1.728	0.818	<0.001
	INT 2	4.9	1.596	0.869	<0.001
	INT 3	5.0	1.564	0.867	<0.001
	INT4	5.2	1.632	0.856	<0.001
	INT5	5.5	1.688	0.721	<0.001

Note: SD stands for Standard Deviation; p-value is the probability value.

attitude/intention for meat with traceability. The current study also reports a number of meaningful drivers of behaviors including perceived risk, food safety concern, perceived the importance of healthy eating, perceived the importance of environmental consequences, along with the conventional core predictors of the TPB. The research elucidates the mechanism of how extrinsic and intrinsic factors affecting the decision-making process regarding traceable meat.

As very few studies in developing countries in South East Asia investigate how consumers make decisions regarding traceable meat, specifically the impacts of food safety environment and disease outbreak, this study, thus, bridge the gap in the literature by enlightening antecedents of purchase attitude/intention for meat with traceability in Vietnam.

One interesting implication in our studied model is related to the significant positive impact of perceived risk on attitude,



Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Figure 3. PLS results of the tested model.

Table 3. Results of hypotheses investigation.

Hypotheses	Path directions	β	p-value	Results
H1	ATT \rightarrow INT	0.01	0.418	Rejected
H2	SN \rightarrow INT	0.03	0.338	Rejected
H3	PBC \rightarrow INT	0.32	< 0.001	Supported
H4	PR \rightarrow ATT	0.38	< 0.001	Supported
H5	PR \rightarrow INT	0.07	0.144	Rejected
H6	FS \rightarrow INT	0.32	< 0.001	Supported
H7	PHE \rightarrow INT	0.11	0.042	Supported
H8	PEC \rightarrow INT	0.18	0.003	Supported

Note: Coefficient β denotes the magnitude of impact; p-value is the probability value.

but not intention. While risk perception is reported not to influence behavioral intention directly, its directly negative effect on attitude is widely adopted (Lobb et al., 2006, 2007; Choi et al., 2013; Nguyen & Ngo, 2019). Depending on context specificity and in case of the significant relationship between risk perception and intention, the sign has been found to be negative (Choi et al., 2013; Nguyen & Ngo, 2019). While these

studies investigate consumers' decisions regarding regular food, a negative relationship is reasonably expected. On the contrary, as traceable food is agreed to be a solution to reduce perceived uncertainty (Chen & Huang, 2013; Buaprommee & Polyorat, 2016; Dang et al., 2019) and build trust (Choe et al., 2009), the positive influence of perceived risk on attitude toward traceable meat in this study hence makes sense. In this vein, consumers with

Table 4. Criterion for goodness of fit and results.

Fit indices	Evaluation metrics ¹	Actual value	Result
APC	Good if $p < 0.05$	0.177 ($p = 0.002$)	Good
ARS	Good if $p < 0.05$	0.334 ($p < 0.001$)	Good
AARS	Good if $p < 0.05$	0.325 ($p < 0.001$)	Good
AVIF	Acceptable if ≤ 5 , ideally ≤ 3.3	1.701	Ideal
GOF	Small ≥ 0.1 , medium ≥ 0.25 , large ≥ 0.36	0.495	Large
SRMR	Acceptable if ≤ 0.1	0.078	Acceptable

¹the metrics are based on Kock (2011a) and the WarpPLS manual (Kock, 2011b).

food safety concerns would opt for safer food choices to avoid the intake of harmful or unsafe food (Dang et al., 2019), similar to the case of organic food (Hsu et al., 2016; Teng & Lu, 2016).

The critical roles of perceived importance of healthy eating and environmental consequences are aligned with findings from various studies regarding organic food (Magnusson et al., 2003; Wee et al., 2014; Teng & Lu, 2016; Yadav & Pathak, 2016; Singh & Verma, 2017) eco-friendly packaged products (Prakash & Pathak, 2017), and safe food (My et al., 2017). Therefore, the present research contends that healthy and responsible eaters would love to maintain their healthy lifestyles which encompassed the careful selection of food, particularly traceable food. It is also worth mentioning that this finding contradicts the case of organic consumers in Thailand whose food choices are influenced by the global trend of opting for healthy food rather than making decisions because of the real cost behind their consumption pattern (Jitrawang & Krairit, 2019).

Another noteworthy result was that the strong impact of perceived behavioral control was found, whereas subjective norm and attitude presented no significant influence on intention. Studies have shown when the impact of subjective norm or attitude is strong, the prediction power of perceived behavioral control would be low (Ajzen, 1991; Nga & Tuan, 2019). Although some studies have shown the important role of subjective norm on the purchase intention (Menozzi et al., 2015; Spence et al., 2018), this paper unveiled the dominance of perceived behavioral control over subjective norm and attitude. Given the impacts of these determinants are not consistent across studies and highly contextual, we suspect that the results could be due to the sociodemographic characteristics of the studied sample, who are mostly generation Z with high education and capacity to understand and apply modern technology.

4.3 Managerial implications

The current study also suggests several managerial implications. For traceable meat marketers, the prospective target is more likely to be consumers with health consciousness and environmental consciousness as these consumers care more about the quality and safety of their meat consumed. For that reason, food marketers should focus on delivering the message of quality assurance or risk-free products to the consumers, potentially through tailored health information on the product label (Dang et al., 2019; Jacintho et al., 2020). Moreover, it is also worth noting that the product label should be simplified

in the form of more drawings and colors, rather than being too technical, which would attract more frequent readings (Schuch et al., 2019; Jacintho et al., 2020). We also suggest the inclusion of food assurance logos and a message indicating the environmental-friendliness of the product on the product label, which serves to provide visual inspection and a sense of control (Van Rijswijk & Frewer, 2012).

In addition, food retailers can design in-store standup banners that provide infographic knowledge related to the advantages of the traceability system, how it can mitigate food risks, and instructions to retrieve information from the QR-code label. Consumers might be interested in giving it a try which could aid purchase decisions. Furthermore, the impact of the animal disease outbreak and the food safety concern count, meat marketers might want to embed the key message of "traceability – the trustworthy solution to control food risks" in their promotion campaign. Whenever consumers confront information about food risks and food safety issues, the recall of this message would urge them to choose more wisely.

Lastly, food traceability, which is still voluntary in Vietnam, should be made compulsory similar to in developed countries (Choe et al., 2009; Menozzi et al., 2015). Policymakers should meticulously consider this proposal as a solution to combat the current situation of long-lasting food safety concerns as well as other food crises such as avian influenza, BSE, and the current ASF.

4.4 Recommendation for future research

There are multiple noticeable limitations of the study demonstrating a need for future research. Firstly, the surveyed sample in this article is constrained to the socio-demographic characteristics of students, hence the interpretation of the results is recommended with caution. Upcoming research could examine other populations in different contexts or countries to extend and revalidate our results. Secondly, the results of the present paper are restricted in its methodology based solely on the surveyed data. Future research can make use of other research methods to extract more knowledge such as the stated/revealed preferences, auction, or other qualitative methods – in-depth interviews, expert elicitation, etc. Thirdly, our work merely focuses on the risk of consuming contaminated meat, future studies could concentrate on other genres of risk perceptions, e.g., consumers' risk of having contact with infected animals, risk of cross-infection from wild animals, and the categories of risk management behaviors customers adopt.

Acknowledgment

This research is funded by Nong Lam University under grant number [CS-CB19-KT-01].

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Appendix A. Constructs with items.

Food safety concern (FS)	
FS1	I am very concerned about the residue amount of beta-agonist (super lean substance) in pork.
FS2	The quality of safety of pork nowadays concern me.
FS3	I am very concerned about the residue amount of antibiotics in pork.
Perceived risk of consuming meat from affected animals (PR)	I, or my family, have concerns about eating pork infected by ASF because it could cause:
PR1	high fever.
PR2	intense headache.
PR3	nausea.
PR4	gastrointestinal toxicity.
PR5	meningitis.
Perceived importance of healthy eating (PHE)	It is important to me that the pork I eat on a typical day
PHE1	Is good for my physical and mental health
PHE2	Keeps me healthy
PHE3	Is nutritious
Perceived importance of environmental consequences (PEC)	When you purchase/would purchase traceable pork how important is it that this helps to
PEC1	Improve the general state of the environment
PEC2	Eliminate the use of beta-agonist (super lean substance) in livestock farming
PEC3	Reduce the over-use of antibiotics in livestock farming
PEC4	Reduce contaminated waste in livestock due to the use of illegal or overdose substances (i.e. beta-agonist, antibiotics, hormone...)
Subjective norm (SN)	I would buy traceable pork because:
SN1	My family, partner and friends approve.
SN2	University scientists are in favor of it.
SN3	The media (TV, radio) are in favor of it.
SN4	The food industry and/or food supermarkets promote it.
SN5	People important to me buy this type of pork.
Perceived behavioral control (PBC)	Regarding the additional information about the production process and origin of traceable pork (obtained via the code)
PBC1	It will be easy to find the additional information.
PBC2	I will be confident that I'll find the additional information.
PBC3	I will be able to find the additional information without help from others.
PBC4	It will be easy to understand the additional information.
PBC5	I will be confident that I'll understand the additional information.
PBC6	I will be able to understand the additional information without help from others.
Attitude (ATT)	Buying traceable pork instead of pork now available in supermarkets would make me feel
ATT1	Bad (1) – Good (7)
ATT2	Unpleasant (1) – Pleasant (7)
ATT3	Foolish (1) – wise (7)
ATT4	Harmful (1) – beneficial (7)
ATT5	Negative (1) – Positive (7)
Intention (INT)	When traceable pork becomes available
INT1	I intend to buy it.
INT2	I plan to buy it.
INT3	I will look for it.
INT4	I desire to buy it.
INT5	It will be important for me to buy it.