



Investigating Factors Affecting Consumers' Satisfaction Towards Food Safety Products in East-West Economic Corridor: A Structural Equation Modelling

Pensri Jaroenwanit*, Uraiporn Kattiyapornpong, and Supot Deeboonmee

Abstract—Food and well-being are essential for people's living, societies, and all nations. Most governments or related organizations have attempted to set up a certain standard in order to protect their people's living. Since the ASEAN Economic Community (AEC) has become borderless, a food safety issue has been a concern. According to some research, food consumers have not obtained criteria to assess by themselves whether the food is safe or at risk. This study aims to investigate consumers' perceptions, attitudes, health expectations, and satisfaction towards food safety products in the current market situation. The objectives of this paper are 1) to assess the relationships between consumers' perceptions and attitudes towards food safety products in East-West Economic Corridor (EWEC), 2) to investigate consumers' knowledge of food safety market situation, and 3) to survey consumers' satisfaction factors towards food safety products. SPSS and Structural Equation Model (SEM) were applied to analyze data from 430 respondents and for hypotheses testing. The results show that consumers around EWEC have been aware of the food safety products and knowledgeable about the food safety market situation. The consumers' satisfaction factors are the safety implementation of all stakeholders and government policymakers. Non-government organizations (food producers, sellers, and marketers) should concern about the world food safety standard, quality, and value-adding. More importantly, the consumers' confidence in food safety products in this particular area should be taken into account as well.

Keywords— Perceptions, attitudes, food safety, satisfaction, EWEC.

1. INTRODUCTION

“Food safety is the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use” [1]. Although, the World Health Organization and its State Members attempt to establish and assure the safety of food from production to consumption, over two million, or one in three people worldwide still encounter death and illness from microbiological contamination of food and water every year [1]. In addition, the access to food safety remains a challenge in the South-East Asia region which impacted on people's health and well-being as well as economic impacts on different levels; namely, individuals, communities and countries [1]. Apart from food quality and nutrition, food safety is one of food product attributes in a typical consumer decision-making on food. It is expected that all food is safe for consumption in all societies and nations, otherwise it can cause anxiety and affect social uncertainty, challenging consumer decision-making, as well as overall food

system [2]. Although the fast-growing economies and advanced technologies enhance the rise of middle class, complex consumer behaviour and efficient supply chains, food safety concern is an alarm facing consumers, food industry, and government [3] [4] [5]. The concerns include all food supply chains system starting from farms (farmers, food growers, food preparation, packing and delivery) to forks (end-users, food consumption), but it is difficult for consumers to assess all food safety products in all food supply chains system. In addition, the growing concerns about food safety lead to the increased demand for the quality, availability of food safety products in the market, the concerns of stakeholders in the nations, and factors affecting consumers' satisfaction, particularly on health expectation.

Although there are benefits and opportunities when countries cooperate on several and various projects, there are also drawbacks and threats involved. This paper focuses on the East-West Economic Corridor (EWEC) that connects the Western Indian Ocean to the Eastern Pacific Ocean to develop the Greater Mekong Subregions that aims to increase economic cooperation among AEC member countries. This route includes a transportation route connecting the port of Mawlamyine in Myanmar and Danang in Vietnam. In addition, the expansion of this route provides the opportunity for domestic and international investors, especially those from Thailand's three AEC neighbouring provinces; namely, Mukdahan, Khon Kaen, and Kalasin [6] [See map in Appendix A] and increases the volume of exports and imports of agricultural and food products (e.g. fruits, vegetables, and processed foods) such as imported products from Vietnam and China and exports via

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Mukdahan province to Guangxi Zhuang, Southern China, with the increased value of 8,690.4 million baht, which Thailand enjoyed the balance of 7,979.2 million baht in 2010 [6]. Moreover, consumers could also enjoy the benefits of the better variety of food products with lower prices. On the other hand, the increased trading of food products in this particular area has raised the concerns about the possibility of critical food disease and food safety issues. Thus, obtaining some knowledge about food safety market situation in this particular area is important for government and non-government policy makers. Food marketers are required better understanding on consumers' health expectation and their satisfaction towards food safety products. This study was one of the first studies investigating food safety products situation in this particular area. Consequently, the objectives of this study are: to assess the relationships between consumers perceptions and attitudes towards food safety products in East-West Economic Corridor (EWEC) and to investigate consumers' knowledge of food safety market situation and consumers' satisfaction factors towards food safety products.

2. LITERATURE REVIEW

What is food safety?

Food safety has long been a concern of consumers and publics [2] and it has become an intensely important concern, especially with incidents of food-borne diseases. Consequently, many governments in many countries have implemented policies towards ensuring the safety of food supply, for example by mandating use of the Hazard Analysis Critical Control Point (HACCP) system in food industries [7][8][9]. In addition to the HACCP, food safety standards were launched in 1994 as part of the Uruguay Round of Multilateral Trade Negotiations. Nowadays, these standards are popularly known as "SPS measures" or "SPS standards" [10][11]. In the late 1960s, HACCP was developed as a managerial tool to ensure food safety standards. It was subsequently recognized as an effective alternative to conventional end-point testing by the World Health Organization (WHO) and the United States Food and Agriculture Organization (FAO), and was recommended in commercial food production. Therefore, HACCP philosophy is incorporated in food safety enactment in many countries as an international food quality control and assurance practice [12][10].

In addition to HACCP, the FDA (Food and Drug Administration) sets forth the Sanitary and Phytosanitary (SPS) Agreement, which instructs governments on how to control food quality. The WTO has monitoring mechanisms for food safety regulations that follow the SPS, which forms a part of the WTO Agreement. Signed in 1994, this agreement aimed to protect consumers while regulating the use of these standards as a means of non-border trade protection [13][14].

Due to environmental, demographic, and climate changes during the early 21st century, food-borne diseases are expected to increase in developing countries. This phenomenon creates a greater challenge to

governments developing food safety laws, as any changes should directly result in the protection of their people and the environment [15]. These are the trends of food safety control which every government around the world should be concerned about, and for which every government should apply consumer protection policies [16][15][17]. Thus, as a matter of urgency, governments should have up-to-date policies for food safety to control food-borne pathogens' transnational spread. These policies should take into account all toxins in food that affect people's health.

The regulation of food safety as a trend is also rising in many countries, particularly in developing countries [18]. Thailand has also increased their food safety standard measurements and rules for protecting consumers. For example, Thailand enacted the 'Clean Food Good Taste' project in the food safety standard regulation [19] by following the FDA and WTO guidelines [8][21][18][13]. For Thailand, various food safety control activities are undertaken by several related organizations. For example, the Department of Health, the Ministry of Public Health of Thailand, and the Ministry of Interior are responsible for improving the standards of food hygiene within the country and work closely with all provinces [22]. Since 1979, the Minister of Public Health has been designated by law to oversee the execution of the Food Act [22]. In 1989, the above-mentioned agencies were instrumental in a successful campaign titled 'Clean Food Good Taste.' The non-mandatory program targeted food vendors, including street food stall vendors, highlighted the benefits of hygiene to Thai residents, and reassured foreign tourists that food preparation and sales are both safe and monitored [22].

Grunert (2005) [23] studies the relationship between food safety and quality in the context of consumer risk perception. The findings show that quality and safety perception is linked to food choice and consumer demand, and are central issues in today's food economics, though many research questions remain to be addressed. The researcher suggests three main streams of research on food quality and safety; namely, (1) dealing with consumer demand for quality and safety, (2) provision of quality and safety, and (3) consumer perception of quality and safety. He proposes that the perception acts as mediating between supply and demand, as perception of the supply of goods that leads to the demand for these goods. He also includes that food safety is part of food quality that consumers believe food safety to be a desirable property of food quality.

East-West Economic Corridor (EWEC)

According to AEC's (ASEAN Economic Community) blueprint, the significance of international transport and logistics regulation was emphasized. Therefore, the Geographical Simulation Model (GSM) included the economic system of the Great Mekong River region [24]. Furthermore, the EWEC road map was run through four countries: Da Nang in Vietnam, Lao Bao – Dansavan border, Savannakhet in Laos, the Second International Mekong Bridge crossing the Savannakhet – Mukdahan border, Kalasin province, Khon Kaen province in

Thailand, Mae Sot – Myawadi border, and Mawamyine in Myanmar [25][24]. The total length of EWEC in Thailand is 620 km [25][26].

Meanwhile, the ASEAN Economic Community (AEC) is the realization of the end-goal of economic integration as outlined in the ASEAN vision 2020. AEC creates a stable, prosperous, and highly competitive ASEAN economic region in which there is a free flow of goods, services, and investments [26][24].

Furthermore, in the EWEC provinces of Thailand, labor is abundant and inexpensive relative to that of producers in food safety such as fresh food, processed food, and cooked organic food products, as well as the clean food markets of North America, Europe and Japan. Meanwhile, the EWEC has lowered the time and cost of moving goods across long distances. The potential benefits from exploiting these competitive advantages in the production of food safety along the Corridor are therefore enormous, including the economy-wide effects from additional employment and expenditures on downstream and supporting industries. These effects are particularly important for small and medium-size companies, which tend to launch their products to markets outside of their communities [27].

Why do consumers choose food safety?

Although substantial research on food safety, there is no detailed published research studies on consumers’ health expectation and satisfaction towards food safety products in this particular area. Therefore, the research questions of this study are below and Figure 1 presents the research conceptual framework:

Q1: Do consumers’ perception and attitude significantly affect consumers’ satisfaction towards food safety products in this particular area?

Q2: Does consumers’ health expectation significantly affect consumers’ satisfaction towards food safety products in this particular area?

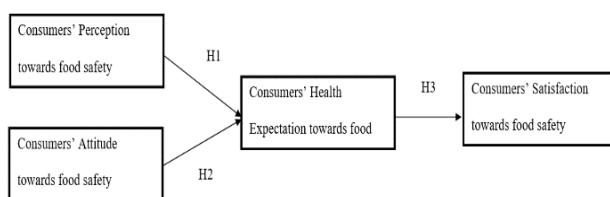


Fig. 1. The conceptual model of this research.

Consumer Attitudes

Attitude is understood as a rational, choice-based evaluation of the consequences of a behavior or a behavior’s subjective utility, as well as an estimate of the likelihood of expected outcomes. Attitude includes affective (e.g. enjoyable or unenjoyable) and instrumental (e.g. beneficial or harmful) evaluation toward a behavior. Attitude also involves an overall evaluation that expresses how much we like or dislike an object, issue, person, or action. Attitudes are learned, and they tend to persist over time. In other words, attitudes reflect the consumers’ overall evaluation of something based on associations linked to it [51]. In addition,

attitude is important because it guides our thoughts (the cognitive function), it influences our feelings (the affective function, or emotion), and it affects our behavior (the conative function) [52][53][54]. Attitude can be described in terms of five main characteristics: favorability, attitude accessibility, attitude confidence, persistence, and resistance [51][53].

Although several researchers study consumer behaviours towards food in general [55][56][7][58], very limited studied emphasise on food safety, especially in this specific region.

Furthermore, attitude was the variable related to perception, knowledge, and behavior [48]. Many studies have pointed out that perception may influence an increased knowledge of food safety as it positively affects consumers’ attitude [59][60]. For example, a study of school children in Taiwan finds that knowledge, attitude, and behavior are positively related to food sanitation [59]. Hence, this research emphasizes consumers’ attitude as it results in behaviour, because an attitude is a factor which relates to perception and behavior [59][60].

H1: Consumer attitude towards food safety products has a significant positive influence on consumer expectations of food safety product on health.

Consumer Perceptions

Perception is one of the most important factors in marketing as it influences consumers’ decision-making [61]. Perception formation is affected by internal and external environmental stimuli such as social and cultural influences [61]. Therefore, better understanding of consumer perceptions and attitudes can assist marketers in the development of marketing strategies. For example, if marketers want to launch a product into the market, they should create a marketing strategy to promote their product in order to ensure consumers know about it. Not only do they need a marketing strategy, but they also need to decide how to induce the consumers’ needs [47].

When making food choices, food quality and safety are both important principles for consumer perceptions and attitude [7][48]. Consumers generally prefer products of high quality and safety. Therefore, consumers’ perception is important as it differs depending on their experiences of food products available in the market [39] as well as their perceptions of food disease. While food safety regulation is rising and increasing attention is being paid to control [49], consumers’ perceptions about food safety and quality label is also increasing. While food quality and safety is usually studied in relation to specific products [50], there are fewer studies on food safety policies that control food quality and safety, especially in developing countries like Thailand.

H2: Consumer perception towards food safety products has a significant positive influence on consumer expectations of food safety product on health.

Consumer Satisfaction

Consumer acceptance of the concept of food safety is

understood as a determinant of key success factors for market orientation and market opportunities[28][29][30]. Consumers accept higher prices to ensure the safety and quality of the products. For example, when making purchase decisions, consumers are influenced by social factors (e.g. attitudes and beliefs), internal factors (e.g. appearance, nutritional content, and sensory), and external factors (e.g. the nature of the food and brand) [31][32][33][34]. Furthermore, some studies suggest that the number of consumer acceptance studies has grown rapidly, but there is little research that focuses on satisfaction towards fresh food safety products [35][36][37]. Satisfaction is one measure of the kind of consumers willing to pay, and it is also appropriate for consumer acceptance measurements [35]. Hence, this research chose satisfaction to measure consumer acceptance of fresh food safety products.

Consumer Expectations

In this study, health expectations towards food safety was applied from health consciousness. That was one of contributing variables. Health expectations refer to health-conscious consumers who are concerned or aware about the quality of their health [38][39]. Additionally, health-conscious people are those with motivation and attitude to maintain or improve their health [39]. Specifically, individuals whose attitude regarding health involves behavior relating to health, for instance, keeping up with health news, improving their health with exercise, and buying safe or organic food products [39][40].

Furthermore, many researchers investigate the effect of attitude towards health and the relationship between health expectations and food quality or food safety [41] of food types such as fast food, fresh food, seafood, restaurant food, street stall food, and many more [42]. These studies have found that consumer knowledge and expectations impact health expectations [43][44][45]. Therefore, health expectations highlight an overall alertness, self-consciousness, involvement, self-monitoring of one's health, social interaction, and attitude [39][46].

H3: Consumer health expectations of food safety products have a significant positive influence on consumer acceptance or satisfaction.

3. METHODOLOGY

This research applied both qualitative and quantitative methods. To identify relevant constructs and items, this research conducted the desk research (literature review on consumers) and in-depth interviews from food safety professionals from the Provincial Health Department, Medical Science Centre, District Health Office, Industrial Support Department, and Custom (Border) Department as these particular stakeholders work closely in food safety areas and involved in policy-making, and were familiar with consumer's issues and concerns toward food safety. The results from the desk-research (literature review on consumers) and in-depth interviews were incorporated and used to design a questionnaire to

collect the quantitative data for the next stage.

The four main factors were included in the questionnaire (see Table 1): perception of food safety (Perception (PerC) items [62], attitudes towards food safety (Attitude toward food safety (AttFS) items [63][64], consumer satisfaction (Consumer Satisfaction (SAT) items [57], and health expectations (Consumer Expectation on Health or Health consciousness (EH) items [48]. The five-Likert scales were used in the questionnaire, ranging from 1= strongly disagree to 5= strongly agree. The structural equation model [20], was used for data analysis. The data were analyzed as follows: 1) reliability test (Cronbach's alpha based on standardized items), 2) Confirm factor analysis, and 3) multiple regression analysis in order to test the hypotheses.

Table 1. Detailed Constructs and Items

Construct/Associated Items	Sources
Consumer Perception (PerC)	
PerC1 I understand how to choose food safety products.	Nambutr (2005) [63]
PerC2 I understand that there are widely produced and distributed food safety products including fresh and processed food in my local areas.	
PerC3 I understand that food safety products are distributed through commercial shops and supermarkets in my local areas.	
PerC4 I often receive food safety product information through advertisements and PR in my local areas.	
PerC5 I am confident in the quality and price of food safety products in my local areas.	
PerC6 I understand that food safety products including fresh and processed food in my local areas are produced in Thailand.	
PerC7 I understand that food safety products including fresh and processed food in my local areas are imported from overseas.	
Consumer Attitude (AttFS)	
AttFS1 Regular consumption of food safety products is good for health.	Jansson (2011) [64]
AttFS2 Food safety product producers are required to be assessed and certified by Government official such as Food and Drug Standard Department.	Prasertsae ng (2012) [65]
AttFS3 Food safety products are only distributed by certified sellers and	Prateepana n (2013)

examined from Government Official such as Food and Drug Standard Office.	[66]	products.	
AttFS4 The distribution of food safety products are widely available and convenient to buy.		Consumer Satisfaction (SAT)	
AttFS5 Safety food products sold in my local areas are imported from other areas and overseas.		SAT1 I am satisfied with the quality of food safety products in my local areas.	
AttFS6 I think the quality of food safety products that produced domestically is the same as those imported food safety products from overseas.		SAT2 I am satisfied that there are sufficient and available food safety products in my local areas.	
AttFS7 I think the quality of food safety products that produced domestically is different from those imported food safety products.		SAT3 I am satisfied with the variety of food safety products in my local areas (various types and brands).	
AttFS8 I think the quality of food safety products that produced domestically is safer than those imported food safety products.		SAT4 I am satisfied with the packaging of food safety products in my local areas.	
AttFS9 I think the quality of food safety products in Thailand is equivalent to those imported food safety products from overseas.		SAT5 I am satisfied with the details of labelling on the packages of food safety products in my local areas.	
AttFS10 I think food safety products that are produced in Thailand have less quality and safety standard than food safety product from overseas.		SAT6 I am satisfied with the price of food safety products in my local areas.	
AttFS11 I have encountered some problems with consumption of food safety products in the past.		SAT7 I am satisfied with the distribution of food safety products in my local areas. There are many channels to buy them and it is very convenient to buy them in my local areas.	Jareonwanit (2011) [57]
AttFS12 I think there will be more of food safety product standard control in the future.		SAT8 I am satisfied with the marketing communication of food safety products in my local areas.	
AttFS13 I will buy and consumer more of food safety products in the future.		SAT9 I am satisfied with the promotional activities of food safety products in my local areas.	
Consumer's Health Expectation (EH)		SAT10 I am satisfied with the food safety products in my local areas and willing to buy more to replace what I normally buy (general foods).	
EH1 I choose to buy food safety products because I concern about my family health.	Gould (1988) [46]	SAT11 I am satisfied with the food safety products in my local areas and willing to buy regularly to replace other general food products.	
EH2 I choose to buy food safety products because I concern about my own health.	Paliyasit (2012) [67]	SAT12 I am satisfied with the food safety products in Thailand that are standard certified by Food and Drag Organisation.	
EH3 I choose to buy food safety products because I expect it will help me being strong and healthy.	Waewjinda (2004) [66]		
EH4 I regularly test my health after consuming food safety products.			
EH5 I quickly feel the change in my health when I consume food safety			

The sampling population includes Thai consumers who are aware and know of food safety products in Khon Kaen, Kalasin, and Mukdahan provinces in Thailand which are the major areas in East-West Economic Corridor (EWEC). Non-probability purposive and convenience sampling approaches were applied. The total of 430 respondents was collected using questionnaire survey developed in the qualitative stage.

4. FINDINGS

Participants' Profile

The sociodemographic profile of respondents is presented in Table 2. All respondents had an experience in purchasing food safety products. The sample consisted of 105 (24.4%) male respondents and 325 (75.6%) female respondents. In addition, the majority of participants' ages was between 31 – 40 years (33.3%, n = 143), followed by 20 – 30 years (32.6%, n = 140), and the ages of 41 – 50 years (21.6%, n = 93). In terms of marital status, 54.4% of participants were married (n = 234), followed by single (44.2%, n = 190), and divorced (1.4%, n = 6). For monthly income, the majority of respondents earned 10,000-25,000 Bath/Month (52.1%, n = 224), followed by less than 10,000 Bath/Month (27.7%, n = 119), and 25,001-40,000 Bath/Month (15.6%, n = 67). Furthermore, the majority of respondents had the bachelor's degrees (51.4%, n = 221), followed by 2-year college degree (12.8%, n = 55), and elementary school level certificate (11.4%, n = 49). Finally, respondents' careers included government officers (21.6%, n = 93), followed by business owners (14.9%, n = 64), and business employees (14.4%, n = 62).

Table 2 Respondent's Profile

Measured Item	Frequency	Percentage	Measured Item	Frequency	Percentage
Gender			Occupation		
Male	105	24.4	Civil servants (Public service)/ Government official	104	
Female	325	75.6	State enterprise employee	32	
Age			Private company officer	62	
20-30 years old	140	32.6	General full time/Part time employee	50	
31-40 years old	143	33.3	Farmer	32	
41-50 years old	93	21.6	Entrepreneur/Business owner	64	
51-60 years old	47	10.9	Stay home parent/Housewife	23	
More than 60 years old	7	1.6	Freelance/Self-employed	10	
Monthly Income (Baht)			Student	53	
< 10,000 Baht	119	27.7	Marital Status		
10,001-25,000 Baht	224	52.1	Single	190	
25,001-40,000 Baht	67	15.6	Married	234	
40,001-55,000 Baht	13	3.0	Divorce/Widowed	6	
55,001-70,000 Baht	2	0.5	Education Level		
70,001-85,000 Baht	2	0.5	Primary School	49	

The descriptive analysis of all responses to each item including the means and standard deviations are presented in Table 3. The results demonstrate the top three mean values of respondents' perception of food safety are: "I know that food safety products are distributed through commercial shops and supermarkets in my local areas" (PerC3, 3.67), "I am confident in the quality and price of food safety products in my local areas" (PerC5, 3.64), "I know that there are widely produced and distributed food safety products including fresh and processed food in my local areas" (PerC2, 3.62), respectively. For the respondents' attitude toward food safety, the top three highest mean values included: "Regular consumption of food safety products is good for health" (AttFS1, 4.22), "Food safety products are only distributed by certified sellers and examined by Government Officials such as Food and Drug Standard

Department" (AttFS3, 4.19), and "Food safety product producers are required to be assessed and certified by Government Officials such as Food and Drug Standard Department" (AttFS2, 4.17). The top three highest mean values of respondents' health expectations were: "I choose to buy food safety products because I am concerned about my own health" (EH2, 4.26), "I choose to buy food safety products because I am concerned about my family's health" (EH1, 4.23), and "I choose to buy food safety products because I expect it will help me be strong and healthy" (EH3, 4.22). Finally, the top three highest mean values of consumer satisfaction were: "I am satisfied with the food safety product sold in Thailand that are standard certified at an internal level" (SAT13, 3.87), "I am satisfied with the food safety products in Thailand that are standard certified by Food and Drug Standard Department" (SAT12, 3.86), and "I am satisfied with the food safety products in my local areas and am willing to buy regularly to replace other general food products (SAT11, 3.70).

Table 3 Descriptive Analysis

Construct/Associated Items	Mean	SD	Construct/Associated Items	Mean	SD
Consumer Perception (PerC)			Consumer's Health Expectation (EH)		
PerC1	3.71	.717	EH1	4.23	.898
PerC2	3.62	.781	EH2	4.26	.850
PerC3	3.67	.747	EH3	4.22	.936
PerC4	3.31	.946	EH4	3.09	1.237
PerC5	3.64	.792	EH5	3.15	1.235
PerC6	3.61	.782			
PerC7	2.93	.914			
Consumer Attitude (AttFS)			Consumer Satisfaction (SAT)		
AttFS1	4.22	.841	EH1	3.61	.791
AttFS2	4.17	.797	EH2	3.47	.777
AttFS3	4.19	.767	EH3	3.50	.813
AttFS4	3.59	.842	EH4	3.53	.701
AttFS5	3.17	.801	EH5	3.60	.744
AttFS6	3.42	1.00	EH6	3.46	.777
AttFS7	3.61	.901	EH7	3.48	.874
AttFS8	3.36	.923	EH8	3.38	.989
AttFS9	3.44	.926	EH9	3.36	.953
AttFS10	2.95	.920	EH10	3.59	.861
AttFS11	2.61	1.222	EH11	3.70	.901
AttFS12	3.96	.855	EH12	3.86	.870
AttFS13	4.05	.793	EH13	3.87	.929

Table 4. Reliability and factor analysis results

Variable	No. of items	Alpha	% Cumulative	KMO	Eigen value (range of loadings)
Consumer Perception (Per C)	4	0.818	60.147	0.761	2.406 (0.744-0.827)
Consumer Attitude (Att FS)	6	0.848	66.338	0.729	1.233 (0.692-0.919)
Health Expectation (EH)	3	0.936	88.821	0.753	2.665 (0.921-0.953)
Consumer Satisfaction (SAT)	10	0.926	67.793	0.865	1.075 (0.645-0.848)

Exploratory Factor Analysis (EFA) was conducted to investigate the reliability of all constructs. Table 4 presents the Cronbach Alpha values which are above the recommended level of 0.6 [20], i.e., Consumer Perception (PerC, α 0.818, four items), Consumer Attitude (AttFS, α 0.848, six items), Health Expectation (EH, α 0.936, 3 items), and Consumer Satisfaction (SAT, α 0.926, six items). Moreover, exploratory factor analysis for each scale pointed out that each construct is

unidimensional, with over 50% of the variance explained and eigenvalues of 2.404, 1.233, 2.665, and 1.075 extracted.

Furthermore, Confirmatory Factor Analysis (CFA) was conducted in order to demonstrate the evidence of construct correlation. Tables 5 and 6 demonstrate the correlation matrix of each construct and its testing autocorrelation. The results show that all constructs have positive correlation, which the highest correlation (.761) between consumer perception (PerC) and consumer attitude (AttFS), and the lowest correlation (.418) between health expectation (EH) and consumer attitude (AttFS). However, the correlation of all constructs is less than 0.80 which indicates no problem on multicollinearity [69]. The VIF (between 1.132 and 1.588) and tolerance (between 0.630 and 0.883) show no major problems on collinearity. Therefore, all constructs are suitable for Structural Equation Model analysis.

Table 5. Correlation matrix among each construct

Constructs	AttFS	PerC	EH	SAT
AttFS	1.000			
PerC	0.761	1.000		
EH	0.418	0.512	1.000	
SAT	0.642	0.724	0.429	1.000
Tolerance	0.695	0.883	0.630	0.702
VIF	1.438	1.132	1.588	1.424

Table 6. Testing autocorrelation

Model	R	R Square	Adjusted R Square	Std. error of the Estimate	Durbin - Watson
1	0.412	0.549	0.635	0.351	1.698

Table 7. Regression path on the structural model relationships tested

Regression paths	S.E.	p-value	Hypothesis Testing
Consumer Perception - > Expected Health	0.08	<0.001	Accepted
Attitude toward Food Safety -> Expected Health	0.05	<0.001	Accepted
Expected Health -> Satisfaction	0.07	<0.001	Accepted

Structural Equation Model Analysis

The conceptual model was then analyzed to determine whether health expectations mediate the relationship between food safety perceptions, attitudes, and consumer satisfaction. The results found that health expectations

mediate between attitude and consumer satisfaction, including the mediate between perception and consumer satisfaction as shown in Table 7 and Figure 2.

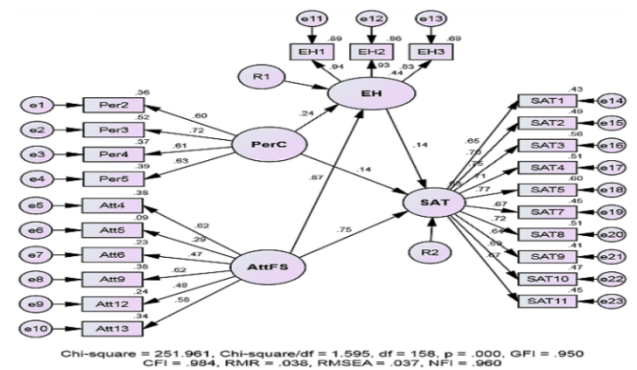


Fig. 2. The structural equation model of research.

The results of the structural equation model (SEM) of the relationships between consumer perception (PerC), consumer attitude (AttFS), health expectations (EH), and consumer satisfaction (SAT) presented below:

Hypothesis 1: Consumer attitude towards food safety products has a significant positive influence on consumer health expectations of food safety products.

The SEM results found values of GFI = 0.950, AGFI = 0.912, CFI = 0.984, RMSEA = 0.038, Chi-square = 251.961, df = 158, CMIN/df = 1.595, p-value = 0.000, indicating the fit of the model. Furthermore, the factor loading is 0.87, meaning that the consumer attitude (AttFS) has a positive effect on health expectations (EH). Thus, Hypothesis 1 is accepted.

Hypothesis 2: Consumer perception of food safety products has a significant positive influence on consumer health expectations of food safety products.

The results from the SEM found the value of GFI = 0.950, AGFI = 0.912, CFI = 0.984, RMSEA = 0.038, Chi-square = 251.961, df = 158, CMIN/df = 1.595, p-value = 0.000, showing the model is fit. However, the factor loading is 0.24, indicating that consumer perception (PerC) has no positive effect on health expectations (EH). Thus, Hypothesis 2 is accepted.

Hypothesis 3: Consumer health expectations of food safety products has a significant positive influence on consumer acceptance or satisfaction.

The results from the SEM found values of GFI = 0.950, AGFI = 0.912, CFI = 0.984, RMSEA = 0.038, Chi-square = 251.961, df = 158, CMIN/df = 1.595, p-value = 0.000. This means that the model is fit. The factor loading is 0.14, meaning expectation (EH) has a positive effect on consumer satisfaction (SAT). Thus, Hypothesis 3 is accepted.

The summary of SEM fit indices results is shown in Table 8.

Table 8. Fit Indices of structural model for this study

Fit Indices	Value	Criteria
χ^2/df	1.595	<5.0
Comparative Fit Index (CFI)	0.984	>0.90
NFI	0.960	>0.90
GFI	0.950	>0.90
Root Mean Square Error of Approximation (RMSEA)	0.037	<0.80
Chi-Square (p-value)	0.000	<0.05

Discussion

This study emphasizes consumer perceptions and attitudes towards food safety in the East – West Economic Corridor, focusing on Khon Kaen, Kalasin, and Mukdahan provinces in Thailand. Results found that the majority of responses include “I know that food safety products are distributed through commercial shops and supermarkets in my local areas” ($\bar{x} = 3.67$), followed by “I am confident in the quality and price of food safety products in my local areas” ($\bar{x} = 3.64$), and “I know that there are widely produced and distributed food safety products including fresh and processed food in my local areas” ($\bar{x} = 3.62$). For consumer attitudes towards food safety consumption, the highest scores included “Regular consumption of food safety products is good for health” ($\bar{x} = 4.22$), followed by “Food safety products are only distributed by certified sellers and examined by Government Officials such as the Food and Drug Standard Department” ($\bar{x} = 4.19$), and “Food safety product producers are required to be assessed and certified by Government Officials such as the Food and Drug Standard Department” ($\bar{x} = 4.17$). These results show that Thai consumers who live in the three provinces of the EWEC area are concerned about their health and food, because consumers are aware of the food safety shops and places that they can purchase in their local areas [29][30][70]. Furthermore, consumer attitudes indicate buying confidence when the products have a quality guarantee from government organizations [20] [71]. Therefore, the quality and safety assurances impact the food decision-making behavior of Thai people in the EWEC area because they have knowledge about food safety [72] [73].

5. CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH

This study provides the industry and policy-makers with additional information to better understand the consumers’ perceptions of food safety in AEC food distribution areas. The current study adds to the literature by using a unique local choice set related to food safety in AEC food distribution areas. The assumption of

consumers’ perceptions and attitudes form consumers’ health expectations which consequently impacts consumer satisfaction was investigated. The results show the positive effect of consumers’ perceptions and health expectations. In addition, health expectations have a positive effect on consumer satisfaction and consumers’ attitudes have a positive effect on health expectations. The results obtained from this study provide interesting information on factors impacting food safety consumers when making the decision in AEC areas.

This study contributes to marketing and international marketing literature and practical implication in EWEC of AEC. Food policymakers, managers, and marketers will benefit from the marketing strategies of food safety in Thailand. The profile data and the hypotheses results can improve understanding of the food safety market situation in Thailand. Thai government organizations can launch suitable policies for food safety in the East-West Economic Corridor (EWEC) in Thailand. This research proposed solutions to enhance the understanding of food safety and the relationship between attitudes, health expectations, and satisfaction. Regarding economic benefits, this study will help create appropriate and effective food safety policy and managerial strategies for food businesses in Thailand.

Although the sampled consumers from Thailand’s three provinces in the EWEC cannot be generalized as representatives of all Thailand, nor the whole world, they at least represent three neighboring provinces in the EWEC of the AEC.

Food safety development in Thailand was implemented a long time ago; however, the number of Thai consumers who are interested in their health has been increasing gradually. For food marketers, effective promotions and marketing strategies in the food safety market using online, mass media, and exhibitions may be worth exploration [17][16][74][75]. Specifically, motivation and consumer attitudes that relate to their well-being and health should be further studied [14][76][74].

Although some past research indicates the important of demo-sociological factors influence on consumption (e.g. [77] [78] [79] [80] [81] [82] [83] [84] [85] [86] [87] [88] [89] [90] [81]), this study does not include those factors in the current investigation. Therefore, future research may further investigate those factors impacting food safety perception, attitude and satisfaction.

ACKNOWLEDGEMENTS

Authors would like to thank Khon Kaen University, Khon Kaen, Thailand, for sponsoring the financial support of this research project, titled “Development of Food Safety Markets on East West Economic Corridor (EWEC) in North-Eastern Thailand”, and this paper is part of the project.

Appendix A [62]



Fig. 2. The opportunity for domestic and international investors.

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