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Chinese Students' Trust in the Safety of Food Purchased through Online Channels

A thesis presented in partial fulfillment of the requirements of the degree of

Doctor of Philosophy

in

Food Safety Management

at Massey University, Palmerston North

New Zealand

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2015

Abstract

With the rapid development of E-commerce, online food shopping has become popular in the past decade in China. Considering the high level of concern that the Chinese have about food safety, there are questions around trust in the safety of food purchased online. The aim of this study is to analyse the factors influencing trust in food safety when Chinese university students purchase food via the internet.

In order to examine the trust of Chinese university students in the safety of food purchased online, a survey was conducted on students from four Chinese universities in 2013. Data analysis was conducted on 1403 valid questionnaires. A Structural Equation Model, Principal Components Analysis and LISREL software were used as statistical tools for analysis.

Trust in food safety is a dynamic process and is based on food risk information transfer. The main outcome of this study was the development of a multi-factor conceptual model of Chinese university students' trust in the safety of food purchased online. This model consists of two separate determinants: food safety and the online shopping environment. Chinese university students were influenced more by the online shopping environment than by concerns with food safety. Trust in food safety is mainly influenced by two dimensions: Food Control (the general and constant element of trust) and Risk information (the changeable element of trust). Trust in the online shopping environment is influenced by two dimensions: Aesthetics and Functionality. Fourteen factors were found contributing to the trust in online food safety; traceability, media and delivery risk need more attention by industry. Since university students will become important online food shopping buyers when they graduate, New Zealand food

industries that export to China should consider these factors that influence sales via the internet.

Acknowledgements

I wish to thank my supervisory panel Steve Flint, Martin Perry, Paul Perry and Dongjing Wang for their support in my doctoral application at Massey University. I would like to express my sincerest gratitude to Professor Steve Flint. Without his full support and constant encouragement, I could not complete this study. I wish to thank Associate Professor Martin Perry for his patience and deep discussions during my study. I am deeply indebted to Dr Paul Perry for his generous support and invaluable advice particularly for survey design and data analysis. I would like to thank Professor Dongjing Wang for his valuable guidance and generous support in my study.

I also wish to thank the staff from Massey University who had provided great support for me during my PhD study at Massey. Particular thanks for Prof Sarah Leberman for her valuable guidance in my study.

Many thanks to my employers and colleagues from AQSIQ, China. Without them, I could not have had the opportunity to study full time in New Zealand. Sincere thanks to Yuanping Li, Daning Wang, Taiwei Yu, Wei Lin, Chunfeng Li, Kexin Bi, Bai Lu, Liyan Xu, Xiuqin Qi, Baofeng Zhang and Xueyan Guo. Without your approval and support, I could not have had the opportunity to work for AQSIQ and be appointed to study for a PhD in NZ.

I express my gratitude to the staff from the New Zealand Ministry of Foreign Affairs and Trade, and the Ministry of Primary Industries for providing the New Zealand-China Food Safety Scholarship to me. Specific thanks to Ms Gabrielle Isaak, Ms Ursula Egan and Mr Tony Zohrab.

Thanks go to my friends: Hao Li, Xuwei Zhu, Honghong Xu, Jiazhang Zhao, Encheng Chen, Xuewan Xu, Shengpu Gao and Liang Dong. They encouraged and supported me so much during my study.

I wish to deeply thank my sister and my parents, especially my dear wife Yuli and my dear daughter Dundun. Without you, it would have been impossible for me to complete this study. I love you.

Table of Contents

Abstract	2
-----------------------	---

Acknowledgements	4
-------------------------------	---

Table of contents	6
--------------------------------	---

List of figures and tables	8
---	---

Abbreviations	10
----------------------------	----

Chapter 1 Introduction

1.1 Background to the study	12
1.2 Research questions	16
1.3 Overview of thesis chapters	17

Chapter 2 Literature Review

2.1 Food safety	19
2.2 Trust in food safety	26
2.3 Factors contributing to trust in food safety	32
2.4 Food purchasing behaviour	39
2.5 Online shopping environment	41
2.6 Student perceptions of food safety	49

Chapter 3 Methodology

3.1	
Introduction.....	
.....52	
3.2 Sample	
design.....	
53	
3.3 Questionnaire	
design.....	
.....55	
3.4 Data	
analysis.....	
...67	

Chapter 4 Trust in food safety

4.1	
Introduction.....	
.....75	
4.2	
Results.....	
.....80	
4.3	
Discussion.....	
.....91	

Chapter 5 Trust in online shopping

5.1	
Introduction.....	
.....103	
5.2	
Results.....	
.....109	
5.3	
Discussion.....	
.....120	

Chapter 6 Trust in the safety of food purchased online

6.1	
Introduction.....	
.....124	

6.2	
Results.....	127
6.3	
Discussion.....	137
Chapter 7 Conclusion	
7.1	
Introduction.....	143
7.2 Chinese students' trust in food safety.....	144
7.3 Key outcomes of this study.....	145
7.4 Limitations and future research.....	150
References.....	152
Appendix 1 Cover letter for questionnaires.....	187
Appendix 2 Questionnaires.....	188
Appendix 3 Questionnaire totals.....	202

List of figures and tables

Fig 4.1: General consumer trust in food	
safety.....	79
Fig 4.2: Proposed model of trust in food	
safety.....	80
Fig 4.3: A Scree plot of 8 observed variables for food	
safety.....	82
Fig 4.4 The first principal component—Food	
Control.....	84
Fig 4.5 The second principal component— Risk	
information.....	84
Fig 4.6 Result of goodness fit	
indices.....	85
Fig 4.7 Attitudes to “Generally, food products are safe”	
.....	86
Fig 4.8 The extent of concern about food hazards	
.....	87
Fig 4.9 Proportions of participants concerned about food safety	
.....	87
Fig 4.10 Proportions of participants who would pay more money for traceable food..	88
Fig 4.11 Proportions of participants’ confidence in countries/areas of	
origin.....	88
Fig 4.12 Sources of information about the food safety	
incident.....	89

Fig 4.13 How does media influence confidence when a food incident happens.....	90
Fig 5.1: Trust in online shopping environment	106
Fig 5.2: Proposed model of trust in online food safety.....	109
Fig 5.3 Result of the Scree test for observed variables.....	111
Fig 5.4 The first dimension of trust in online shopping—Aesthetics.....	113
Fig 5.5 The second dimension of trust in online shopping—Security.....	114
Fig 5.6 Trust model in online shopping	114
Fig 5.7 Multiple factors of trust in online shopping.....	115
Fig 5.8 Online shopping experience.....	116
Fig 5.9 Reasons for buying goods online	116
Fig 5.10 Proportions of participants who had not bought goods online	117
Fig 5.11 Frequency of online shopping	117
Fig 5.12 Online goods categories.....	118

Fig 5.13 List of online shopping	
websites.....	119
Fig 6.1 Trust in the online food	
safety.....	128
Fig 6.2 Multi-factor model of trust in the online food	
safety.....	129
Fig 6.3 Frequency for buying food	
online.....	130
Fig 6.4 Reasons why participants bought food	
online.....	130
Fig 6.5 Online food shopping	
websites.....	131
Fig 6.6 Favourite online food	
choices.....	132
Fig 6.7 How much did websites influence buying	
decisions.....	133
Fig 6.8 How much did the website's reputation influence buying	
decisions.....	133
Fig 6.9 Proportions of participants had bought food online from the above areas.....	134
Fig 6.10 Proportions of participants had bought the above NZ food groups online.....	135
Fig 6.11 Proportions of participants decided to buy NZ food online	
.....	135
Fig 6.12 Proportions of participants who had not bought NZ food	
.....	136

Fig 6.13 Proportions of participants that had bought imported food online.....	137
Table 4.1 Measurement properties for observed variables	81
Table 4.2 Rotated Component Matrix of observed variables.....	83
Table 4.3 Demographic variables.....	91
Table 5.1 Measurement properties for observed variables	110
Table 5.2 Rotated Component Matrix observed variables.....	112
Table 5.3 Demographic variables.....	120

Abbreviations

ANOVA-Analysis of Variance

AVE-average variance extracted

B2B-Business to business

BSE-Bovine spongiform encephalopathy

CA-Cronbach's Alpha

CFA-Confirmatory Factor Analysis

CFI-Comparative fit index

E. coli-Escherichia coli

EFA-Exploratory factor analysis

FAO- Food and Agriculture Organization

GM-Genetically modified

HPAI-highly pathogenic avian influenza

KMO-Kaiser-Meyer-Olkin

PCA-Principal Components Analysis

RMSEA-Root Mean Square Error of Approximation

SEM-Structural Equation Model

TRA-Theory of Reasoned Action

vCJD-Variant Creutzfeldt-Jakob Disease

WTP-Willingness to pay

α -Cronbach's Alpha

χ^2 -Chi-squared difference test

Chapter 1 Introduction

1.1 Background to the study

This study is about Chinese university students' trust in the safety of food purchased online. Both food safety and the E-commerce environment are regarded as two dimensions of trust. Factors influencing these dimensions are examined.

The recent growth in electronic commerce (E-commerce) in China has drawn the attention of researchers. A report about Chinese E-commerce indicating that in 2015 the value of the entire Chinese E-commerce market was more than USD 3 trillion with a 27% increase from 2014 (China International Electronic Commerce Center, 2016). The value of the 2015 online retail market in China accounted for more than US\$ 580 billion with a 33% increase from 2014.

In terms of the Chinese online shopping environment, many researchers have focused on the factors which influence Chinese consumers' online purchasing intentions. Chang and Zhu (2007) noted that there are five key factors including personal information security, usefulness, convenience, trade reliability and shopping feeling which can influence Chinese online buying behaviour. Income, network usage capability and online shopping security rather than age, education level and convenience are important factors influencing Chinese online shopping intentions (Yin & Wu, 2008). Peng, Wang, and Cai (2008) focused on university students and they argued that factors including usefulness of the internet, internet knowledge, internet service, perceived risk and reputation can affect the Chinese university students' interests in online shopping behaviour. Furthermore, some researchers emphasized the role of perceived risk in influencing online shopping intention. In terms of online clothes shopping, there are

many different types of risk in relation to online shopping in China including product performance risk, financial risk, payment risk, delivery risk and so on (Zheng, Favier, Huang, & Coat, 2012). Among them, product performance risk is the most important risk which influence the online shopping intentions of Chinese consumers. Yao (2008) regarded psychological risk as the most important perceived risk influencing consumer online buying behaviour followed by function risk, service risk, payment risk, privacy risk, physical risk, social risk and time risk.

There is limited academic research on E-commerce in the food industry in China. Previous studies focused on E-commerce development in agriculture products and supply chain building rather than consumer purchasing intentions. Geng, Ren, and Wang (2007) discussed the special situation of the agriculture industry in E-commerce, paying particular attention to the standardization of information technology applications in agriculture industry development. Zhang (2010) reviewed the development of E-commerce in the Chinese food industry examining the advantages, weakness and requirements of E-commerce. Yang (2011) explored how to develop E-commerce in fresh agriculture products in China and focused on the development of the supply chain.

Large research gaps remain in the understanding of online food shopping in China. Basic questions such as what influences the online food shopping intentions of Chinese consumers, why Chinese buy food via the internet rather than traditional channels and why Chinese buy foreign food rather than local food over the internet remain largely unanswered. There is a very apparent need to better understand the purchasing of imported food online in China.

In addition, there is little academic evidence for China on the nature of trust in the safety of food purchased via the internet. Research in other countries has investigated

consumer trust in online food shopping and has pointed out that this trust plays an important role in influencing purchase intention. Many researchers regard trust as the most important element affecting consumer online purchasing behaviour (Salo & Karjaluoto, 2007; Gregg & Walczak, 2010). Gefen, Karahanna, and Straub (2003) argued that both the online trade environment and trust in online shopping are the most important elements influencing consumer online buying behaviour. Hofstede, Canavari, Fritz, Oosterkamp, and Sprundel (2010) proposed a typology of trust to explain how buyers' trust in online food trade is built. Based on this typology of trust, Canavari, Fritz, Hofstede, Matopoulos, and Vlachopoulou (2010) investigated factors contributing to the generation of trust in online agri-food throughout Europe and how these factors are communicated. However, in China, consumer trust in the safety of food purchased online is still unclear.

One of the important reasons to study consumers' trust in the safety of food purchased online is because of the low general level of trust that the Chinese have in food safety. Food safety incidents continue to occur in China, highlighted by the melamine contamination in milk powder in 2008. Such incidents have led to growing concerns over food safety (Song, Gao, Liu, & Nanseki, 2010; Li, Liu, Wang, & Dai, 2011; Liu, Pieniak, & Verbeke, 2014). As a result of the continuing food safety incidents, food safety has become one of the top concerns in China with the Chinese consumers' trust in food safety being quite low (Liu, Pieniak, & Verbeke, 2014; Song, Gao, Liu, & Nanseki, 2010; Veeck, Veeck, & Zhao, 2015).

Food purchasing intentions are very complicated and there are many factors that influence food buying intentions (Henderson, Coveney, Ward, & Taylor, 2011; Nonis, Hudson, & Hunt, 2010; Wang, Mao, & Gale, 2008; Yeung & Yee, 2012). Yeung and

Morris (2001) noted that the perception of food risk is one of the most important factors affecting consumer responses and purchasing behaviour, particularly when there has been a loss of trust in food safety or where people lack the necessary information. Looking at food safety as the inverse of food risk, trust in food safety has become a very popular research topic in China. Many studies note that trust in food safety plays a particularly important role in Chinese consumer food purchase intention (Li *et al.*, 2011; Song *et al.*, 2010; Wang, Zhang, Mu, Fu, & Zhang, 2009). It logically follows that trust in food safety is likely to be a very important factor influencing online food purchasing intentions in China. For New Zealand, it is important to study Chinese perceptions of imported food purchased online because, China has become the largest destination for New Zealand's food exports (Statistics New Zealand, 2012) and New Zealand food is very popular in Chinese online shopping websites.

Based on previous research, consumer trust in the safety of food purchased online might be influenced by both food safety and the online shopping environment. Trust in food safety is assumed to be influenced by many factors which include farmers, food manufacturers, food retailers, food regulators, food hazards, food groups, food traceability, food brands, media and food incidents. Trust in the online shopping environment is assumed to be influenced by the following factors: visual appeal, design style, entertainment, usability, relevance, customization, interactivity, ease of payment and financial security (Harris & Goode, 2010).

In order to study Chinese online food buying intentions, the subject of this study, a model of trust in the safety of food purchased online was developed and examined in terms of Chinese food safety in general and the current online shopping environment.

Data to develop this model was based on the results from a questionnaire survey of students from four universities in China.

The primary aim of this thesis was to examine what influences trust in the safety of food purchased via the internet from the perspective of individual Chinese university students. Specifically, this study explores what factors influence Chinese consumer trust in food safety in general, what factors influence Chinese consumer trust in the online shopping environment and, how food safety and the online shopping environment influence the online food buying behaviour.

1.2 Research questions

This study focussed on the following research questions in terms of Chinese university students:

- a. What is the overall level of trust in food safety?
- b. What are the key factors contributing to trust in food safety?
- c. What factors can influence trust in the online shopping environment?
- d. What are the key factors contributing to trust in the safety of food purchased online?
- e. How can New Zealand food suppliers enhance Chinese consumers' online food buying intentions?

1.3 Overview of thesis chapters

There are seven chapters in this thesis. This chapter, **chapter 1**, provides an introduction to the entire thesis. Background, research gaps, research questions and the objectives of the thesis are discussed.

Chapter 2 aims to provide a detailed literature review including the following key contents: food safety, trust, risk, E-commerce, online food shopping, factors that influence trust in online food safety and student perceptions of food safety.

Chapter 3 details the methodology used to examine trust in online food safety. Survey questionnaires were used to collect data from a sample of students in Chinese universities. One thousand and seven hundred questionnaires were returned and the Structural Equation Model, Principal Components Analysis and LISREL software were applied as the statistical tool for analysis.

The objective of **Chapter 4** is to explore Chinese consumer trust in food safety, based on data collected in the survey. Related factors influencing trust in food safety are discussed including farmers, food manufacturers, food retailers, food regulators, food hazards, traceability, food brands, food incidents and media. A trust model of food safety for Chinese students is examined.

Chapter 5 focuses on developing a model of Chinese students' trust in the online shopping environment. Specifically, it investigates the following influencing factors: visual appeal, design style, entertainment, usability, relevance, customization, interactive nature, ease of payment, financial risk and delivery risk.

Chapter 6 aims to develop a multi-factor model of trust in the safety of food purchased online. Both food safety and the online shopping environment are considered together. In addition, imported food buying intentions of Chinese students are also discussed.

Finally, in **Chapter 7**, the main findings and conclusions of this thesis are considered. Limitations and recommendations are included.

Chapter 2 Literature Review

2.1 Food safety

Introduction to food safety

Food safety is a popular research topic. Previous studies have explored many aspects of food safety including food risk analysis (Delea, 2012; Liu *et al.*, 2012; Sorge *et al.*, 2011), food safety management (Lao *et al.*, 2012; Oses *et al.*, 2012; Papademas & Bintsis, 2010), consumer perceptions of food safety (Yeung & Yee, 2012), safety of food groups (Adam & Brülisauer, 2010; Buchanan, Baker, Charlton, Riviere, & Standaert, 2011; Lairon, 2010; Papademas & Bintsis 2010; Van Loo, Alali, & Ricke, 2012), food nutrients (Verkerk & Hickey, 2010), food manufacturing technique (Fryer & Bakalis, 2012), genetically modified (GM) food (Kim, 2010) and many other topics.

Food safety is defined by Food and Agriculture Organization (FAO, 2014) as *“assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use”*. Many researchers have defined food safety as the probability of not experiencing a food hazard (Wilcock, Pun, Khanona, & Aung, 2004). According to previous definitions, food safety only involves real food hazards or potential harm effects on human health. Other aspects in terms of subjective issues may also influence consumer perceptions of food safety. In order to have a deeper understanding of food safety, “risk” is introduced in this thesis to investigate food safety.

Risk

In the 1940s, White (1945) began to study risk perception in relation to natural hazards. According to Lowrance (1976), risk can be used to measure the severity and probability

of harmful effects. Around the 1970s, Slovic (1987) found that some people perceived risks differently from others in regards to technological hazards. In the 1980s, researchers started to investigate risk communication based on risk perception theory (National Research Council, 1989). Initially, risk research focused on objective hazards including natural hazards and technological hazards (Lofstedt, 2006).

Other researchers started to realize that risk involves more elements as well as real hazards. Some researchers pointed out that there are three main dimensions of risk, including severity of the risk, awareness about the risk and exposure to the risk (Boholm, 1998; Hohl & Gaskell, 2008). Wynne (1992) proposed an important typology dividing risk into four elements: risk (knowing the odds), uncertainty (knowing only the parameters whose odds are unknown), ignorance (not knowing even these parameters) and indeterminacy (a state that is completely open-ended). However, social factors, environment, economy and other factors can also influence risk perception (Miles & Frewer, 2001). Haimes (2009) argued that risk is very difficult to define as it is multidimensional.

Hansson (2010) divided all risk definitions into two groups: one group as an objective concept determined by physical facts while the other is a social concept. In this case Risk has a dual nature: fact and value (Hansson, 2010). The dual nature of risk has been further explained by a theory of “Risk = Hazard + Outrage” proposed by Sandman (1987). This theory is accepted by some researchers to assess the nature and influence of risk (Lachlan & Spence, 2010). According to this theory, hazard stands for objective aspects while outrage represents subjective aspects. In the public’s perspective, risk means much more than that, hazards and subjective issues involve voluntariness, control, fairness, process, familiarity etc. Sandman (1987) argued that the most

important principle of risk is outrage rather than the hazard, and that this outrage determines the perceptions of risk. Sandman (1987) also noted that the public pays too little attention to the objective risk (hazard) while governments or experts normally ignore the subjective issues (outrage). This explains why people might perceive a huge risk regarding a small hazard, but hardly care about some risks that are serious real threats (Boer, McCarthy, Brennan, Kelly, & Ritson, 2005). Furthermore, Sandman (2006) also noted that people can accept a high but voluntary risk rather than a low but involuntary risk. For example, people might drive a car after drinking alcohol and ignore the high risk of an accident, but they choose to refuse to consume GM food for which the risk to health is debatable.

Considering trust in food safety may involve the actual food hazard and subjective food concerns, a dual nature of risk particularly “Risk = Hazard + Outrage” will provide a good insight in investigating food risk. In this thesis, “Risk = Hazard + Outrage” (Sandman, 1987; 2006) will be used to define risk particularly in terms of food risk and trust in food safety. Although hazard issues will be analysed when it comes to food hazards and food groups in Chapter 4, the focus of this thesis is to provide insight into the psychological aspects of food risk.

Some previous research believed that risk information transference might be the main reason influencing a person’s perceptions with respect to trust in food safety (Frewer, Howard, Hedderley, & Shepherd, 1996). If people cannot access adequate and necessary information of a certain risk, people may feel unsafe. In order to avoid or dismiss risk, one of the key factors influencing risk perception might be risk communication.

Food risk

The consumer risk perception of food risk is an individual's perception of risk relating to the consumption of food (Schroeder, Tonsor, Pennings, & Mintert, 2007; Yeung and Morris, 2001). According to the theory proposed by Sandman (1987; 2006), food risk includes both objective and subjective aspects. Similarly, many researchers believe that consumer perceptions of food risk are determined by both objective aspects (food hazards) and subjective aspects (social and psychological characteristics of food hazards) (Benson, 2011; Yeung & Morris, 2001). Sources of food hazards include microbiological, chemical and physical hazards (Rocourt, Benembarek, Toyofuku, & Schlundt, 2003). Considering risk has both an objective and subjective nature, however, subjective aspects related to food risk will be emphasized in this thesis.

Many researchers had focussed on food risk analysis (Poortinga & Pidgeon, 2003; Verbeke & Viaene, 1999). Food risk analysis includes risk assessment, risk management and risk communication (WHO/FAO, 2006). Risk analysis has become a global tool and the preferred method to assess potential risks regarding hazards in the food chain. This includes determining the real danger to public health, direct food safety controlling systems and developing food safety standards as risk analysis is based on adequate scientific assessment, large stakeholder participation and transparent communication (WHO/FAO, 2006). According to Yeung and Morris (2001), the main basis of consumer concerns about food risk are subjective attributes rather than real food hazards. This is the reason why public behaviour is often out of line with the real food hazards (Yeung & Morris, 2001). Social and psychological characteristics related to food risk are closely associated with three risk attributes including dread, unknown and extent (Slovic, 1987; Yeung & Morris, 2001). Benson (2011) argued that key subjective parameters including sadness, distress, anxiety, fear and outrage and their emotional responses can be triggered and result in extreme social fear and anger about

food safety. Benson (2011) once chose a food incident (contamination of spinach with *E. coli* O157:H7) to explain how a subjective aspect caused a catastrophic social crisis with minimal food hazard risk. In this case, Sandman's theory (2006) was widely applied in food risk analysis (Benson, 2011), particularly risk communication (Boer *et al.*, 2005; McCarthy & Brennan, 2009).

Some researchers believe that it is not necessary for governments to provide all food risk information to the public because consumers might be confused by large amounts of information that they may not fully understand (Lofstedt, 2003). Based on a large amount of food safety information including many amplified risks, the public have to make their own decisions about which food they can eat and which information sources they can trust. In this case, the public may make unscientific decisions that may not be in their best interest (Lofstedt, 2006). This may expose the consumer to greater food risk.

However, many researchers believe that food risk should be communicated no matter the extent of uncertainty. Frewer *et al.* (2002a) claim that the public expect to be told the real uncertainty from the government, to have transparency in risk management, as well as having the right to make reasoned choices related to food risk. Some researchers note that uncertainty communication can help the public make their own decisions and maintain consumer trust in governments (Johnson & Slovic, 1995). If governments fail to release all the information relating to risk or deny real risks, this will result in a lack of public trust in the government (MAFF, 2000). The main reason why many food safety scandals developed into to a crisis is the lack of transparency of regulatory policy, often due to social and environmental values not being considered by

governments (Lofstedt, 2006). Without openness trust cannot be generated; without recognition of uncertainty the openness cannot exist (MAFF, 2000).

Absolute food safety can never be guaranteed and food safety issues continue to occur (Rasco, 2010). Consumer concern towards food safety might be quite high, although the level of risk associated with food safety is lower than in earlier times (Berg, 2004). Prior to the BSE incident, European consumers usually did not worry about both food safety and food quality (Rohr, Luddecke, Drusch, Muller, & Alvensleben, 2005). Consumers simply thought that all food products sold in the market were safe and food safety participants did not realise the necessity to communicate food safety information to the public (Rohr *et al.*, 2005). However, after a series of food crises, including Bovine spongiform encephalopathy (BSE) or mad cow disease, the dioxin crises, and foot-and-mouth disease, the public perceptions of food safety changed. They started to realise the food risk and doubted the credibility of food safety control systems and public regulators dealing with food safety. This caused a reduction in consumer trust in food safety (Gellynck & Verbeke, 2001; Miles & Frewer, 2001; Rohr *et al.*, 2005). Food safety participants, particularly government authorities, then imposed stricter requirements for food quality on the food supply chain in order to improve food safety and restore public trust (Rohr *et al.*, 2005). Similarly, in China, consumers have become concerned about food safety after the melamine-contaminated milk incident (Chen, 2008). According to a survey conducted just after the melamine incident in 2008, 42% of Beijing consumers didn't believe local food was safe (Song *et al.*, 2010).

Consumer perception of risks with respect to food safety is related to different cultures and regions (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000; Hofstede *et al.*, 2010). This is supported by research conducted in Europe (Canavari *et al.*, 2010), Asia and

North America (Knight, Gao, Garrett, & Deans, 2007a; Knight, Holdsworth, & Mather, 2007b; Schroeder *et al.*, 2007). In addition, previous research showed that consumer perceptions and trust in food safety vary depending on factors such as the type of food hazard, gender, age, educational level and economic status (Hofstede *et al.*, 2010; Rohr *et al.*, 2005; Wilcock *et al.* 2004).

2.2 Trust in food safety

Trust

Trust has become a popular research subject in a number of disciplines during the last two decades (Doney & Cannon, 1997; Henderson, Ward, Coveney, & Meyer, 2012; McKnight & Kacmar, 2002; Poortinga & Pidgeon, 2003). Trust can minimise uncertainty and complexity (Mayer, 1995), develop market strategy (Morgan & Hunt, 1994) and has an indispensable role in internet trade and service (Sharma & Sheth, 2004). Trust is so complicated that it has been defined in various ways, such as the willingness to be vulnerable to the actions of another party (Mayer *et al.* 1995) and the willingness to rely on an exchange partner in whom the buyer has confidence (Morgan & Hunt, 1994). Henderson *et al.* (2012) regard ‘relationship’ as ‘systems of communication’ and such relationships should not be limited to interpersonal relationships, but also cover social systems. This means that trust involves individuals–individuals, individuals–social systems and social systems–social systems. Trust is defined as “*a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another*” (Rousseau, Sitkin, Burt, & Camerer, 1998, p.395). Although this definition was accepted by many researchers (Mollering, Bachmann, & Lee, 2004), risk was not considered.

Many researchers have attempted to define trust by comparing it with “risk”, particularly when a trade or exchange happens. Calnan and Rowe (2006) believe that trust is constructed from a set of inter-personal relationships between individuals. People will make the decision to accept the risk when people have positive judgements on the competence and willingness of the trustee (Calnan & Rowe, 2006). Berg (2004) also noted that trust is an individual and subjective response to the notion of risk. Shepard and Sherman (1998, p.423) identified trust as the willingness to “*accept the risks associated with the type and depth of the interdependence inherent in a given relationship*”. Based on previous research, in this thesis, trust will be regarded as a willingness to accept a certain risk based on positive expectations of the intentions or behaviour of another. According to this definition, trust consists of three important features: trust is a psychological state, trust means an acceptable risk, and trust is a positive expectation. Normally, when risk decreases, trust will increase.

There is a close relationship between risk and trust (Chen, 2008). Basically trust is more related to a feeling while risk can be accurately calculated by risk experts (Berg, 2004). Risk perception focuses on the cognitive level of how the public perceive and estimate risks while trust emphasizes the extent of how people deal with such perceptions (Chen, 2008). Some researchers (Grunert, 2005; McKnight & Chervany, 2001) pointed out that there is an inverse relationship between trust and risk. For example, when the public have a low trust level in food safety the perceptions of risk increase.

Trust in food safety

There is a large amount of research on trust in food safety in many areas and disciplines (Giraud & Halawany, 2006; Henderson *et al.*, 2012; Liu *et al.*, 2014; Veeck *et al.*, 2015; Wang *et al.*, 2008; Williams, Stirling, & Keynes, 2004).

Trust in food safety is the essential basis for daily food purchase behaviour. Any food products purchased and sold will have some degree of uncertainty and risk (Fischer, Gonzalez, Henchion, & Leat, 2007). However, developments in food technology and the growth in international trade provide consumers with an ever increasing range of competitively priced foods (Wilcock *et al.*, 2004). At the same time, people can only know a little about the foods they consume frequently and consumers usually lack basic information about the safety and risk of the food they are eating (Fischler, 1988). When consumers are purchasing food, they have to rely on their trust in the food industry and the government to guarantee the safety of food products, being the basis for consumer trust in the food industry (Chen, 2008). From the perspective of consumers, in order to reduce the potential risk arising from food safety, consumers will choose the food in which they may have more trust (Yeung & Yee, 2003).

A series of food safety events including the BSE crisis, dioxin crisis, and foot-and-mouth disease, heavily affected the public trust in food safety control systems and public regulators resulting in a drop in consumer trust in food safety (Chen, 2008; Gellynck & Verbeke, 2001; Miles & Frewer, 2001). Consumer trust in food safety then emerged as the crucial issue in terms of the food supply chain (Grunert, 2005; Rohr *et al.* 2005; Verbeke, 2005). In order to deal with the potential risk, consumers have to modify their consumption habits to avoid the associated food and brands and switch to other potential food choices, threatening the viability of the food industry concerned (Gossner *et al.*, 2009). The public's mistrust consequently results in severe adverse effects on the development of the food industry (Gossner *et al.*, 2009). Furthermore, continuing severe food incidents have greatly affected the public trust in local food control systems, public regulators and governments, particularly in China (Chen, 2008; Finucane *et al.*, 2000; Gellynck & Verbeke, 2001; Grunert, 2005; Henderson *et al.*,

2012; Jensen, 2004; Rohr *et al.* 2005; Verbeke, 2005). What's worse, when consumer trust is lost, regaining that trust is very difficult and will take a long time (Bennet, Calman, Curtis, & Fischbacher-Smith, 2010).

Theoretical foundation of trust building

Many researchers have attempted to find out what is the nature of trust. Renn and Levine (1991) identified five core components of trust: competence, objectivity, fairness, consistency, and faith. Kasperon, Golding, and Tuler (1992) identified four key dimensions that play an important role in the development and maintenance of trust: commitment, competence, caring, and predictability. Some research indicated that competence and care are the main dimensional concepts of interpersonal trust. Metlay (1999) suggested that trust is not complex and multifaceted, but rather a simple concept based on two distinctively different components 'care' and 'competence'. Normally, competence and caring are the two widely accepted core elements of trust, while fairness, consistency, faith, commitment, predictability are still being disputed (Kasperon *et al.*, 1992; Metlay, 1999; Renn & Levine, 1991). There are some other elements of trust building, such as the credibility of an information source (Jungermann, Pfister, & Fischer, 1996), the perceptions of others' (Langford, 2002), the passage of time (Berg, 2004; Rousseau *et al.*, 1998), age (Berg, 2004) and the consumer's impression of sales representatives (Ganesan, 1994). However, when it comes to food safety, many other factors including the food supply chain, incidents, and the media should be considered. What's more, the above research regards trust as a static structure of trust and does not emphasize the relationship between risk and trust.

In order to have a better understanding of trust in food safety, a dynamic structure of trust building with multi-order factors is needed. This thesis will discuss trust building

in two categories: the nature of trust and how trust is influenced. As to the nature of trust in food safety, in the perspective of this study, trust is a dynamic state and is based on continuing risk information transfer. This judgement has been supported by some previous research. Many researchers believe that the major element of being trusted in terms of food safety is the perception of truthful information; information asymmetry is the main reason for distrust in food safety (Frewer *et al.*, 1996; Yee, Yeung, & Yeung, 2005). Gellynck, Verbeke, and Vermeire (2006) introduced an information flow model to explain the generation process of trust in food safety from the perspective of information communication. In this information flow, food safety information consists of both objective (rational) risk information and subjective (irrational) risk information. Frewer *et al.* (1996) pointed out that perceived food information in the consumers' mind is the basis of consumer trust building rather than the real food hazard risk based on scientific assessments. In order to remove the information asymmetry, information communication is regarded as the most logical solution (Yee *et al.*, 2005). Insufficient food related information and limited access can result in information asymmetry, and people will feel difficulty in making choices (Teisl & Roe, 1998). In some situations, information may be available but it fails to attract the attention of consumers given the huge amount of information that people are exposed to on a daily basis (i.e. information overload) (Gellynck *et al.*, 2006).

De Jonge (2008) argued that the general trust of consumers in food safety can be viewed from two perspectives: optimism and pessimism. According to De Jonge (2008), optimistic and pessimistic attitudes to food safety can co-exist and they are influenced by each other. However, for many factors it may be hard to be divided into optimistic or pessimistic factors. For example, consumers may have an optimistic perception of food safety but they can become quite pessimistic about food safety when an extremely

serious food safety incident emerges. This study attempts to regard trust as a state of risk information transfer where risk information can be either optimistic or pessimistic. In this case, it will be easier to examine many factors which might influence trust in food safety.

As to the factors contributing to trust in food safety, they will be discussed in the following section.

2.3 Factors contributing to trust in food safety

There are many factors contributing to trust in food safety (Giraud & Halawany, 2006; Henderson *et al.*, 2011; Knight *et al.*, 2007b; Wang *et al.*, 2008; Williams *et al.*, 2004). Based on previous research, some important factors contributing to trust in food safety need to be considered.

Food supply chain

Developments in food technology and the growth in international trade provide consumers with an ever increasing range of competitively priced foods (Wilcock *et al.*, 2004). At the same time, people have limited knowledge about the foods they consume; often lacking the basic information about the quality and safety of the food they are eating (Fischler, 1988). The public have to rely on their trust in the food industry and the government to guarantee the safety of food products and this is the basis for consumer trust in the food industry (Chen, 2008). Although the food industry, including farmers, manufacturers, distributors and retailers, has a primary responsibility for the control of food safety (Fischler, 1988; Wilcock *et al.*, 2004), consumers still require their governments and food experts to bear some responsibility for food safety and

consumer protection. In this study, food safety authorities and global organizations (i.e. FAO) were represented by the “regulator” part of the food safety participants as well as farmers, food manufacturers and food retailers.

Food hazard

Food safety refers to all hazards that might cause food to endanger public health; such hazards are not negotiable and must be removed once exposed (WHO/FAO, 2006).

Sources of food hazards are divided by Yeung and Morris (2001) into microbiological, chemical and technological hazards. Gossner *et al.* (2009) noted that foodborne diseases can arise from biological, chemical and physical hazards.

Consumer concerns towards the safety of food can vary significantly based on the types of food safety hazards. Some elements can determine consumer attitudes to food safety including chemical issues (e.g. hormones in milk and food additives), health issues (e.g. cholesterol contents and nutritional imbalances); spoilage issues (e.g. microbial contamination), regulatory issues (food inspection and labelling), deceptive practices (e.g. weight-reduction diets) and ideal situations (e.g. length of time for pesticide safety assessment) (Brewer, Sprouls, & Craig, 1994). Ramsey and Funk (2009) noted that microbiological hazards and food packaging might cause the main food concerns in milk products. In China, Li *et al.* (2011) found out that many consumers concerns about the antibiotic residues in seafood had an adverse impact on buying intentions. Knight, Holdsworth, and Mather (2008) noted that Chinese consumers seem more accepting of genetically modified food than European and Indian. Normally, Chinese consumers might perceive greater food risk for a food safety hazard than American people (Schroeder *et al.*, 2007).

Food group

Some researchers noted that consumer trust in food safety can vary among different food groups. Rohr *et al.* (2005) found that the public had various assessments of effects of food safety attributes in eggs, beef and apples in Germany. In Australia, food additives and food labels are viewed as the main factors influencing the public concerns about food safety (Williams *et al.*, 2004). In the USA, raw animal food, undercooked hamburgers and raw seafood were of high concern for consumers (Klontz, Timbo, Fein, & Levy, 1995).

Food Brand

According to Keller (2003), brand is a multi-dimensional term covering many elements: country of origin, supply chain, third party certifications, company and so on. For an organization, the significance of a brand is to recognize the marketplace benefits created from the brand (Keller, 2009). According to Hoeffler and Keller (2003), possible benefits of brand include: improved perceptions of product, higher customer loyalty, less vulnerability of market response or crises, more profits, better commercial relationships, increased marketing communication effectiveness and additional opportunities. Since it is difficult for consumers to acquire all necessary information and knowledge about food safety, consumers need to find a trustworthy information channel to avoid potential food risk during their food buying (Hu, 2010). Brands are an indicator for consumers to perceive the level of risk for food safety and can influence purchasing decisions (Keiningham, Perkins-Munn, & Vavra, 2005).

Yeung and Yee (2012) found that the public can adopt marketing strategies to cope with food risk concerns including brand, quality assurance, price, shelf life and endorsement. In order to reduce the potential risk arising from food safety, the public can choose

alternative brands of food products in which they may have more trust (Yeung & Yee, 2003).

Traceability

Food safety concerns often arise from conflicting information between the consumers and the food industry (FAO, 2011). Adequate food safety information is required by the public to make their food shopping decisions, however, consumers always face information asymmetry and this asymmetry influences the consumers' perception of risk (Choe, Park, Chung, & Moon, 2009). Traceability is an ideal mechanism to bridge the information gap between the public and industry (Gossner *et al.* 2009; Ortega, Wang, Wu, & Olynk, 2011). In order to minimise the perceived risk associated with food safety, traceability has been introduced to the food supply chain (Choe *et al.*, 2009) and helps in consumer confidence in food safety (FAO, 2011). Giraud and Halawany (2006) noted that the implementation of traceability from "farm to fork" can benefit the food industry by providing top quality food products and rebuilding public confidence in food safety. Traceability also can reduce the adverse impacts of food incidents and minimise food borne diseases (Mejia *et al.*, 2010). In addition, traceability provides an opportunity for food suppliers to communicate with consumers and avoid consumer concerns with moral issues associated with food safety (Lindh & Olsson, 2010). Similarly, traceability can improve the transparency of the entire food supply chain, so it can produce and strengthen consumer trust in food safety (Van Rijswijk, Frewer, Menozzi, & Faioli, 2008). Traceability can indicate food safety is controlled and guaranteed, and traceability is important for developing consumer trust in food safety (Van Rijswijk *et al.*, 2008). Furthermore, traceability can also bring other indirect

benefits to food buying intentions, such as health, quality, control, welfare and environmental issues (Van Rijswijk *et al.*, 2008).

Media

There are a lot of examples of media amplification of food events including genetically modified food and BSE (Frewer, Miles, & Marsh, 2002b). For example, in 1996 the media announced a causal link between BSE and Variant Creutzfeldt-Jakob disease (vCJD), causing a significant drop in the public trust of regulators and scientific experts (Eldridge & Reilly, 2003). Although one role of the media is to educate the public, the media is a mixture of science, economy, politics and culture (Lofstedt, 2006). According to the social amplification theory, proposed by Renn and Levine (1991), social amplification of the public perceptions of risk can be much more heightened or attenuated than the real hazards because of psychological, social and cultural effects. During the information transmission, mass media (i.e. newspapers and TV) usually amplify related information by creating or interpreting risk information to attract public attention (Goodman & Goodman, 2006). This can explain why media reports associated with a hazard or potential risk often exaggerate the adverse effects (McCarthy, Brennan, Boer, & Ritson, 2008). The transmission then continues throughout the mass media, regulators and society, which may also attenuate or amplify the event into a revised message. This process is regarded as the 'ripple effect' (Kasperson *et al.*, 1988; Renn & Levine, 1991). This theory has been used to explain many food risk issues and food incidents (Eldridge & Reilly, 2003; Frewer *et al.*, 2002a). Many researchers believe that media plays an important role in building, diminishing or rebuilding trust in food safety by education or the ripple effect, with media as the primary platform for food risk

communication (Frewer *et al.*, 2002b ; Goodman & Goodman, 2006; Lofstedt, 2006; McCarthy *et al.*, 2008).

Food incidents

The level of food safety concern can be increased substantially by serious food events, resulting in adverse effects on the development of the food industry (Gossner *et al.*, 2009). BSE in Britain, the dioxin crisis in Belgium and the highly pathogenic avian influenza (HPAI) from Asia have had an impact on consumers all over the world (Schlundt, 2008). The BSE incident cost the UK government approximately £288 million. Furthermore, all UK exports of beef and related products were prohibited by the European Commission in 1996, costing about £600 million to the industry and severely affecting the total UK economy (MAFF, 2000). Immediately after the melamine contaminated milk incident in China was revealed, 68 countries refused to import food from China or imposed harsh restrictive trade measures against Chinese food, particularly for Chinese dairy products (Gossner *et al.*, 2009).

Based on the above factors contributing to trust in food safety, a multi-order factor model of trust in food safety will be developed in Chapter 4 Trust in food safety.

2.4 Food purchasing behaviour

Food buying is very complicated with many influencing factors (Henderson *et al.*, 2011; Nonis *et al.*, 2010; Wang *et al.*, 2008; Yeung & Yee, 2012). Most food purchasing behaviour has some degree of uncertainty and risk related to food safety (Fischer *et al.*, 2007). Consumers' concerns about food safety and their food purchasing behaviour are linked and therefore of interest to the food industry (Wilcock *et al.*, 2004). Food safety researchers struggle to define food safety and understand how consumers perceive food

risk and choose food. Many researchers have explored the impact of food risk on food buying behaviour (Nonis *et al.*, 2010; Yeung & Yee, 2003; Yeung & Yee, 2012).

Researchers have for some time been aware of the fact that trust in food safety plays an important role in affecting consumer purchase intentions (Yeung & Yee, 2012). Yeung and Morris (2001) noted that the perception of food risk is one of the most important factors affecting consumer responses and purchasing behaviour, particularly when there has been a loss of trust in food safety or where people lack the necessary information. Eom (1994) confirmed that there is a negative relationship between food risk perception and purchasing intentions. Moreover, some researchers even argued that purchasing intentions are shaped by the perceived food risk, and that public perceptions of risk may become the major factor influencing purchase intention (Taylor, 1974; Zeckhauser & Viscusi, 1990). This is supported in the meat purchasing field. Yeung and Yee (2012) found that food safety is the most important factor in determining Chinese people's purchase of meat.

Some researchers noted that it is the subjectivity rather than objectivity of perceived risk that determines consumer behaviour (Rozin, Pelchat, & Fallon, 1986; Yeung & Morris, 2001). They argued that food buying behaviour is usually influenced more by subjective aspects of food risk, being based on psychological rather than objective considerations.

Both trust and risk have more cultural and political attributes rather than the objective properties relating to food hazards (Macnaghten & Urry, 1998). The reality of safe food might not mean a high level of consumer trust in the safety of food. Many consumers connect food safety to virtual risks and worry about the hypothetical health risks without scientific evidence. Although the public perceived risk regarding food safety often does not represent the real food hazards, the consequent feeling of distrust for

consumers can result in substantially objective effects on food purchase intention (Berg, 2004).

When the food industry understands the consumer concerns for food risk, this could help the industry develop more effective marketing strategies to restore consumer trust in food safety and increase their market share (Heerde, Helsen, & Dekimpe, 2007; Yeung & Yee, 2012).

2.5 Online shopping environment

Electronic commerce

With the widespread uptake of information technology, electronic commerce (E-commerce) is becoming an important trade channel (Zhang, Deng, Wei, & Deng, 2012). E-commerce has several categories including Business-to-Business (B2B), Business-to-Customer (B2C), and Customer-to-Customer (C-C) (Moodley, 2002). Compared with traditional trade, E-commerce can significantly promote business trade efficiency and convenience (Zhang *et al.*, 2012).

Online shopping has developed rapidly in developed countries. In the UK, online shopping market value is increasing rapidly (Rose & Dhandayudham, 2014). In Greece, online shopping is still in the first stages of development (Papaioannou, Georgiadis, Moshidis, & Manitsaris, 2015). In the USA, online shopping is undergoing huge changes. The year with the highest growth rate was 2011, after which the growth rate slowed (Schultz & Block, 2015).

Some researchers have noted, understandably, that online shopping between developing and developed countries differs significantly. The main issue is technical barriers which

are a major barrier to the development of online shopping in developing countries, but less of a problem in developed countries such as those of the EU (Canavari *et al.*, 2010). However, the Chinese online shopping market seems to have increased particularly rapidly. In 2011, the value of the Chinese online shopping market was only about US\$ 123 billion (Ministry of Commerce of China, 2012). In 2015, the value of the Chinese online shopping market accounted for more than US\$ 580 billion (China International Electronic Commerce Center, 2016). Recently, China's online shopping market value has been growing at a rate of 33%, far more than the rate of increase in Germany (22%), Japan (27%), the USA (17%), and the UK (18%) (China International Electronic Commerce Center, 2016; Schultz & Block, 2015).

Online shopping environment

Previous research has explored consumer perceptions of online shopping experiences (Nambisan & Watt, 2011; Jüttner, Schaffner, Windler, & Maklan, 2013). According to Hofstede *et al.* (2010), online retailers cannot provide adequate trustworthiness for buyers because these e-buyers don't know what they might be provided through the internet. Online consumers are quite conservative about choosing a new supplier via the internet. Many researchers believe that trust in an online shopping environment can establish a basic customer base for online shopping (Grewal *et al.*, 2003; Harris & Goode, 2004; Stewart, 2003), particularly for the first time buying something with a new retailer (Canavari *et al.*, 2010).

The online transaction environment is quite complicated and websites are accepted useful tools for researchers to examine consumers' online shopping intentions (Barnes & Chen, 2007; Harris & Goode, 2010). According to Gefen *et al.* (2003), websites and trust are regarded as the most important elements influencing consumer online buying

intentions. Chang and Wu (2012) stated that perceived risk regarding websites plays a crucial role in promoting online shopping intentions and behaviours. Bai, Law and Wen (2008) explored the relationship between satisfaction with websites and online purchase intention in China. They suggested that website quality can directly increase the degree of Chinese consumers' satisfaction with websites, which has an important impact on online purchase intention.

Trust in the website is generated mainly from the perceived reputation of websites (McKnight, Choudhury, & Kacmar, 2000). Szymanski and Hise (2000) noted that people perceived website security as one important criterion to e-satisfaction. Similarly, Flavián, Guinalfú and Gurrea (2006) found that consumer trust in online shopping can be increased by the degree of their satisfaction and loyalty toward websites. When researchers planned to analyse consumer trust in online shopping, websites can be used to represent the entire online transaction environment to simplify the study (Harris & Goode, 2010).

Previous research indicated that many factors can influence the trust in the websites, including design, visual appeal, entertainment value, usability, information and financial security related to websites (Harris & Goode, 2010; Mathwick, Malhotra, & Rigdon, 2002). Many researchers noted that an attractive design of a website is very important for online exchanges (Zeithaml, Parasuraman, & Malhotra, 2002). Some researchers noted that better aesthetic characteristics can improve consumers' satisfaction in the online shopping environment (Szymanski & Hise, 2000) and result in more positive attitudes to the online service quality (Montoya-Weiss, Voss, & Grewal, 2003). According to Zeithaml *et al.* (2002), functionality and usability are regarded as the crucial criteria for online consumers when they are choosing a website. Similarly,

Srinivasan, Anderson and Ponnnavolu (2002) and Donnelly (2001) showed that usability plays a key role in the way consumers evaluate a website.

However, risk exists with each purchase via the internet. The openness over the internet is the main reason for the emergence of security risk (Zhang *et al.*, 2012). Since consumers cannot physically experience the goods through touch, sight or smell through online stores, this causes many doubts among consumers and may keep potential consumers from buying products. Other concerns include the security of personal information, credit card information and service (Hansen, Jensen, & Solgaard, 2004; Miyazaki & Fernandez, 2001; Swinyard & Smith, 2003). Chang and Wu (2012) stated that perceived risk regarding the website of online stores plays a crucial role in promoting online shopping behaviours and influences online purchasing intention through cognition- and affect-based attitudes.

As there are many factors contributing to trust in online shopping, some researchers have attempted to divide these factors into different categories. For example, factors influencing consumer online buying intentions are divided into two categories: internal factors and external factors (Cheung, Chan, & Limayem, 2005). Internal factors are closely related to consumer perceptions including attitudes to the internet medium, personal motivations, perceptions of risk and personal innovativeness; external factors include the online shopping environment: convenience, ease of use, perceived usefulness, control and enjoyment (Cheung *et al.*, 2005; Gefen *et al.*, 2003; Wolfinbarger & Gilly, 2001). Rose and Dhandayudham (2014) stated that the above influencing factors can encourage online shopping intentions and benefit online retail market development. Trevinal and Stenger (2014) proposed a conceptualization of the online shopping experience, involving four dimensions: physical, ideological, pragmatic

and social. Rose *et al.* (2012) pointed out that online purchase intention is determined by online shopping satisfaction and trust in online shopping. Interactive speed, telepresence, challenge, skill, ease of use, customization, connectedness, aesthetics, perceived control and perceived benefits were ten antecedent variables for online shopping intention. Based on previous research, many factors need to be examined. In this case, a multi-level model of trust in the online shopping environment will be better to explore the nature of trust structure. This kind of trust model will be discussed with more details in Chapter 5.

In terms of the Chinese online shopping environment, many researchers have focused on the factors which influence Chinese consumers' online purchasing behaviour. Chang and Zhu (2007) noted that there are five key factors including personal information security, usefulness, convenience, trade reliability and shopping feeling which can influence Chinese online buying behaviour. Yin and Wu (2008) pointed out that income, network usage capability and online shopping security rather than age, education level and convenience are important factors influencing Chinese online shopping intention. Peng *et al.* (2008) focused on university students and they argued that factors including usefulness of the internet, internet knowledge, internet service, perceived risk and reputation can affect the Chinese university students' interests in online shopping behaviour.

Zheng *et al.* (2012) noted that there are different types of risk related to online clothes shopping in China. Among them, product performance risk is regarded as the most important risk which influences online shopping intention. Psychological risk is regarded as the most important perceived risk which influences consumer online buying

behaviour, followed by function risk, service risk, economical risk, privacy risk, physical risk, social risk and time risk (Yao, 2008).

Online food shopping

Schultz and Block (2015) noted that product categories should be considered when online shopping in the USA is examined. Schultz and Block (2015) explored several product categories including ticket electronics, appliances, entertainment, furniture, beauty products and gift cards. However, food products were not examined in their research. Papaioannou *et al.* (2015) examined factors influencing online Greek fast food industries and noted that consumers based their decisions on price, where fast food industries seem to pay more attention to building a reputation and the appeal of their websites. However, this research did not emphasize food safety in terms of online shopping.

There is some recent research focusing on the consumer online food buying intention. Hsu and Chen (2011) found that the needs for convenience and variety are important motivations contributing to online health food shopping. Other factors of importance include safety and health, however, the convenience need is believed to be the most important motivation to online shopping. Liang and Lim (2011) explored the online purchase behaviour of specialty food. They divided consumers into two categories: active online food shopping people (adventurous consumers) and inactive online food shopping people (traditionalists). Compared with traditionalists, most adventurous consumers are young people and they are much more interested in online food buying. Perceived risk, including personal information security, delivery risk and service risk have been related to the online purchase of food in China (Chang & Zhu, 2007; Yao, 2008; Peng *et al.*, 2008; Zheng *et al.*, 2012).

Some Chinese research in online food shopping has focused on new technology applications. Huang and Liu (2014) focused on the application of new traceability in agricultural food E-commerce: traceability techniques can track hazardous food sources rapidly. Wang and Luo (2014) designed a new E-commerce platform to provide fast food online ordering. However, these studies focused on techniques rather than consumer purchase intentions. Limited research focuses on the Chinese consumers' attitudes to the online shopping food.

Lack of buyers' trust is the key reason to limit B2B E-commerce development in the food sector in Europe (Hofstede *et al.*, 2010). In order to examine the trust building in B2B food trade, Hofstede *et al.* (2010) proposed a typology of trust through the perspective of a buyer in search of a new supplier in Europe. According to this typology, buyers trust in a transaction consists of a series of sub trusts - in the product, in the seller and in the market environment. From their study, there are several variables for trust building, such as culture, food groups, reputation and market environment. Reputation is regarded as an extremely important factor for food E-commerce. Hofstede *et al.* (2010) noted that this trust typology can reflect how buyers' trust in B2B food trade is built. Based on this typology of trust, Canavari *et al.* (2010) investigated all factors contributing to the generation of trust in B2B agri-food trade and how these factors are communicated. They noted that that culture plays an important role in the creation of online trust particularly for the food industry. The reason is that the food supply chain often involves international trade and individual attitudes towards risk differ in various countries. They argued that trust structure can be a significant variable in countries in Europe and this was supported by Jean, Sinkovics and Kim (2008).

McKnight *et al.* (2000) pointed out that there is an exploratory time prior to an initial purchase online. During the exploration stage consumers have no direct experience with online shopping and their trust in websites is generated mainly from the perceived reputation of websites (McKnight *et al.*, 2000). After this period, consumers might make the decision to purchase goods through the websites for the first time. This exploratory stage is viewed as the ‘commitment stage’ (McKnight *et al.*, 2000) and the level of satisfaction of the websites determines the following online purchase behaviour.

Because this study will examine trust from the perspective of individual consumers, it will focus on individual online shopping. Online shopping is identified as “*the use of online stores by consumers up until the transactional stage of purchasing and logistics*” (Monsuwé, Dellaert, & Ruyter, 2004:1118). In this study, online shopping will cover two types of E-commerce: B2C and C2C because only these two types are directly involved with individual consumer purchasing behaviour.

2.6 Student perceptions of food safety

Health research indicates that food health educational information aimed at an entire population cannot achieve the desired effect (Contento *et al.*, 1995). Food information, therefore, should be targeted to specific groups (Altekruse, Yang, Timbo, & Angulo, 1999; Medeiros, Hillers, Kendall, & Mason, 2001). However, limited academic research is focussed on young adults (Byrd-bredbenner *et al.*, 2007) while a high proportion of young adults lack a basic food safety background and necessary food risk information to pass on to their children (Altekruse *et al.*, 1999; Kennedy *et al.*, 2005). There are several explanations for this. Firstly, young people have had limited opportunities to learn about food safety issues. Secondly, the response rate from health surveys for young adults, particularly for males, is often low, where the young prefer to focus on other activities,

such as academic study or sports (Kroeze, Werkman, & Brug, 2006). College students' food habits are often ignored in research on risk assessment (Comrie, Masson, & McNeill, 2009).

However, young adults' perceptions of food safety play an important role in their future health. Young people account for the largest percentage of food allergy incidents, potentially resulting in death (Bock, Munoz-Furlong, & Sampson, 2001; Sampson, 2004). The reason might be that the young population gets little information from their main social network (friends) and their parents (Sampson, Muñoz-Furlong, & Sicherer, 2006). 39% of young people do not realize that they have a food allergy to certain food (Sampson *et al.*, 2006).

Online information is regarded as the main information channel for young people compared with traditional sources (Sampson *et al.*, 2006). Most information can be easily distributed by the internet (Comrie *et al.*, 2009). Few studies have investigated the influence of new media on food safety communication (Barnett *et al.*, 2011).

However, compared with traditional food risk communication channels (e.g. brochures, leaflets, videos exhibitions and meetings), the new media including QQ and Wechat (like Facebook) can play an important role in young adults' concerns towards food safety. This field of research is useful for exploring trust in online food shopping as university students are regarded as the main online shopping customers (Leonard, 2012; Liang & Lim, 2011; Zhang *et al.*, 2011).

Many researchers note that Chinese middle class has developed rapidly since the late 1990s because of the growing number of young professionals with high education and their involvement in the expanding economic structure (Loh, 2015; Wu & Zhang, 2005). There were a large number of university students in China graduating and

starting work in 2014 (Ministry of Education of China, 2015). In this case, an in-depth understanding of Chinese university student trust in online food shopping will be beneficial for the food industry.

Chapter 3 Methodology

3.1 Introduction

Surveys, case studies and experiments are popular research strategies in the social sciences (Denscombe, 2007). A survey is an important research strategy to collect empirical research data originating from a large number of respondents at a specific point in time (Denscombe, 2007). Compared to some other research strategies, such as experimentation, the degree of accuracy and the response rate of a survey might be low. However, surveys can collect empirical data with wide and inclusive coverage, having considerable potential for generalizability that some other methods often do not have. Survey research costs are often low and can be predictable. They can often be conducted in a fairly short period of time (Bryman, 2008).

Survey strategy includes several research methods including self-administered questionnaires (printed and online), and interviews (face-to-face and telephone), (Denscombe, 2007). Interviews can be used to collect data with greater depth and detail and usually have higher response rates. However, interviews also have several disadvantages. Interviews can consume much time, and the impact of an interviewer and/or the specific context might have an influence on the reliability of the data gathered (Denscombe, 2007). The self-administered questionnaire is one of the most important survey research methods (Denscombe, 2007). Questionnaires are familiar to most people and are a low cost tool to gather data (Dillman, 2007). Since questionnaires have been applied to explore consumer trust in food safety (De Jonge, 2008; De Jonge, Van Trijp, Renes, & Frewer, 2010), self-administered questionnaires were used in my study to conduct a survey in China to examine Chinese students' trust in online food safety.

3.2 Sample design

In this study, a complicated model of trust in online food safety was proposed with many factors influencing trust to be examined. The Structural Equation Model (SEM) is deemed to be a suitable method to analyse data for such a complicated situation. Hair, Anderson, Tatham and Black (2005) noted that a large sample size is required for a SEM. Specifically, Comrey and Lee (1992) pointed out that 200 participants is fair, 300 is good, above 500 is very good, and above 1000 is excellent. In order to explore the trust between buyers and sellers in C2C E-commerce, Leonard (2012) conducted a questionnaire survey involving 248 participants. De Jonge (2008) received about 458 suitable questionnaires to study general consumer trust in food safety. According to Harris and Goode (2010), 257 fully completed questionnaires were received to study consumer trust in the e-servicescape model with a return rate of 39%. In order to explore New Zealand consumers' intentions toward functional food, Sukboonyasatit (2009) sent 500 questionnaires to people in Palmerston North, with 474 valid questionnaires being returned. In the present survey I decided to send 2000 questionnaires to help ensure a sufficient number of respondents for SEM analysis.

Wang and McCluskey (2010) conducted a survey about Chinese consumer preferences for imported wine in both Beijing and Shanghai. They noted that there were three reasons why they chose major urban areas: residents from urban areas have much more disposable income than rural areas, foreign food products are not available in small cities or rural areas and most of the existing foreign food consumers live in major cities. Chinese people living in Beijing have higher incomes than those from most other parts of China, making it easier to pay for premium food; and they do purchase imported food

via the internet (Data 100, 2013). In the present survey, one major city (Beijing) and one medium city (Zhenjiang) in China were chosen to be the target cities for the survey.

Most previous studies exploring trust in E-commerce have focused on university students (Leonard, 2012; Liang & Lim, 2011; Zhang *et al.*, 2011). Therefore, this appeared to be a logical choice for the present study on the trust in food safety for food products purchased on line. University students are regarded as a major group of online customers. For example, Leonard (2012) noted that university students are the largest population segment for online shopping and spending in the U.S.A. Compared to undergraduates on campus, young professionals with a full time job are able to afford more imported food since foreign food products in China are always more expensive than local brands. However, it is very difficult to find sufficient working professionals to be volunteers. Wang and McCluskey (2010) recruited 195 residents from seven randomly selected communities and 228 students from three universities to participate in their research exploring Chinese consumer preferences for wine sales. Compared with students, it was very hard to access professionals' contact information while the recruitment of community residents was much more difficult (Wang & McCluskey, 2010). This might be an important reason why previous researchers prefer students rather than other groups. All participants in my survey were university students, including undergraduate students and postgraduate students. A limited budget meant that this survey was limited to four universities (Beijing University, Capital Normal University, Capital University of Economics and Business, and Jiangsu University of Science and Technology). These universities are based in both a major city (Beijing) and a middle size city (Zhenjiang city).

This research was conducted in accordance with the Code of Ethical Conduct for Research, Teaching and Evaluations involving Human Participants (Massey University, 2015), where all participation in this study was fully informed and voluntary. Each survey participant was informed about the object, significance, benefits and potential risks to the participants related to this research, as well as their rights as participants and being told that all responses were confidential. All collected information was treated as confidential. The survey and questionnaire design was deemed to be of low risk and was reported to the Human Ethics Committees of Massey University, New Zealand.

3.3 Questionnaire design

In order to make sure the design of the questions was suitable for Chinese university students, a pre-survey was conducted in advance and the original questions were translated into Chinese. Fifty Chinese overseas students in Wellington were invited to participate in a pre-test survey. Based on the feedback from this pre-test survey, the number of questions and the structure of many questions were refined. In addition, many questions were rephrased in both Chinese and English versions so that they could be more easily understood.

The initial intention was to have Chinese students do the survey online with distribution via email during my pre-survey. However, there were two reasons I decided to use printed questionnaires in the end rather than email. Firstly, universities and student unions confirmed that they did not have email addresses for their students and that they always used mobile phones rather than email to communicate with their students. Secondly, the rate of responses via the email from students was usually extremely low. Few Chinese students seemed to use email as their main form of social communication.

During the entire survey period, all participants could communicate with me via the mobile phone (i.e. chat on Wechat or QQ). Participants had been given sufficient opportunity to access more detailed explanations regarding the meaning of certain concerns. Those of most concern were questions dealing with food regulators, traceability, and family income.

The questionnaire for this research was mainly based on two previous surveys, one for trust in food safety (De Jonge, 2008) and one for trust in online shopping (Harris & Goode, 2010). Every variable, from the literature, contributing to trust in online food shopping was examined by at least one question. Fifty questions were adapted into the questionnaire, with a structure as follows: 16 questions for food safety, 17 questions for online shopping, 8 questions for online food shopping, 5 questions for online imported food and 4 questions for demographics.

Among the 50 questions, flexible measurement scales were applied. Twenty six items were rated on 5-point scales (i.e. strongly agree, agree, neither agree nor disagree, disagree and strongly disagree), eighteen questions were single-choice (i.e. which of the following categories best describes your family's annual income?) and six questions were multi-choice (i.e. what food below have you bought or you are going to buy via the internet?). A copy of the questionnaire can be found in Appendix 2. As to the questions supposed to examine the observed variables (i.e. Q1.2 for 'farmer'), each question was designed with several items to explore one variable. Some items may have a similar meaning, but they were written in various ways. Two items designed in opposite ways will improve the accuracy level of a variable being examined.

The first section focused on the overall trust in food safety. It explored consumers' average level of trust in food safety, trust in the food supply chain, attitudes to food

hazards and food groups, attitudes to food traceability, attitudes to food brands, attitudes to media and perceptions of food incident information. In this section, nine variables contributing to trust in food safety were examined: farmer, manufacturer, retailer, regulator, food hazard, food group, traceability, food brand and media. Most variables were examined by at least one question. The second section explored trust in the online shopping environment. In this section, ten variables contributing to trust in food safety were examined: visual appeal, design style, entertainment value, usability, relevance of information, customization, interactivity, ease of payment, financial risk and delivery risk. Each variable in the second section was examined by one question. Other aspects were also examined in this section and they included online shopping behaviour, reasons for online shopping, online shopping frequency, goods categories, and preferred websites. The third section examined online food shopping behaviours in China. This section covered the frequency of online food shopping, preferred websites and food groups. The fourth section explored imported food behaviours via the internet. In the final section demographic information was investigated. This section included information about gender, age, education and family income.

The overall level of student trust in food safety was developed from the previous research for general consumers' trust in food safety (De Jonge, 2008). In the survey conducted by De Jonge (2008), four items were developed to measure the positive attitudes of consumers to food safety, while three items were adapted to explore the negative attitudes of consumers. As to the first questions (Q1.1), there were six items used to measure the overall trust of Chinese students in food safety and these items are replicated from De Jonge's survey (2008). However, trust is a very complicated term and variables are not easily divided into optimism or pessimism. This study develops a

new theoretical foundation for the trust model. This theoretical foundation will be discussed further in the Chapter 4 discussion section.

The food supply chain plays an important role in food quality and food safety control and it is regarded as a significant and important factor influencing the overall trust in food safety. For food industries, trust in supply chains could save transaction expenses (Sodano & Verneau, 2006). As to the consumers, they believe that farmers, food processing companies, food retailers and other actors related to the food safety control system should be responsible for the safety of food (Grunert, 2002; Berg *et al.*, 2005). Since the public usually does not have sufficient knowledge about food risks, supply chain actors provide sufficient related food safety information to society and thus guarantee the public's confidence in purchasing food from outside food markets (Van Kleef *et al.*, 2006). In the research of De Jonge (2008), trust in farmers, food retailers, food manufacturers and the government were used to measure consumer trust in the food supply chain. In the present study, four questions (Q1.2-Q1.5) that explore Chinese students' trust in the food supply chain were derived from De Jonge's survey (2008). Farmers, manufacturers, retailers and food regulators were regarded as four important sectors contributing to the trust in the food supply chain. Compared with the questionnaire designed by De Jonge (2008), in this study food regulators were used instead of the government because other organizations including food certification agencies and food testing laboratories should also be considered. In this study, the government, food certification agency, and food testing laboratory were represented by "food regulators".

Based on previous research, consumer concerns of food risk always involve food hazards (De Jonge, 2008). According to the dual nature of risk "Risk = Hazard +

Outrage” (Sandman, 1987; 2006), this study regards food risk as a “low hazard, high outrage” risk. In this case, even a tiny potential food hazard might result in extreme food safety concerns and significant loss of consumer confidence in food safety. In addition, food hazards might result in varied impacts on consumer trust in different cultures and regions. De Jonge (2008) examined 17 types of food-related hazards in Canada and Netherland to identify how food hazards influence consumer confidence in food safety. In the question for food hazards (1.6), eight food related hazards were measured including food additives, toxic or harmful non-food materials, farming conditions, animal disease (i.e. mad cow disease), genetically modified foods, microorganisms, antibiotics and residues. Although the item “use by dates on food” is not a food hazard, this item is also included. The reason is that ignoring “use by dates on food” can result in severe foodborne diseases and this item is an important part of the content for food labels.

In addition, some researchers noted that consumer perceptions of food risks can vary among different food groups. Rohr *et al.* (2005) found that the public had various assessments of the effects of food safety attributes in eggs, beef and apples in Germany. In the USA, raw animal food, undercooked hamburgers and raw seafood were of high concern for consumers (Klontz *et al.*, 1995). Compared to consumers in Western countries, Chinese consumers have different food concerns related to food hazards and food groups because of different food consumption habits and continuing food incidents. Although Knight *et al.* (2008) noted that Chinese consumers seem more accepting of genetically modified food than Europeans and Indians; Chinese consumers are normally more concerned about food safety than their American counterparts (Schroeder *et al.*, 2007). Many Chinese consumers were concerned about the antibiotic residues in seafood and such concerns had an adverse impact on buying intentions (Li *et*

al., 2011). After melamine contaminated milk powder was found in 2008, Chinese consumers became concerned about the safety of milk powder and non-food materials in food. Thus in my survey both food hazards and food groups were examined. As to the question of students' risk perceptions of food groups (Q1.7), several high risk food products were explored including milk powder, meat products, seafood, vegetables and fruits. Since wine, honey, health food and baby food imported from New Zealand are very popular in China, these food categories were also included.

In recent research, traceability plays a growing role in the food industry (Chrysochou, Chrysochoidis, & Kehagia, 2009) and it is viewed as an important factor which can help to improve consumer confidence in food safety (FAO, 2011). Traceability can reduce the adverse impacts of food incidents and minimise the potential of food borne diseases (Mejia *et al.*, 2010). In addition, consumers can directly access certain food related information which can reduce public worries about ethical issues (i.e. whether animals were killed humanely) as well as food risk concerns (Lindh & Olsson, 2010). In China, consumers will pay a premium for food products containing traceability information (Ortega *et al.*, 2011). According to a survey conducted in China (Song, Liu, Wang, & Nanseki, 2008), 92.8% of Chinese participants believed that a traceability system is necessary for food safety control, with 89.4% willing to pay more for food products with traceability information. Similarly with the questions used in Song *et al.*'s survey (2008), two questions (Q1.8-1.9) were used in the present survey to evaluate the impact of food traceability on Chinese consumer trust in food safety. One question was designed to find out how Chinese students think about the implementation of food traceability techniques. Items of this question are mainly similar with previous questions which were used to examine other factors (i.e. farmer). The other question

was to measure how much of a premium Chinese students would pay for a food product which can be traced.

In terms of food safety, consumers always choose a food brand they have confidence in. It is difficult for consumers to acquire all the necessary information and knowledge about food products. When the public do not have enough information on food safety, they will resort to a favoured and trusted brand (Hu, 2010). Brands can provide an ideal indicator for consumers to perceive the level of risk for food safety and hence influence purchase decisions (Keiningham *et al.*, 2005). When a food safety scare emerges, brands with a high safety assurance are preferred by consumers (Yeung & Yee, 2012). Although the government can provide high quality standards for food processing, food industries still need to promote their own brand value and food safety guarantee to build consumer confidence (Yeung & Yee, 2012). Food industries should consider how to apply brand strategies to support consumers to recognize brands and create customer trust in both brand equity and food safety (Hu, 2010). In this study, one question (Q1.10) was designed to examine how food brands influence students' perceptions of food safety.

Food related incidents can impact on public trust in food safety throughout the world. Bovine Spongiform Encephalopathy (BSE, or mad cow disease) is a good example of a food safety incident that influenced consumer trust. The BSE incident damaged not only UK trust in beef products but also confidence in the UK government's announcements about food risk (MAFF, 2010; Jensen, 2004). In China, the melamine-contaminated milk incident seriously damaged Chinese consumer confidence in the quality and safety of the whole dairy industry in China and also changed Chinese consumers' perceptions of food safety (Chen, 2008; Gossner *et al.*, 2009). In De Jonge's (2008) research, the

influence of food incidents was measured by three questions, all of them open-ended. In the present study, I used an open-ended question (i.e. Do you recall a particular food incident? Q1.13). This question was based on one of the questions developed by De Jonge (2008). Additionally, one single-choice question (Q1.14) was designed to find out which food group is closely related to students' recall of food incidents.

Although media was not examined in the survey conducted by De Jonge (2008), this variable should also be considered. The way the media frame and cover a risk story and how and what they decide to inform the public could influence consumer perceptions of food risk (Andsager, 2000; Frewer *et al.*, 2002b). Science and the public are often regarded as independent of each other (Woolgar, 1996). Consumers are ignorant of the scientific reality about food hazards and risks, and media should focus on rectifying the knowledge gap between food safety participants and the public (Hilgartner, 1990). The practices of risk communication vary from top-down risk communication (from experts to the public) to consultative, transparent and inclusive decision-making processes, which start to focus on public perceptions (Wynne, 2001). In the view of Lofstedt (2006), risk communication is a constructive dialogue between all related stakeholders rather than just top-down communication (Lofstedt, 2006). In this case, efficient risk communication for media may enhance transparency of governance and boost public confidence in the safety of food (Halkier & Holm, 2006; Rowe & Frewer, 2004; Wales, Harvey, & Warde, 2006). In order to investigate how media influence students' trust in food safety, a seven-item question (Q1.16) was designed including several important elements for the media: source of information, transparency, efficiency, scientific statements, reports and stakeholders. These items were highly emphasized by international organizations as important in terms of food risk communication (FAO/WHO, 1998).

Aesthetic appeal of a website is regarded as the first construct of Chinese students' trust in online shopping. This term "aesthetic appeal" is similar to the "ambient conditions" dimension of Bitner (1992). Aesthetic appeal emphasizes ambient characteristics and it may result in positive evaluations of a website (Harris & Goode, 2010). Many researchers noted that an attractive design of a website is very important to online exchanges (Grewal *et al.*, 2003; Zeithaml *et al.*, 2002). Some researchers noted that better aesthetic characteristics can improve consumers' satisfaction in the online shopping environment (Szymanski & Hise, 2000) and result in more positive attitudes to the online service quality (Montoya-Weiss *et al.*, 2003). Harris and Goode (2004) pointed out that a website's aesthetic appeal features are closely associated with the online consumer's trust. In this regard, a website's aesthetic appeal is viewed as one of the key dimensions for the development of e-trust by Harris and Goode (2010). There are many factors which might impact on aspects of a website's aesthetic appeal. The general introduction (Ekhaml, 1996), page graphics (Dreze & Zufryden, 1997), audio-video characteristics (Evans & King, 1999), appropriate background (Callahan, 2001), page image (Ekhaml, 1996) and entertainment environment (Mathwick *et al.*, 2002) are important influencing factors. Harris and Goode (2010) examined the above factors' role in the dimension of online aesthetic appeal and argued that the originality of the website design, visual appeal and entertainment value are the three main influencing factors. In the present study, three questions including visual appeal (Q2.7), design style (Q2.8), and entertainment value (Q2.9) were chosen to examine the aesthetic appeal of a website. The design of these three questions was replicated from the questionnaire developed by Harris and Goode (2010).

Functionality of a website is the second construct to measure student trust in online shopping in this questionnaire. Functionality was studied as a dimension of the physical

servicescape (Bitner, 1992) and it involves the structure, organization and usability of a website. According to Zeithaml *et al.* (2002), functionality and usability are regarded as the crucial criteria for online consumers when they are choosing a website. Similarly, Donnelly (2001) and Srinivasan *et al.* (2002) proposed that usability plays a key role in the evaluation of a website by consumers. Some researchers (Montoya-Weiss *et al.*, 2003) believe that suitable information can highlight the value of website usage; particularly if the information content is regarded as the most important factor influencing the functionality of a website. Furthermore, comfortable interaction between a website and consumers constitutes an important factor in attitudes towards a website (Bauer, Grether, & Leach, 2002); interactivity is regarded as the key basis for an online transaction (Srinivasan *et al.*, 2002). In addition, some research found that personalization regarding the servicescape of a website can avoid negative appraisals from consumers (Rust & Kannan, 2002); a website should take into consideration individual information needs (Donnelly, 2001). Harris and Goode (2010) listed usability, information, customization and interactivity as the main factors contributing to the dimensions of layout and functionality. In this questionnaire, four questions were replicated from the questionnaire developed by Harris and Goode (2010) to examine four observed variables: usability (Q2.10), relevance of information (Q2.11), customization (Q2.12) and interactivity (2.13).

Security is viewed as the third construct of Chinese consumer trust in online shopping. Financial risk regarding online shopping is reviewed as the main service security concern for online shopping behaviours. Financial security can reflect how consumers perceive the risk of the online payment process. It is widely discussed in previous studies (Chang & Wu, 2012; Montoya-Weiss *et al.*, 2003; Yao, 2008). Szymanski and Hise (2000) noted that people perceive convenience, site design, and financial security

as the main factors for e-satisfaction. Montaya-Weiss *et al.* (2003) found positive links between online consumers' e-satisfaction and perceived security of a website. Many researchers believe that perceived security plays a pivotal role in online shopping intentions (Szymanski & Hise, 2000; Zeithaml *et al.*, 2002). Chang and Wu (2012) claim that perceived risk regarding the websites of online stores plays a crucial role in promoting online shopping behaviours and influences online purchasing intention through cognition and affect-based attitudes. Harris and Goode (2010) believe that financial security is one of the most powerful factors to be used to evaluate trust in the online shopping environment. Besides financial risk, other risks may exist. Some researchers pointed out that product performance risk is the most important risk which influence the online shopping intention in China (Zheng *et al.*, 2012). Yao (2008) regarded psychological risk as the most important perceived risk which influences consumer online buying behaviour followed by function risk, service risk, payment risk, privacy risk, physical risk, social risk and time risk. In this regard, I will explore three kinds of risk to represent online service security: financial risk (Q2.14), delivery risk (Q2.15) and payment service (Q2.16). The items used to measure these three factors were mainly based on the questionnaire designed by Harris and Goode (2010).

3.4 Data analysis

Data collection

Between April and June 2013, 2000 printed questionnaires were sent to Chinese students at four universities. The student unions from four universities distributed the questionnaires to students randomly. The chairmen of the four universities' student unions randomly chose 25-30 majors via the universities' official major lists.

Undergraduate students, master students and doctoral students were all covered in the

sampling process. The participation of students from the chosen majors in completing the questionnaires within two weeks was entirely voluntary. Questionnaire responses were collected by the student unions and were returned to me within a month. One thousand and seven hundred questionnaires were received amongst which 297 had missing values. In the end, 1403 questionnaires were valid for the data analysis, which represented approximately a 70% response rate. There were three reasons why so many questionnaires were received. Firstly, the questionnaires were distributed to students by student unions which have a powerful impact on students. On Chinese university campuses, Chinese students always have quite high interest in cooperating with student unions. Secondly, Chinese students were passionately interested in some topics (i.e. food safety and online shopping). Thirdly, an academic research survey is quite unusual on most Chinese university campuses. Many participants told me that it was their first time to participate in an academic research survey.

Among 1403 valid responses, 1238 students had experienced online shopping, 832 students had purchased food online, and 259 students had purchased imported food online.

More figures regarding the questionnaires are listed in Appendix 3. All questionnaire data was transferred into an Excel file and then was analysed by the LISREL method.

Demographic variables

Among 1403 participants, 1217 participants were undergraduate students accounting for 87% of all participants, while the other 186 participants were postgraduate students. 1372 participants' are aged between 18 and 30 with this age group accounting for 98% of all participants.

Among 1403 participants, 778 participants were female students (55%) and 625 participants (45%) were male students.

Only 955 participants filled in the question for family income: 560 participants' families (58.6%) belong to the low income class (annual income under RMB 80,000), 318 participants' families (33.3%) belonged to the middle income class (annual income between RMB 80,000-200,000) and 77 participants (8.1%) come from the high income class (annual income RMB 200,000 over).

Previous research shows that consumer perceptions towards food safety vary because of demographic elements including gender, age, educational level and economic status (Wilcock *et al.* 2004). Because participants in this survey are university students on campus, most participants belonged to the same age group (18-30 years) and have the same educational background (undergraduate student). Therefore, only two demographic factors, gender and family income, were examined in this study. In this study, Analysis of Variance (ANOVA) was used for data analysis with significant differences at the 0.05 level.

Structural Equation Model

In my study, the trust model is a structural model containing multi-items (88 items in total), multi-variables (18 variables), multi-determinants (six determinants) and two dimensions. In this case, the Structural Equation Model (SEM) is a statistical tool to analyse the structural model of trust. SEM is a powerful method to provide insight into consumer psychology and consumer behaviour (Priester, 2010). SEM can be used to explore the nature of the basic constructs and the influence of one construct over another (Priester, 2010). Since 2010, SEM has been promoted by the Journal of

Consumer Psychology for studies of consumer psychology (Lacobucci & Churchill, 2010). SEM was also used by Harris and Goode (2010) to examine trust in online shopping and applied by De Jonge (2008) to explore consumer trust in food safety via factor analysis. Since my research model is mainly based on their previous models, SEM was applied to study the nature of Chinese student trust in online food shopping.

Principal Components Analysis

Principal Components Analysis (PCA) is one of the most important multivariate statistical techniques (Abdi & Williams, 2010). If a data set represents many observations and they are described by inter-correlated variables, PCA can be used to reduce the number of observed variables and the minimum number of principal components can be established in order to represent that data set (Abdi & Williams, 2010). PCA can extract the main information for a data set, simplify the construct of a multivariate model, reflect the significant variance among observed variables, and describe the extent to which certain components are closely related to a principal component (Abdi & Williams, 2010).

In the first stage of PCA, the number of principal components needs to be confirmed. In order to find out how many principal components are needed, a scree test can be applied. In a scree plot, the slope of a of an eigenvalue always drops significantly from steep to flat in front of an elbow point. After that point, the graph stays flat. The specific number of principal components before an elbow point in the scree test reflects the most satisfactory number of principal components (Jolliffe, 2002).

Subsequently, a rotation of the observed variables can be applied to describe the inter-correlation among the observed variables (Abdi, 2003). A rotation component matrix

can describe the extent of each observed variable related to a certain principal component. Analysed by Varimax Rotation, a group of observed variables is related closely to one principal component based on the rotation loading value of these variables. In this case, the relationship between observed variables and principal components can be found and this relationship can be used to represent the nature of a data set (Abdi & Williams, 2010).

Since the trust model is multivariate, PCA will be performed in my study to summarize the observed factors.

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) is the key method to validate SEM. CFA can specify several latent factors to represent observed factors to reflect constructs so it can propose a simpler measurement structure (Asparouhov & Muthén, 2009). Both the model of trust in online shopping proposed by Harris and Goode (2010) and the model of trust in general food safety developed by De Jonge (2008) were validated by CFA. However, CFA might fail to find any observed variables or latent factors. In this case, the refined model assessed by CFA may still be complicated (Asparouhov & Muthén, 2009). Furthermore, CFA also faces a high risk that it might wrongly separate one variable from others (Asparouhov & Muthén, 2009). Therefore, Exploratory Factor Analysis is necessary before using CFA to avoid unnecessary mistakes.

Exploratory factor analysis (EFA) is a primary method to explore SEM. EFA can separate observed variables with a low factor loading value from others. Based on objective survey data, EFA provides an accurate structure of a model involving limited latent factors, compared with the proposed theoretical model which is only based on a

literature review. De Jonge (2008) applied EFA to investigate 15 food groups, removed four components out of 15 components and found that the remaining components still reflected 73% of all variance. Harris and Goode (2010) also conducted a preliminary analysis to find out the extent of the loading value of variables on latent factors. In my thesis, EFA will also be applied to prepare a preliminary analysis before CFA. It will be evaluated to determine the extent to which observed variables are loaded on potential latent factors, to remove some observed variables in the current theoretical model, and decide how many latent factors are required.

To explore SEM, either LISREL or Amos software can be used (Blunch, 2013; Albright & Park, 2009). Both Harris and Goode (2010) and De Jonge (2008) used LISREL to analyse their data. In this case, this thesis used Lisrel to analyse SEM and examine potential coefficients among variables.

Goodness of fit indices

In order to assess the level of reliability and validity of the data, particularly how much the model matches the data, there are a number of choices of goodness of fit indices. However, there is no consensus of a universal model fit that could be applied. Multiple fit indices from various types of measures are viewed as a practical solution (Shook, Ketchen, Hult, & Kumar, 2004). In my thesis, the entire data analysis involves variables, latent factors and model structure. Based on the previous related research (De Jonge, 2008; Harris & Goode, 2010), this thesis will employ a number of goodness of fit indices to verify the appropriateness of the data analysis.

In order to find out whether the data of my survey can be analysed by PCA, two tests were applied in this study. Kaiser-Meyer-Olkin (KMO) is used to describe whether data

can be analysed by PCA. According to Hair *et al.* (2005), a value of KMO above 0.70 indicates that it is satisfactory to analyse a data by PCA, between 0.60 and 0.70 means the extent is average and 0.50-0.60 KMO means fair. If the KMO value is below 0.50, it is generally viewed as unacceptable. Bartlett's Test of Sphericity is also applied to assess the acceptable level of PCA. According to Jolliffe (2002), data can be analysed by PCA if a p value is below 0.05 in the Bartlett's test. In this study, both KMO and Bartlett tests were used.

The level of reliability can be examined by Cronbach's Alpha (α) coefficient. α coefficient is employed to access the average correlation of the internal questionnaire items (Cortina, 1993). The value of α coefficient is between 0 and 1. If items of a questionnaire are measuring exactly the same thing and there is no error, α coefficient should be 1. Thus, α coefficient can determine the level of internal correlation of the design of a questionnaire, and errors in the data from the participants (Spiliotopoulou, 2009). Harris and Goode (2010) employed α coefficient to evaluate the reliability of each of the observed variables. α coefficient should be over 0.7 or the scale will be viewed as not reliable (Nunnally, 1978). In this thesis, α coefficient will be used to determine the level of reliability of questionnaire design and data.

To explore the goodness of fit of the entire model, a Chi-square difference test (χ^2) is a basic measure to assess how well a model reproduces the data (Albright & Park, 2009). If the χ^2 value is quite high, it means that the model fails to predict the data; if the χ^2 value is low, it implies that the extent to which the model represents the data is high (Lacobucci & Churchill, 2010). In another words, the lower the value of the χ^2 the better the model fit. Normally, an acceptable model implies that the χ^2 value should not be significant ($P < 0.05$).

However, only using a sole χ^2 value as a measure might cause problems because χ^2 is influenced by sample size (Gerbing & Anderson, 1985). Since the size of the survey in my research is large, χ^2 stays low if the size of a sample is not more than 200. When the size is beyond 200, the value of χ^2 could become large, which means that the model does not fit the data at all (Marsh, Balla, & McDonald, 1988; Harris & Goode, 2010). In order to avoid this distorted situation, degrees of freedom should be considered (Lacobucci & Churchill, 2010). Byrne (1989) noted that a model fit can be acceptable if the χ^2/df ratio does not exceed 5.0.

The Comparative fit index (CFI) is used to assess how well a model matches another model rather than matching the data like χ^2 (Lacobucci & Churchill, 2010). CFI is employed to reflect the complexity and parsimony of a model and its value is between 0 and 1. The higher value of CFI the better the model (Albright & Park, 2009). As recommended by Hair *et al.* (2005), a model is acceptable if the value of CFI is over 0.92.

Root Mean Square Error of Approximation (RMSEA) is another goodness of fit index (Albright & Park, 2009). If the RMSEA value is less than 0.05, it means a model can match well with the degrees of freedom (Albright & Park, 2009). However, many researchers noted that RMSEA is quite sensitive to the size of a sample (Albright & Park, 2009). Once the size of a sample exceeds a certain number ($N > 250$), RMSEA might become quite distorted (Lacobucci & Churchill, 2010). According to Hair *et al.* (2005), the maximum acceptable value of RMSEA is 0.08.

Chapter 4 Trust in food safety

4.1 Introduction

Trusting intention and trusting beliefs are two elements of trust in food safety (Kriegersteffen, Boland, Lohscheidt, Schneider, & Stolze, 2010). Trusting intention is the public's willingness to rely on others including farmers, retailers, certification systems and food labels; and trusting beliefs are consumer beliefs in the trustworthiness of the above actors. Trust can be divided into three types: dispositional trust (faith in humanity, trusting stance), personal trust and institutional trust. These sub-trusts produce both trusting intention and trusting beliefs.

Bruce (2002) investigated the public perception of the application of new biotechnology in the food sector. His theory argued that the public trust in a new technique in the food industry is based on reasonable benefit and risk analysis. Similarly, Starr (1969) also pointed out that individual behaviour is regarded as a rational response to the risk as people make their own decisions based on risk-benefit assessment. According to Bruce (2002), if biotechnology brings enough benefits, the public will accept it even though it might be quite risky. However, once biotechnology fails to match society's aspirations, a mismatch will emerge and public scepticism will arise. For example, when GM soya and maize were imported into the UK, the government was interested in reducing farming costs and increasing production efficiency to increase profits while public benefits and values were not ignored. The public felt a risk was being imposed upon them with no tangible benefits to them. That is why there seemed to be antipathy towards GM soya and maize in the UK. Bruce (2002) believes that there is more work needed around bridging the gap between perceptions, values and visions of "government and industry" and the "ordinary citizen". Bruce (2002) proposed several

suggestions to re-establish public trust in GMF, such as biotechnology's ethical dimension that should be viewed as an intrinsic rather than extrinsic value. The biotechnology industry needs to listen to public concerns and make an appropriate response to help people realize the benefits by themselves.

Lindgreen (2003) argued consumer trust in food safety consists of several sub-trusts including generalized trust, trust in the food control system, trust in food processing and individual trust. If one sub-trust is lost, the consumer will have to draw on other ones. Lindgreen (2003) then pointed out that if consumers lose their trust in domestic food safety and/or local government agencies, exporting countries can restore this trust by their own marketing schemes. Similarly, Knight *et al.* (2007b) also pointed out that public distrust may provide an important opportunity for food exporting countries to enter a market that has been damaged through a food safety incident.

Based on the large number of food incidents and the size of the food industry, with any food products purchased and sold there will be some degree of uncertainty and risk. The potential serious commercial implications for partners in the food chain mean that there is mutual dependence, with even a small problem with a particular supplier having huge implications where the whole chain/network can be jeopardised (Fischer *et al.*, 2007). To avoid or minimise the potential risks, communication of information regarding the food supply chain is important (Fritz & Fischer, 2007).

Trust between food distribution channels can play an important role in consumer trust in food safety. Fritz and Fischer (2007) indicated that trust between food supply chains, throughout the upstream stages and downstream stages, is one of the most important prerequisites for transferring trustworthiness to consumers (Trust B2C). Food industry purchasing agents might play an important role in the analysis of consumers' trust in

food and their purchase behaviours. As consumers have complete freedom to choose from which supermarket to buy food, each purchasing agent needs to source food products from their trustworthy food distribution channel members to make sure the food is safe, or they risk losing consumers or being penalized by the regulatory authorities. That is why most consumers trust the quality and safety of food in supermarkets and prefer to buy food products in supermarkets rather than any other source (Knight *et al.*, 2007b). To some extent, trust of the food distribution channel members, particularly for large supermarkets, represents the concerns of the “end-consumers”. Large retail buyers are regarded as “gatekeepers of consumer choice” (Knight *et al.*, 2007b). However, it might be a different situation with the organic food industry. Consumers have a high degree of confidence in small shops since they can experience competence and integrity from the contact with the sales staff (Kriegesteffen, Boland, Lohscheidt, Schneider, & Stolze, 2010).

Fritz and Fischer (2007) established a hypothetical model for the development of trust in food business relationships. They believed that such trust is determined by three essential factors including personal bonds, past collaboration and quality of communication (influenced by frequency of communication and quality of information). In order to test this model, Fritz and Fischer (2007) conducted a survey in 5 European countries with relevance to 4 types of food (fresh produce, meat, grain and dairy) and this model proved to fit the survey results very well. From the survey, both the quality of communication and collaboration are the key determinants to active management of trust. As collaboration can only change with time, trust can be built most quickly by communication through enhancing the quality of information.

De Jonge, Van Trijp, Renes, & Frewer (2007) argued that trust in food safety has four determinants: trust in food related actors (regulators and those associated with the food supply chain), the perceived perception of the safety of food groups, the public recall of food associated with critical incidents, and consumer individual differences. This model had been further refined by De Jonge (2008) and Drescher, De Jonge, Goddard and Herzfeld (2012). According to this model (Fig 4.1), trust in food related actors and perceptions of a particular food group have more influence than the other determinants. Furthermore, trust in the government and food manufacturers are more strongly associated with the public trust than trust in farmers and retailers. Moreover, trust in meat and fish is highly influenced by public recall of food safety incidents. Trust has an impact on food purchasing intentions.

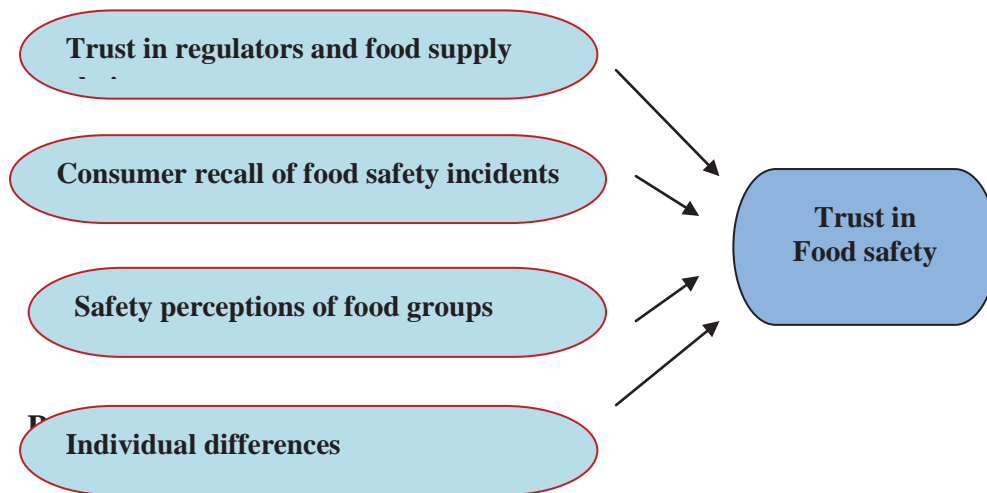


Fig 4.1: General consumer trust in food safety (De Jonge *et al.* 2007; De Jonge, 2008)

Proposed model of trust in food safety

Based on the previous research, in my study trust in food safety is assumed to be influenced by four dimensions: food supply chain and regulators, food safety perceptions, food information and food safety incidents (Fig 4.2). The food supply chain and regulators involves four observed variables including farmers, food manufacturers, food retailers and food regulators. Food safety perceptions cover two observed variables: objective food hazards and safety perceptions of food groups. Food information involves three observed variables: food brand, food traceability and media.

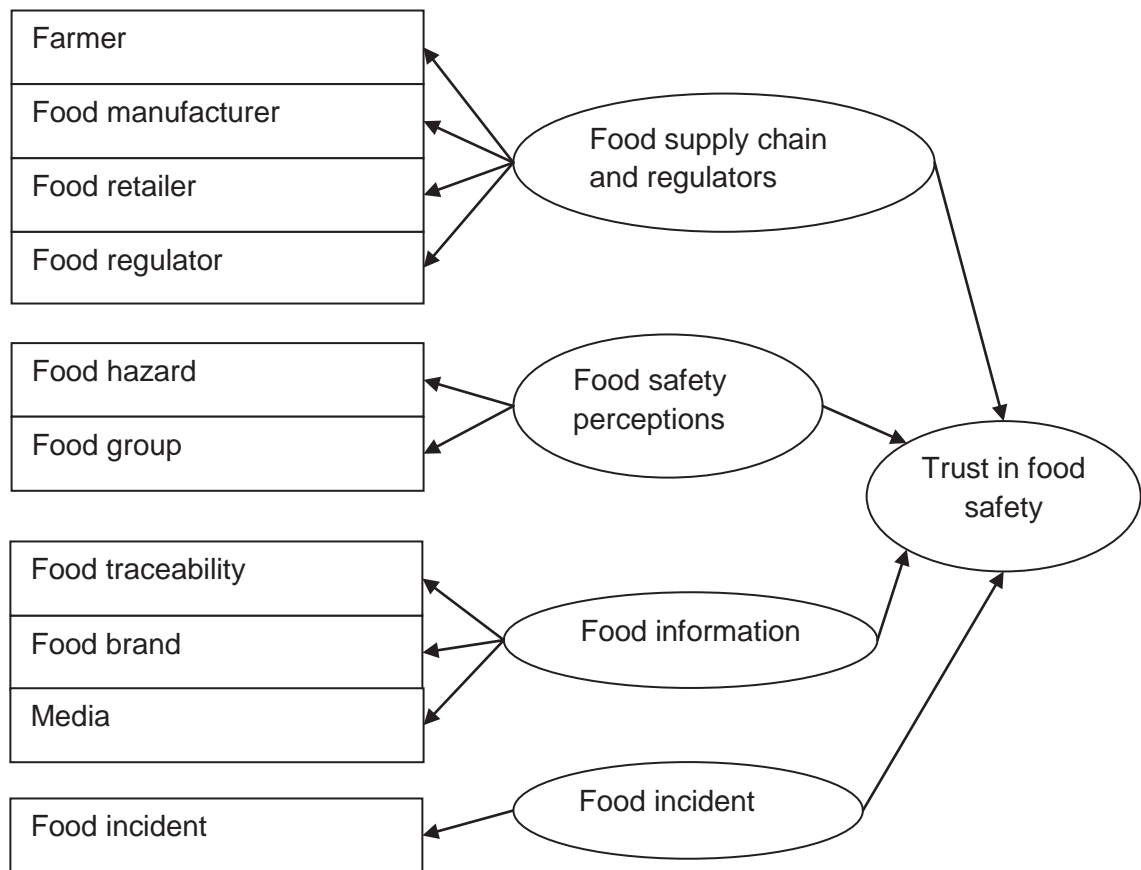


Fig 4.2: Proposed model of trust in food safety

4.2 Results

Conceptual structure of trust in food safety

In the following Table 4.1 α coefficients of ten observed variables related to trust in food safety are listed. The α values of the ten observed variables in the questionnaire are over 0.7 and the AVE values of most variables exceeded 0.50. This indicates that these nine variables are reliable and valid for further data analysis (De Jonge, 2008; Harris & Goode, 2010).

Table 4.1 Measurement properties for 10 observed variables

Observed Variables	Cronbach's Alpha	AVE
Farmer	0.810	0.582
Manufacturer	0.723	0.722
Retailer	0.843	0.698
Regulator	0.802	0.655
Food hazard	0.826	0.560
Food group	0.813	0.512
Food traceability	0.834	0.527
Food brand	0.897	0.471
Media	0.842	0.577
Food incident	0.826	0.531

The result of EFA shows that the KMO value is 0.782 and Bartlett test's p value < 0.001. This means that the data is suitable to be analysed by the method PCA. In this case, EFA was applied to test whether the framework of the proposed model of trust in overall food safety was suitable for Chinese students. In the following scree plot (Fig 4.3), the line of eigenvalues goes from 2.8 to 0.2. Since an elbow point is around 1.0 when the number of components becomes 3, this means that the most appropriate number of principal components of trust in food safety should be two. This indicates that the best choice is to divide the ten observed variables into two principal components.

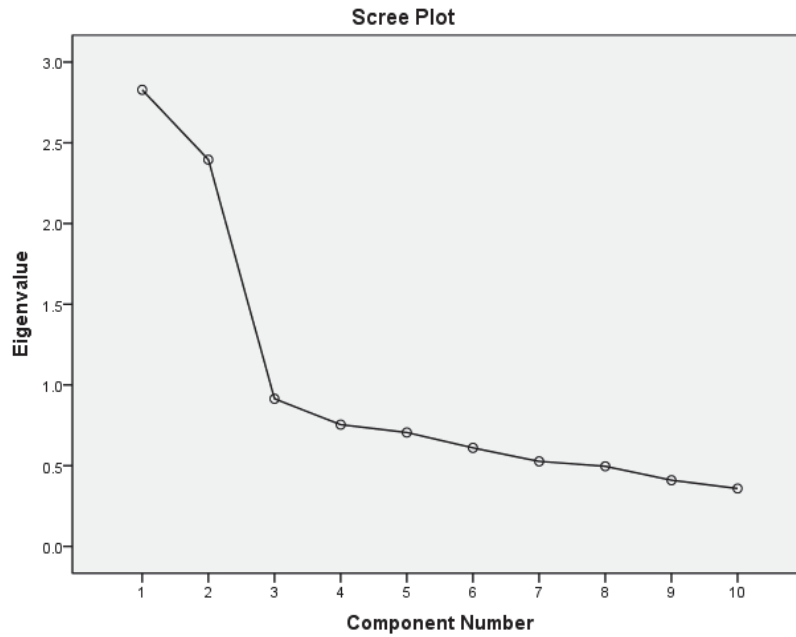


Fig 4.3 A Scree plot of 10 observed variables for food safety

Although the most appropriate number of the principal components of trust in food safety was confirmed, how closely each principal component was related to the ten observed variables is still not clear. In this study, the Rotated Component Matrix method was performed to describe the extent to which each observed variable was related to the other observed variables. Based on the following Table 4.2, we find that four observed variables (farmers, manufacturers, retailers and regulators) are significantly and closely related to each other. This means that the 1st principal component can be used to present the above four observed variables. Similarly, the other six observed variables are more closely related to each other. This means that the 2nd principal component can be chosen to represent the following six observed variables: food hazards, food groups, food traceability, food brands, media and food incidents. To make it easy, in this study the 1st principal component was defined as the first dimension of trust in food safety “Food Control” while the 2nd principal component is defined as the second dimension “Risk Information”. Compared with 6 variables in Risk

Information, the 4 variables in Food Control appear more related to each other. The main reason for this discrepancy might be that variables in Food Control are more related to objective aspects while variables in Risk Information involve both food hazards and subjective concerns.

Table 4.2 Rotated Component Matrix of 10 observed variables

Observed Variables	1 st Principal Component	2 nd Principal Component
	(Food Control)	(Risk Information)
Farmer	0.806	
Food manufacturer	0.841	
Food retailer	0.822	
Regulator	0.780	
Food traceability		0.749
Food hazard		0.753
Food group		0.527
Food brand		0.422
Food incident		0.572
Media		0.782

Based on the above results, the Confirmatory Factor Analysis (CFA) method was used to examine the internal relationship between the ten observed variables, the two principal components and trust in food safety. Based on the data analysis of CFA, the standardized parameter (or loading value) of each observed variable to the associated principal component represents how much this variable could influence the principal component. In Food Control, the loading values of farmers, food manufacturers, food retailers and Regulators are listed in Figure 4.4. Such loading values reflect the extent that each observed variable is related to the Food Control. Based on Figure 4.4, it implies that farmers, food manufacturers, food retailers, and regulators are important influencing factors for Food Control, with food manufacturers have the greatest influence.

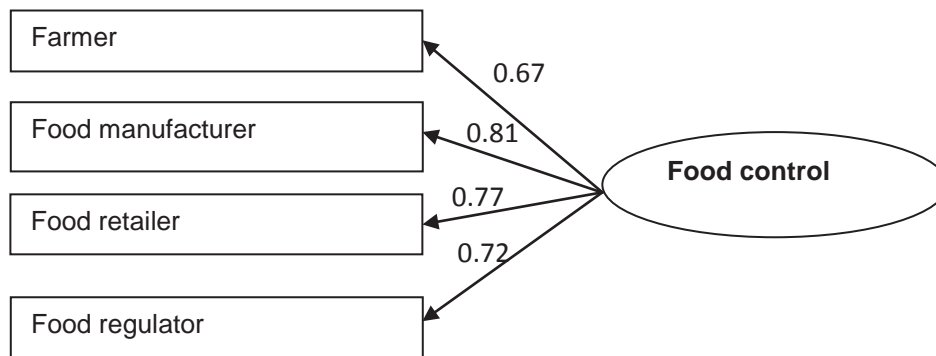


Fig 4.4 The first principal component—Food Control

In the second dimension of trust in food safety (Fig 4.5), the loading values of food hazards, food groups, food traceability, food brands, food incidents and media are listed. Based on Figure 4.5, only three observed variables (food hazards, food traceability and media) are important influencing factors for the dimension Risk Information. However, food groups and food incidents do not show much relation to Risk Information. In this case, only food hazard, food traceability and media will be picked as critical factors influencing Risk Information, while food group, food brand and food incident will be eliminated from further discussion in the thesis.

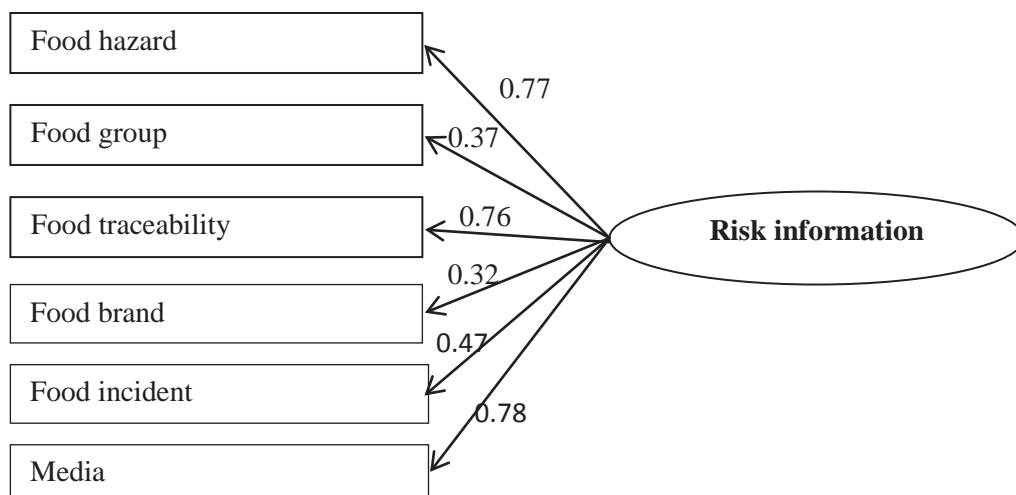
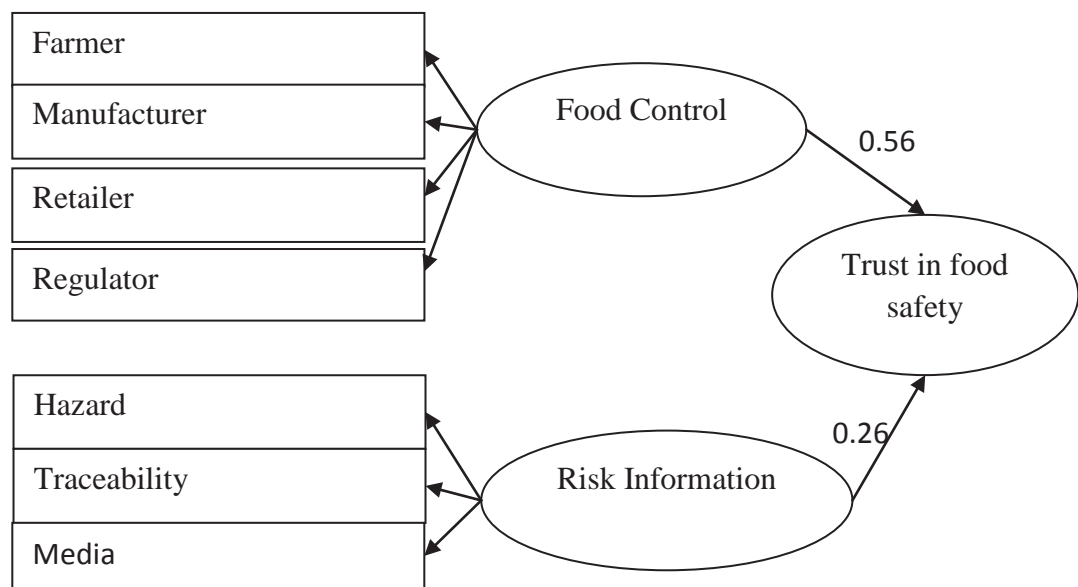


Fig 4.5 The second principal component— Risk information

As to the trust in food safety, the values of the goodness fit indices including χ^2/df , RMSEA and CFI (Fig 4.6) for the model of trust implies a satisfactory result. According to Fig 4.6, the loading value of Food Control (0.56) is much higher than the loading value of the Risk Information (0.26). This implies that the Food Control has more influence than Risk Information in developing trust in food safety. In summary, we find that there are seven critical factors influencing trust in food safety; and these seven factors can be divided into two dimensions: Food Control and Risk Information.



χ^2/df	RMSEA	CFI
2.65	0.05	0.97

Fig 4.6 Result of goodness fit indices

Chinese students' perceptions of food safety

When the 1403 participants were asked “Generally, food products are safe”, 48.13% of participants strongly agreed or agreed with this point while 25.83% disagreed or strongly disagreed. Full details of responses are shown in the following Figure 4.7.

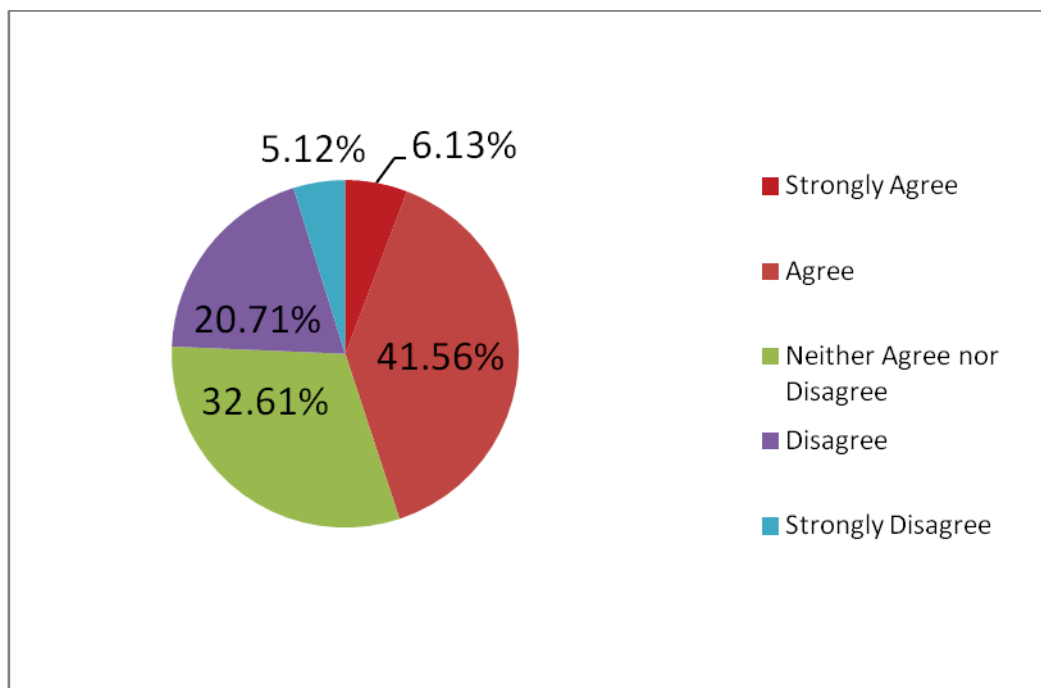


Fig 4.7 Attitudes to “Generally, food products are safe” (n=1403)

When the participants were asked “How much are you concerned about the following food risks?”, 87.24% of participants showed concerns about “Use by dates on food”, which accounts for the highest level of food risk concerns. Only 46.83% of participants were concerned about “Sanitary conditions in farming”, which reflects the lowest level of food hazard concerns. Full details of the levels of food hazard concerns are shown in the following Figure 4.8.

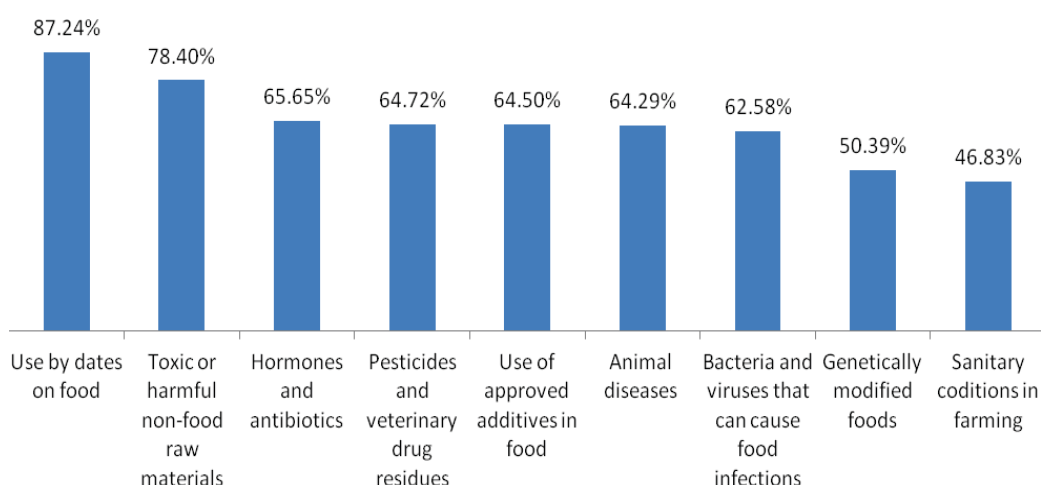


Fig 4.8 The extent of concern about food hazards (n=1403)

When the participants were asked “To what extent are you concerned about the food safety of the following categories”, 90.38% of participants showed that they were concerned about the safety of meat products, followed by 88.74% of vegetable and fruit products. Milk powder (65.43%) accounted for the middle proportion of participants’ concerned about food safety (Fig 4.9).

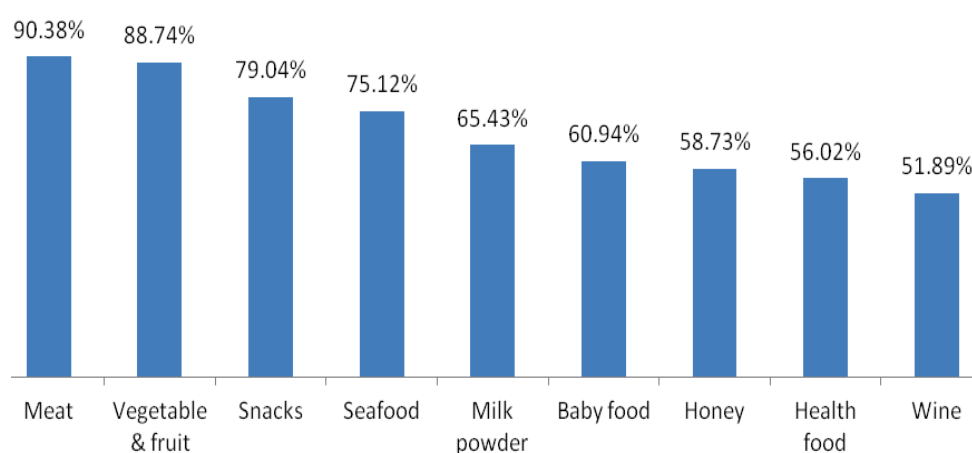


Fig 4.9 Proportions of participants that concerned about food safety (n=1403)

More than 90% of participants were willing to pay more for food with traceability information (Fig 4.10).

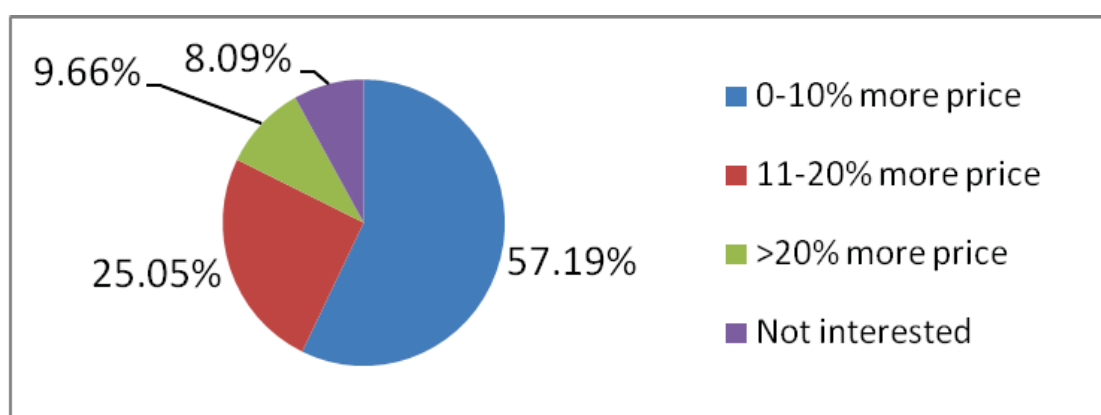


Fig 4.10 Proportions of participants that were willing to pay more money for traceable food (n=1403)

When the participants were asked “How safe do you believe food is from the following countries/areas?”, most participants believe that food from the EU, USA, New Zealand, Australia and Japan is safe (Fig 4.11). However, the safety of food imported from Southeast Asia showed a much lower level of confidence.

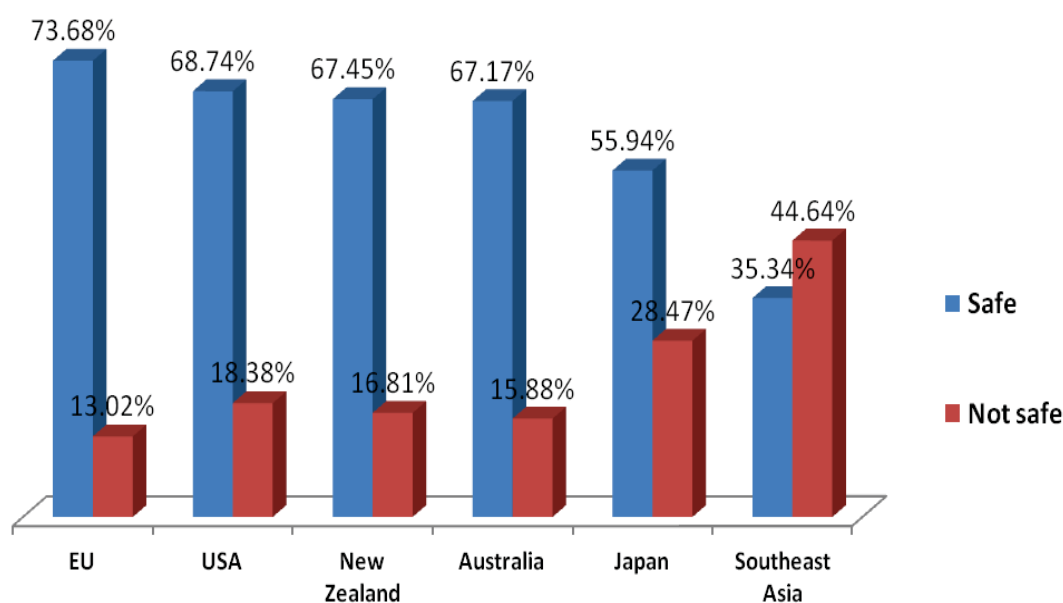


Fig 4.11 Proportions of participants' confidence in countries/areas of food origin (n=1403)

When the participants were asked questions related to food safety incidents, 77.52% of participants could recall food safety incidents that happened recently, and 22.48% of participants could not recall any incidents. Among the participants who could recall food safety incidents, 75.69% of them remembered an incident related to milk powder, 10.31% of them remembered meat product incidents, and 9.94% of them remembered snack food incidents. In addition, the main information sources of food incidents for participants was TV/Radio (39.98%) and online news websites (35.77%) (Fig 4.12). Although traditional media still remains the main part of information transferring sources of food safety incidents, the present study finds that online channels account for nearly 43% of the entire information transferring sources (35.77% for websites and

7.02% for online social network).

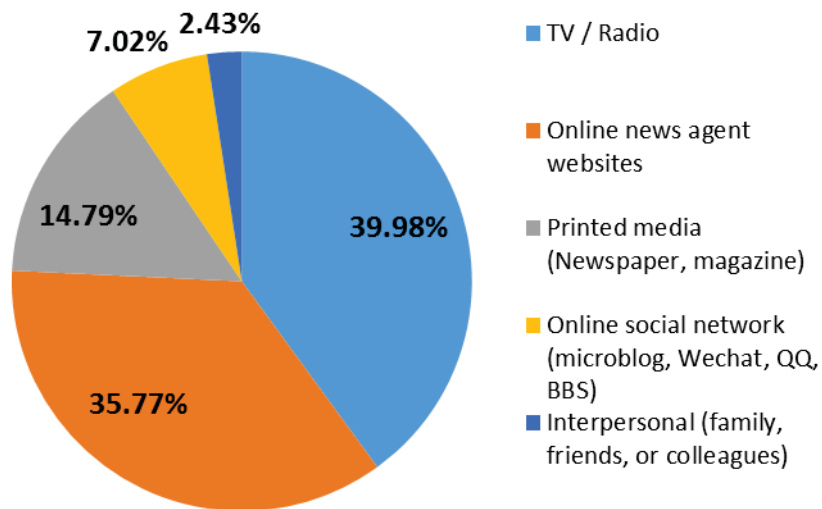


Fig 4.12 Sources of information about food safety incidents (n=1403)

When the participants were asked “How do the following issues affect your judgement about the reliability of information regarding food safety “, media comments, transparency, participating, openness, scientific evidence, efficient release to the public , and credibility of information sources are important elements of media regarding student trust in food safety (Fig 4.13).

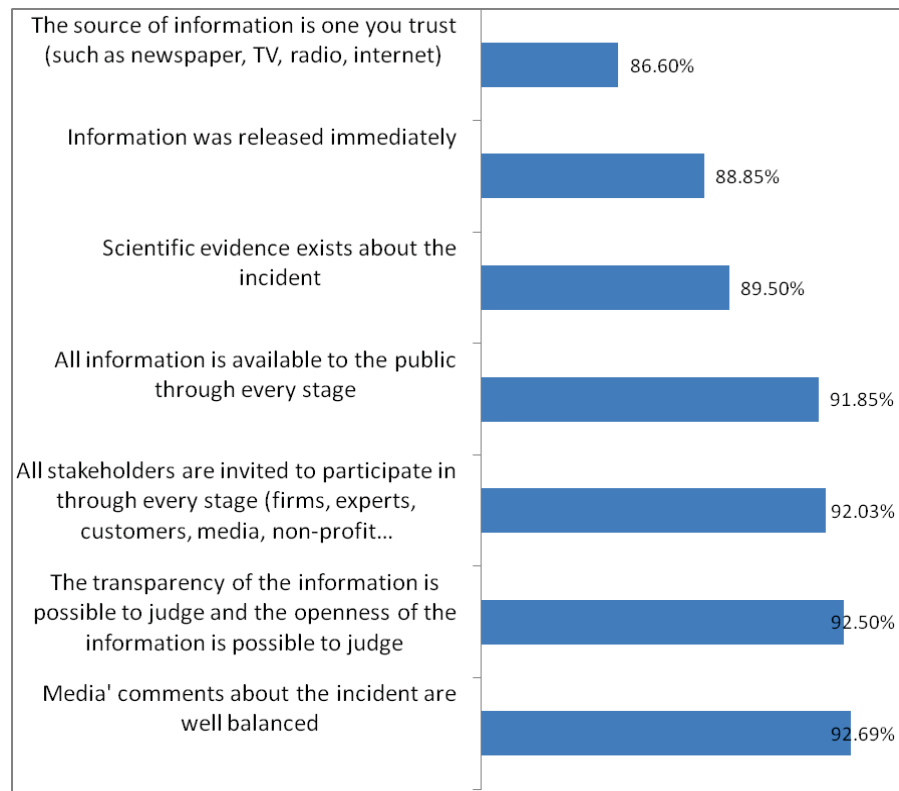


Fig 4.13 How does media influence confidence when a food incident happens (n=1403)

Gender and income are two demographic variables explored in this chapter (Table 4.3). Based on the results in Table 4.3, gender has a very weak influence in the following ten observed variables except food incidents. Family income, however, seems to have a strong influence in several observed variables including farmers, food traceability, food brands and food incidents. In this study, we have found that female students usually pay much more attention to food incidents than male students; while students with higher family incomes can be more interested in food traceability, food brands.

Table 4.3 Demographic variables

	Gender (n=1403)		Family income(n=955)	
	F	Sig.	t	Sig.
Farmer	0.002	0.969	7.778	0.000
Manufacturer	0.000	0.992	1.194	0.304
Retailer	0.924	0.337	0.868	0.420
Regulator	0.011	0.917	1.501	0.223
Food hazards	0.058	0.810	2.950	0.053
Food groups	1.004	0.316	0.847	0.429
Traceability	0.329	0.567	6.172	0.002
Brand	5.285	0.022	10.915	0.000
Incident	6.845	0.009	8.354	0.000
Media	0.676	0.411	3.129	0.044

4.3 Discussion

Conceptual structure of trust in food safety

According to Rousseau *et al.* (1998), trust is a psychological state for people who are willing to accept they are vulnerable, while they have positive expectations upon others' intentions or behaviours. Competence and caring are the two widely accepted core elements of trust while fairness, consistency, faith, commitment, and predictability are debatable (Kasperson *et al.*, 1992; Metlay, 1999; Renn & Levine, 1991). Based on previous findings, when the public decide to accept vulnerability (i.e. it is impossible for consumers to access sufficient information associated with food safety), people are used to relying on entities in which people have positive expectations of the intentions or behaviours of them (i.e. consumers are willing to trust in familiar food retailers to make their food purchase decision).

Previous researchers identified many theories of the conceptual structure of trust in food safety. However, these models focused on the culture in developed countries and these may not apply to countries such as China. Since culture always plays an important role in consumer trust, it is necessary to explore a trust model for Chinese consumers in the safety of food. In this study, a new conceptual trust model for Chinese students was

developed in Figure 4.6. In this model, Chinese student trust in food safety has two dimensions: Food Control and Risk information. The most important dimension, Food Control, is influenced by four factors: farmers, food manufacturers, food retailers and food regulators. The other dimension, Risk information, is mainly influenced by three factors: food hazards, food traceability and media.

Level of student trust in food safety

The extent of food safety concerns varies among different countries (Finucane *et al.*, 2000; Hofstede *et al.*, 2010). Normally, Asian consumers perceive a greater food safety risk than American people (Schroeder *et al.*, 2007). Given the continuing food safety incidents that have emerged in China in the past decade, previous research suggests that Chinese consumers are extremely concerned about food safety issues and the level of trust in food safety is quite low (Li *et al.*, 2011; Liu *et al.*, 2014; Song *et al.*, 2010; Veeck *et al.*, 2015; Wang *et al.*, 2009). Song *et al.* (2010) noted that low Chinese consumer trust in food safety is represented by the fact that 42% of Beijing consumers do not believe food is safe (Song *et al.*, 2010). Gao, Knight, Zhang, Mather, and Tan (2012) stated that food industries in China are very complicated and the food supply chain is poorly regulated; many Chinese consumers only have a low level of confidence in general food safety. Moreover, food safety has been ranked as the top social concern in China (China Daily, 2013). However, my study found that Chinese university students seem quite confident in food safety. Only 26% of students thought food was unsafe, while 48% of students believed food is safe, and the other students neither agreed nor disagreed with “food is safe”. Compared with the average Chinese consumers’ level of trust in food, university students are comparatively confident in food safety. This finding is supported by previous research (Pieniak, Verbeke,

Scholderer, Brunso, & Olsen, 2007). They pointed out that young people from Belgium, the Netherlands, Denmark, Spain and Poland seemed more confident than other population groups in general food safety. One possible reason to explain this observation is that researchers only focused on the general Chinese population and ignored the particular features related to students. There is little information anywhere in the world that explores the differences in attitudes between young people and the general population concerning food safety (Byrd-bredbenner *et al.*, 2007; Comrie *et al.*, 2009). Another possible explanation is that, young students might have limited information or experience of adverse effects of food safety issues. Young students' parents are too busy to teach them in the family environment and they cannot learn enough about food safety from school (Beard, 1991). Even when they decided to access certain information associated with food safety, they just consult with their friends or classmates rather than their parents (Sampson *et al.*, 2006; Kennedy *et al.*, 2005). Please note that current Chinese students on campus may not be affected by the melamine incident in 2008 because these student were quite young at the time of the incident.

Food Control actors

Pivato, Misani and Tencati (2008) conducted a survey to explore the relationship between consumer trust and corporate social responsibility. They found that corporate social responsibility could generate public trust and this trust can translate into purchase behaviour and brand loyalty. They believe that trust is the main variable in terms of the relationship between food producers, retailers and consumers.

The food supply chain is widely accepted as an important element influencing consumer trust in food safety. Consumers have to rely on the reputations of food industries to decide which foods to purchase (Drescher *et al.*, 2012) and the food supply chain is

considered to be an important driver of general consumer trust in food safety (Berg *et al.*, 2005; Grunert, 2002). Similarly, Fritz and Fischer (2007) pointed out that trust in the food supply chain is the prerequisite for the development of consumer trust in food safety. In addition, other food control actors should also be considered. De Jonge (2008) noted that there were four factors closely related to trust in the food supply chain and regulators: farmers, food manufacturers, food retailers and regulators. According to De Jonge (2008), regulators were used to represent the government. However, some other food control actors including third-party certification authorities, food testing institutions and global organizations (i.e. Codex Alimentarius Commission, CAC) also play an important role in controlling the safety of food throughout the entire food supply chain (Gellynck *et al.* (2006). In this study, Food Control defined as one dimension of trust in food safety, covers the following four food control actors: farmers, manufacturers, retailers, and regulators; where regulators include government, third-party certification authorities, food testing institutions and global organizations. In this study, farmers, manufacturers, retailers, and regulators were four important factors influencing student trust in Food Control. The results were supported by previous research (De Jonge, 2008). Although these four factors are correlated with the development of trust in Food Control, De Jonge (2008) argued that the government and food manufacturers were the primary elements in creating consumer trust in the food supply chain. Compared to De Jonge's conclusion, my study indicates that food enterprises and food retailers are more strongly related to the Chinese student trust in the Food Control. What's more, both the government and farmers are quite closely associated with trust in Food Control.

According to Pieniak *et al.* (2007), young people from Belgium, The Netherlands, Denmark, Spain and Poland naturally trust food industries and related authorities.

Young people from the above five European countries prefer to trust government, scientists and consumer organisations and they were not interested in accessing any food safety information sources. In my study, Chinese young people also have a high trust in food related regulators as well as food manufacturers, retailers and farmers. Generally speaking, Chinese student trust in the Food Control does not show much difference with previous research.

Food risk

Previous research noted that food hazards can influence consumers' perceptions of food safety. Williams *et al.* (2004) noted that food additives and residues are the main food concerns for Australian consumers. According to a Chinese official news agency (China Daily, 2013), illegal additives, poor hygiene and unsafe materials are ranked as the crucial food safety concerns in China. This study found that Chinese students are generally concerned about food safety hazards. In this study, we found that Chinese students are really concerned about many food risks. More than 60% of Chinese students worry about hormones and antibiotics, pesticides and drug residues, additives, diseases, microorganisms, GM food, and hygiene. Among these food hazards, Chinese students ranked the shelf life of food (Use by dates on food) as the number one food concern, followed by toxic or harmful non-food raw materials. This finding is quite different from consumers in other countries (Williams *et al.*, 2004), however, it is supported by some Chinese researchers. Wang *et al.* (2008) noted that the shelf life of food is the most important factor influencing the intention to purchase food in China; in addition, harmful non-food raw material was regarded as the second main food risk for Chinese students. Many researchers believe that food risk concerns vary among

different countries (Finucane *et al.*, 2000; Hofstede *et al.*, 2010). This study's results fully support this view.

Many researchers have pointed out that food groups are closely related to consumer attitudes to food safety. In the Netherlands, people have the lowest level of trust in the safety of meat and fish. These two food groups have a great influence in creating consumer optimism in food safety trust (De Jonge, 2008). In China, milk powder and seafood have caused much consumer concern about food safety (Li *et al.*, 2011; Song *et al.*, 2010). However, in the present study Chinese students were not too concerned about the safety of milk powder. This study found that Chinese university students were concerned more about perishable food including meat products, vegetables and fruits.

The influence of food traceability on consumer trust appears to vary among countries. Van Rijswijk *et al.* (2008) noted that in Europe different food safety concerns might result in different attitudes to food traceability. Van Rijswijk *et al.* (2008) found that there was no obvious difference between northern and southern European countries regarding consumer perceptions of traceability. However, Giraud and Halawany (2006) found that traceability is a criterion for consumer confidence in Southern Europe, while it did not influence the public's trust and purchases in the Netherlands and Germany. Food chain traceability can improve consumer trust in food safety; Brazilian people were less aware of the importance of food traceability than European people (Kher *et al.*, 2011). To explain why the public in Europe have confidence in traceability, Kher *et al.* (2011) believe that the application of the General Food Law of Europe and the implementation of traceability systems in the food supply chain may be responsible. In China, traceability seems to be attracting an increasing awareness in the food markets. According to a survey conducted by Song *et al.* (2008), 92.8% of Chinese participants

believe that a traceability system is necessary for food safety control and 89.4% will pay more for food products with traceability information. Ortega *et al.* (2011) also point out that Chinese consumers would pay a premium for products containing traceability information. These findings are supported by this study. More than 90% of Chinese students were willing to pay more to buy food with traceability information. Chinese students were aware that food traceability was increasing with the implementation of food safety regulatory requirements in China.

Normally, traceability information often covers much food information across the entire food supply chain. However, too much traceability information may result in complacency regarding traceability. According to Gellynck and Verbeke (2001), the public are not interested in the issues of complicated information relating to food traceability. Simple and easily accessed traceability information is preferred by consumers (Verbeke, 2005). Van Rijswijk *et al.* (2008) emphasised that food labels were the most effective channel for food industries to transfer food traceability information to consumers. Furthermore, compared with advanced traceability systems for food labelling (i.e. RFID tags), simple food labels were more effective (Giraud & Halawany, 2006). Given that a 2D barcode implemented with sufficient traceability information has been widely applied in China, a simple food label with a 2D-barcode might be a good choice for food industries to appeal to Chinese students, giving them confidence in food safety.

In order to minimize food safety risk, consumers prefer their favourite and trusted brands, particularly during times of heightened concern about food safety (Gossner *et al.*, 2009; Yeung & Yee, 2003). Although the government can provide high quality standards for food processing, food industries still need to promote their own brand

value and food safety guarantee to build consumer confidence (Yeung & Yee, 2012). Keiningham *et al.* (2005) also noted that familiar brands provide consumer confidence in food safety influencing buying intentions. In times of food safety crises, brands with a high safety assurance will be preferred by consumers (Yeung & Yee, 2012), particularly by Chinese consumers (Gao, Knight, Zhang, & Mather, 2013). However, in this study food brands did not influence Chinese students' trust in food safety. As to imported food, country of origin can be regarded as a brand for imported food. This study found that Chinese consumers have a higher level of trust in the safety of food imported from developed countries. Nearly 44.64% of Chinese participants distrust the safety of food produced in Southeast Asia and 28.47% of participants distrust food made in Japan, while only 25.83% distrust domestic food. In addition, this study shows that Chinese students are very confident in the food made in EU, USA, New Zealand and Australia.

Food safety incidents understandably have an important influence in trust in food safety (De Jonge *et al.*, 2007; Pennings, Wansink, & Meulenberg, 2002). The occurrence of a continuing food safety crisis heightens the consumer perception of risk and increases levels of public concern (Frewer *et al.*, 2002b; Pennings *et al.*, 2002; Verbeke, 2001). The BSE incident is a good example of food safety issues that decreased consumers' trust in food safety worldwide (Jensen, 2004). Similarly, the melamine-contaminated milk incident had a major influence on consumer trust in food safety in China (Song *et al.*, 2010). According to a survey conducted just after the melamine incident in 2008, 42% of Beijing consumers didn't believe local food is safe (Song *et al.*, 2010). However, in this study we found that Chinese students were hardly affected by food incidents. This finding seems quite different compared with previous research. There might be several reasons that can explain this difference between this thesis and

previous research in Chinese consumer trust in food safety. Firstly, the finding of Song *et al.* (2010) was published nearly two years after the melamine incident, and hence could be much fresher in Chinese consumers' minds than it is today. Secondly, the sample of participants in this thesis may have been quite young during the melamine incident, so the incident might have had a limited impression on them. Therefore, Chinese university students are not overly concerned with food incidents in China, and are not aware of the influence of food brands in their trust of food safety.

Food risk communication

According to Gellynck *et al.* (2006), food safety information is the basis of trust in food safety. As for Chinese students, online media accounts for 42.79% of their entire information sources, followed by TV and radio (39.98%) and the printed media (14.79%). This result implies that online media has already significantly influenced Chinese consumer trust in food safety. Since many university students will get married and raise children in a few years, online media might be the best way to educate students in food safety information.

However, how to conduct efficient and useful communication of food risk information is very challenging. Food risk information consists of both objective (or rational) information and subjective (or emotional) information. The content of information and the way of transferring information can determine consumer perceptions of food safety (Andsager 2000; Frewer *et al.*, 2002b). However, information asymmetry promoted through media reports is a key reason for distrust in food safety (Frewer *et al.*, 1996; Yee *et al.*, 2005). Gellynck *et al.* (2006) noted that insufficient food related information and limited access can result in information asymmetry (Teisl & Roe, 1998). Rowe *et al.* (2004) noted that risk communication practice should focus on rebuilding public

confidence in food risk management. Increasing transparency in risk management practices and targeted risk communication at risk groups can increase public trust (Rowe *et al.*, 2004). Gellynck *et al.* (2006) pointed out that traceability, food labelling and safety certifications were important pathways for food industries to transfer food safety information to consumers; traceability being more efficient than the other methods to increase consumer trust in food safety. Furthermore, media often provide a biased view in the interests of providing a sensational news item (Goodman & Goodman, 2006). Based on this study, balanced comments, transparency, participation for all stakeholders, openness, scientific evidence, efficient release of information, and credibility of information sources are important elements of information communication via media to improve trust in food safety.

Conclusion

The aim of the present chapter is to provide a basic analysis of the conceptual structure of Chinese student trust in food safety, and how that trust is developed and influenced. In this study, a trust model was proposed based on previous research and then it was refined following the survey result. Using factor analysis, eight variables associated with trust building were examined and two dimensions (unobserved factors) of trust in food safety were confirmed: Food Control and Risk information. This trust model provides insight into the nature of how students' trust in food safety developed, and it also can be used to examine how student trust in food safety is influenced by different variables.

Trust is divided into two dimensions: Food Control (the general and constant element of trust) and Risk information (the changeable element of trust). The first dimension, Food Control (or trust in food supply) is the main basis for building trust in food safety; the

dimension represents the general and constant part of the trust structure. It is influenced by four factors: trust in farmers, trust in manufacturers, trust in retailers and trust in Regulators. Normally, this element of trust is the overall trust in food safety. It usually remains stable over the long term and does not differ much among countries. The other dimension of trust building, Risk Information, represents the changeable and variable part of trust. This dimension is closely related to cultures, and it might change in the short term. This dimension can be influenced by food hazard, traceability and the media.

Chapter 5 Trust in online shopping

5.1 Introduction

Although online shopping is expanding fast in the world, research about trust model in online shopping environment is limited. Hoffman and Novak (1996) proposed a flow model to understand how people think about the online shopping experience; the model was refined in 2009 (Hoffman & Novak, 2009). According to this model, flow is a state occurring when consumers are navigating the websites. The nature of the online shopping environment is interactive among consumers and websites. Ensuring consumers have an enjoyable experience is important for a successful online shopping environment. In order to examine the nature of trust in the online shopping environment, Harris and Goode (2010) proposed a framework of trust in a website. In this model, trust in a website is determined by three dimensions: aesthetic appeal, layout and functionality, and financial security. Furthermore, these three dimensions were influenced by nine independent factors.

In this study, I will use a trust model to explore Chinese student trust in online shopping. This trust model is mainly based on the trust model proposed by Harris and Goode (2010). In the new trust model, ‘service risk’ replaces the third dimension of ‘financial security’. This dimension is influenced by three factors: ease of payment (i.e. online payment experience), delivery risk (i.e. risk related to product during delivery period) and financial risk (risk related to online cheque account security).

Previous research has found that trust can produce e-loyalty and establish a steady customer base for online shopping (Grewal *et al.*, 2003; Harris & Goode, 2004; Stewart, 2003). Flavián *et al.* (2006) found that consumer trust in online shopping can be

increased by the degree of satisfaction and loyalty consumers have in websites. Harris and Goode (2010) note that trust in the e-servicescape is of the utmost importance for online stores to attract customers. McKnight *et al.* (2000) pointed out that there is an exploratory time prior to the initial purchase online. During the exploration stage, consumers have no direct experience with online shopping and their trust in websites is generated mainly from the perceived reputation of websites (McKnight *et al.*, 2000). After this period, consumers might make the decision to purchase goods through the websites for the first time. This exploratory stage is viewed as the 'commitment stage' (McKnight *et al.*, 2000) and the level of satisfaction with the websites determines the following online purchase behaviour. Bai *et al.* (2008) explored the relationship between satisfaction with websites and online purchase intention in China. They suggested that website quality can directly increase the degree of Chinese consumers' satisfaction with websites, which have an important impact on online purchase intention.

Harris and Goode (2010) presented a comprehensive multi-level model of trust in the online servicescape and discussed how trust in the website influences online buying intentions (Fig 51). According to Harris and Goode (2010), trust in a website is used to represent consumers' evaluations of the online servicescape and this trust is positively related to online customers' purchase intentions. They argued that trust in the website has a significant impact on online exchange and they strongly highlighted the importance of this trust in expanding e-commerce markets. Based on the study of Harris and Goode (2010), there are three dimensions contributing to the outcome of trust in the website: aesthetic appeal, layout and functionality, and financial security. Their model is based on the previous research of Bitner (1992) who proposed a conceptual model of the offline servicescape consisting of three dimensions. Bitner (1992) argued that

ambient conditions, layout and functionality, and signs, symbols and artifacts are three crucial dimensions for the physical surroundings of the servicescape. Since Bitner's (1992) research was only associated with the offline environment, Harris and Goode (2010) modified his two dimensions (ambient conditions is refined by aesthetic appeal, while layout and functionality remains same). However, the third dimension (signs, symbols and artifacts) was replaced by a new dimension (financial security). Based on the previous studies regarding online environmental factors (Srinivasan *et al.*, 2002; Szymanski & Hise, 2000; Wolfinbarger & Gilly, 2001; Zeithaml *et al.*, 2002), these three dimensions could be regarded as the critical dimensions contributing to the e-servicescape (Harris & Goode, 2010).

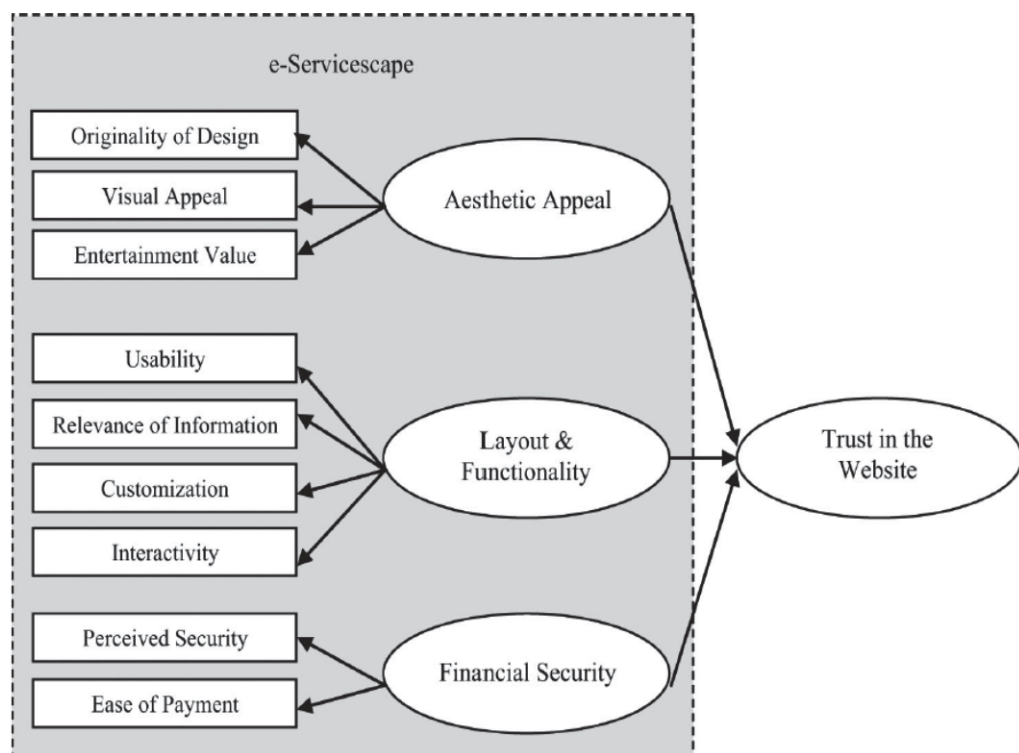


Fig 5.1: Trust in online shopping environment (Harris & Goode, 2010)

Compared to the above trust model in online shopping, however, it can be argued that other important factors should be taken into consideration. Firstly, risks regarding

products purchased on the internet are ignored. Harris and Goode (2010)'s model is based on a general products survey which covers audio/visual goods, computers, clothes, groceries and flight tickets. However, it does not involve the risk related to goods with high risk, particularly for the safety of products. Indeed, physical food safety problems have been discussed in many previous studies. For example, spoilage, traceability, quality standards, certification and specification can hinder online trade in the agri-food sector (Wilson, 2000). Ramsey and Funk (2009) studied the effects of food hazards on online dairy products in America. Their research noted that 6 products were found to be unacceptable in 61 cheeses purchased via the internet because of microbiological hazards found in cheese. Moreover, the packaging of products could be damaged during the delivery process and this made it hard to trace unsafe products. Since safety is the key concern associated with food industries, food safety will be an additional dimension in the modified model as well as the above three dimensions partly mirrored from the Harris and Goode's model (2010). Hofstede *et al.* (2010) created a hierarchical typology model of trust in online food shopping and this model highlights the importance of product risk. In this model buyers' trust in online food trade was discussed and there are three main sources that could determine such trust. These sources include product risk, e-seller reputation and the product exchange environment. Five dimensions influencing trust in food products via the internet are product reputation, product specification, product inspection, product certification and product price.

There are some other perceived security factors as well as financial security. Since consumers cannot concretely experience (i.e. touch, see or smell) the goods they are going to buy from the online stores, many doubts might keep potential consumers from buying products (Hansen *et al.*, 2004; Miyazaki & Fernandez, 2001; Swinyard & Smith,

2003). These doubts include personal information concerns, credit card security concerns and service concerns. Yao (2008) regarded psychological risk as the most important perceived risk which influences consumer online buying behaviour followed by function risk, service risk, financial risk, privacy risk, physical risk, social risk and time risk. In this regard, I will take into consideration the service risk and it will include both financial risk and product delivery risk. Details about the service risk will be discussed in the modified model design.

In my study, trust in the website will be viewed as the second dimension of trust in the safety of online food. This dimension is mainly based on the research conducted by Harris and Goode (2010), and it includes three determinants: aesthetic appeal, functionality and service security. The third determinant is a modification of the original model to measure service risk rather than just financial security. According to Harris and Goode (2010), financial security was regarded as the main service risk. However, delivery service is also viewed as one of the important factors influencing Chinese online shopping intention (Chang & Wu, 2012; Yao, 2008; Zheng *et al.*, 2012). In order to study Chinese students' trust in online shopping, both delivery risk and financial risk are important factors contributing the third determinant (service security). Since food safety will be viewed as one dimension as well as the online shopping environment, it will not be mentioned in the refined trust model for online shopping. The modified model of Chinese student trust in the website is as follows (Fig 5.2):

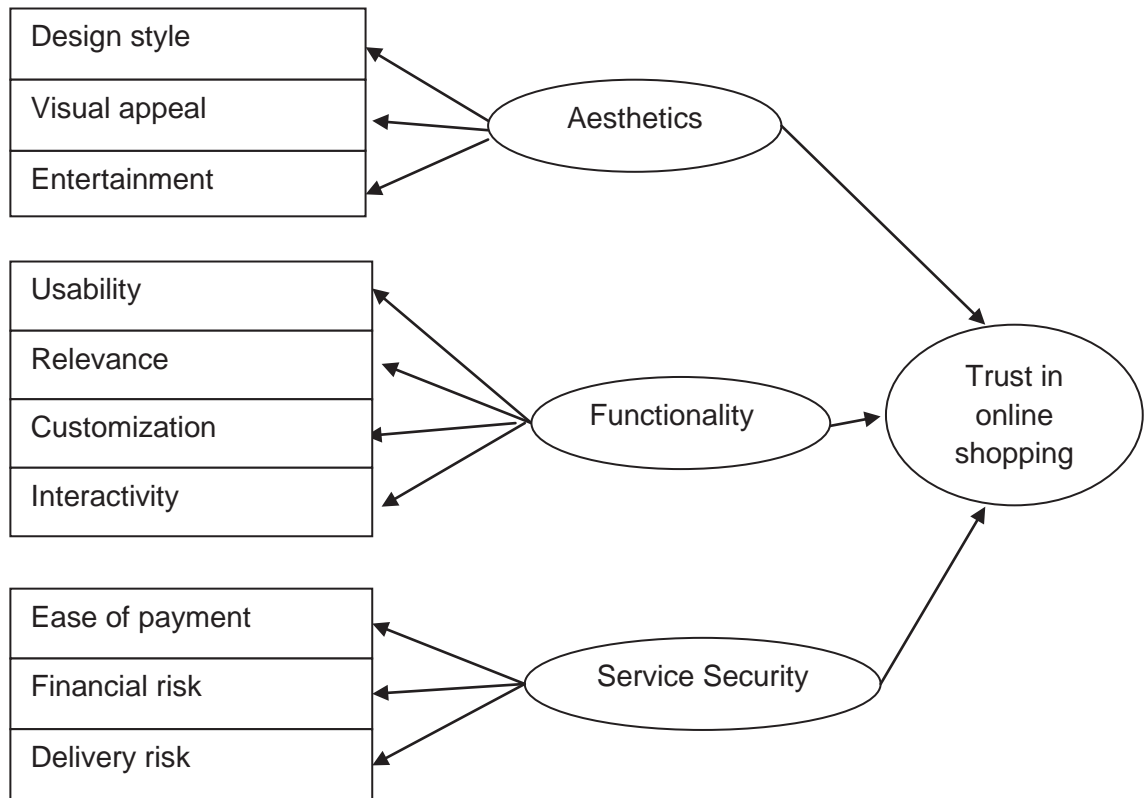


Fig 5.2: Model of trust in online food safety

5.2 Results

Model of trust in online shopping

In 2013, 2000 questionnaires were sent to Chinese students at 4 universities and 1238 participants were found with online shopping experience. The objective of this chapter is to examine the proposed trust model in the online shopping environment, and explore specific features of Chinese students in online shopping behaviour.

The same tests were used here as the ones in section 4.2. The α coefficients of 10 observed variables related to trust in online shopping are listed in the following Table 5.1. The α values of all variables in the table are over 0.7 and the AVE of all variables exceeded 0.5. This indicates that these ten variables are reliable and valid for further data analysis.

Table 5.1 Measurement properties for observed variables

Observed Variables	α	AVE
Design style	0.755	0.645
Visual Appeal	0.854	0.696
Entertainment	0.853	0.671
Usability	0.816	0.597
Relevance of information	0.798	0.572
Customization	0.832	0.552
Interactivity	0.779	0.659
Ease of payment	0.759	0.575
Financial risk	0.747	0.612
Delivery risk	0.736	0.574

In order to find out whether the data can be analysed by PCA, two tests were applied: KMO (Hair *et al.*, 2005) and Bartlett's Test of Sphericity (Jolliffe, 2002). The results show a KMO value of 0.777 and Bartlett test's p value < 0.001, which means that the data is suitable to be analysed by PCA.

In order to evaluate the proposed model of trust in online shopping, a two-stage procedure was used. First, EFA was applied to refine the proposed model of trust in online shopping. A Scree test was used to test the appropriate dimensions of trust to represent all the 10 observed variables. Then a Rotated Component Matrix was applied to explore the inner links among these variables. In this case, the structure of trust in online shopping can be refined. Subsequently, CFA was applied to find out the standardised coefficients of these 10 observed variables to the particular dimension, as well as the loading values between dimensions and the trust in online shopping.

Based on the Scree test, a line of eigenvalues was found (Fig 5.3). Because an elbow point is around 1.0, it means that the most appropriate principal components for the 10 variables should be two. This indicates that the best way to represent the 10 observed variables to explain the structure of trust in online shopping is choosing two dimensions.

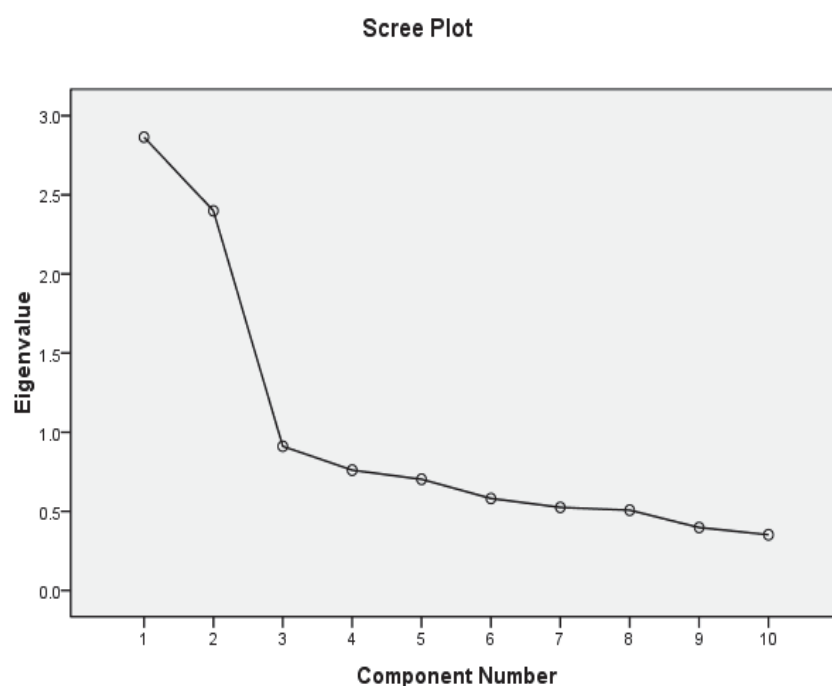


Figure 5.3 Result of the Scree test for observed variables

In order to explore relationship links among the 10 variables and how each variable is associated with the two dimensions, a Rotated Component Matrix method was applied. In Table 5.2, we can see that 5 observed variables (including entertainment, visual appeal, design, customization, and relevance) are significantly and closely related to one principal component. Similarly, the other 5 observed variables (including delivery risk, financial risk, ease of payment, usability and interactivity) were significantly and closely related to the other principal component. In this chapter, the 10 observed variables were viewed as first-order factors associated with the trust in online shopping, and the two unobserved principal components are regarded as the second-order factors

related to the trust in online shopping. In this case, trust in online shopping can be represented by two unobserved principal components, with each principal component closely related to 5 variables. To make it easy, in this chapter the 1st principal component is defined as Aesthetics while the 2nd principal component is defined as Functionality.

Table 5.2 Rotated Component Matrix of observed variables

Observed Variables	Links to Principal Components	
	1 st Principal Component (Aesthetics)	2 nd Principal Component (Functionality)
Visual appeal	0.781	
Design style	0.781	
Entertainment	0.805	
Usability		0.644
Relevance	0.575	
Customization	0.732	
Interactivity		0.567
Ease of payment		0.682
Financial risk		0.704
Delivery risk		0.725

Based on the above results, the CFA method was used to examine the internal relationship between the first-order factors (10 factors), the second-order factors (2 dimensions) and trust in online shopping. Based on the analysis by CFA, the loading value of each factor (observed variable) to the associated dimension (principal component) represents how much these factors could be replaced by a defined dimension.

In the first dimension Aesthetics, the loading values of visual appeal, design style, entertainment, customization and relevance to the outlook are listed in Figure 5.4. Such loading values reflect the extent that each observed variable related to the first dimension Aesthetics. Visual appeal, design style and entertainment were more closely related to the trust chain than the other two factors. Entertainment had the greatest influence.

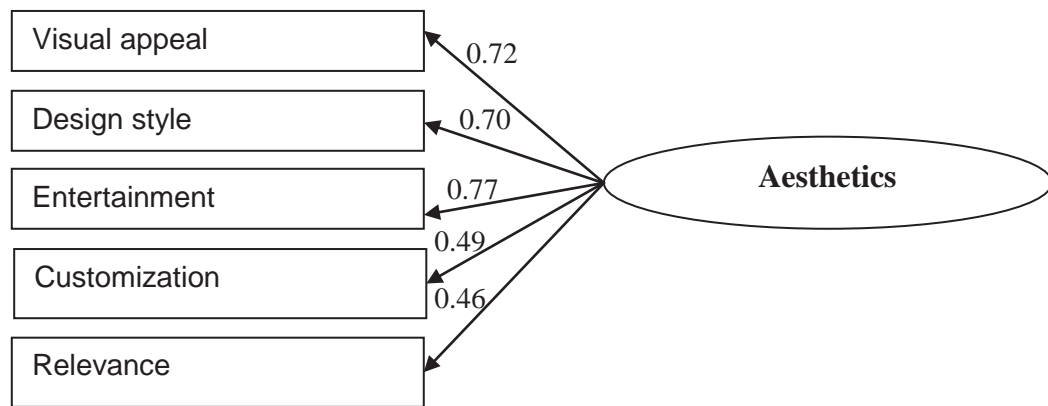


Fig 5.4 The first dimension of trust in online shopping—Aesthetics

In the second dimension Functionality (Fig 5.5), the loading values of payment, financial risk, delivery, usability and interactivity are listed. Payment, financial risk, delivery and usability were closely related to the second dimension Functionality, and these four important factors seemed to impact similarly on trust in online shopping. However, interactivity did not show much influence on Functionality.

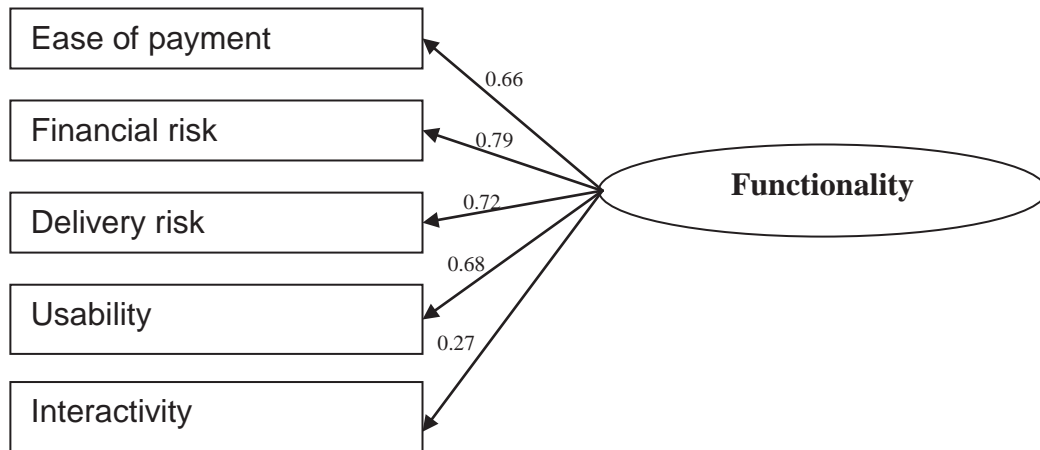
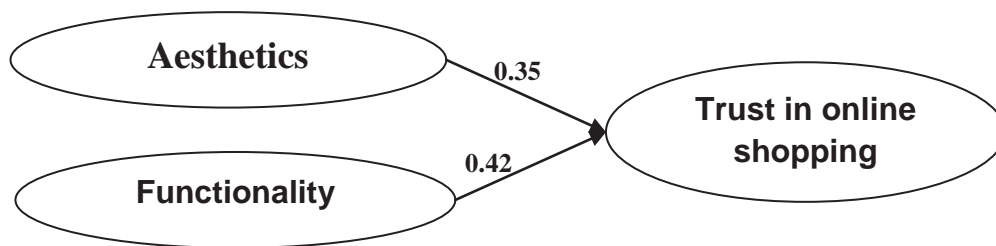


Fig 5.5 The second dimension of trust in online shopping—Functionality

As to the trust in online shopping, the values of the goodness fit indices including χ^2/df , RMSEA and CFI (Fig 5.6) for the model of trust implied a satisfactory result.

According to the trust model in online shopping, both the Aesthetics and Functionality had a relatively high influence on the trust in online shopping. This also implies that the Functionality had a bit more influence than the Aesthetics dimension in developing Chinese university students' trust in online shopping.



χ^2/df	RMSEA	CFI
4.498	0.075	0.92

Fig 5.6 Trust model in online shopping

Based on the above results, a multiple factors model of trust in online shopping was developed and is presented in Figure 5.7. According to this model, trust in online shopping is determined by two dimensions: Aesthetics and Functionality. The

dimension Aesthetics is influenced by three factors: entertainment, visual appeal and design. The dimension Functionality is influenced by four factors: ease of payment, financial risk, delivery risk and usability.

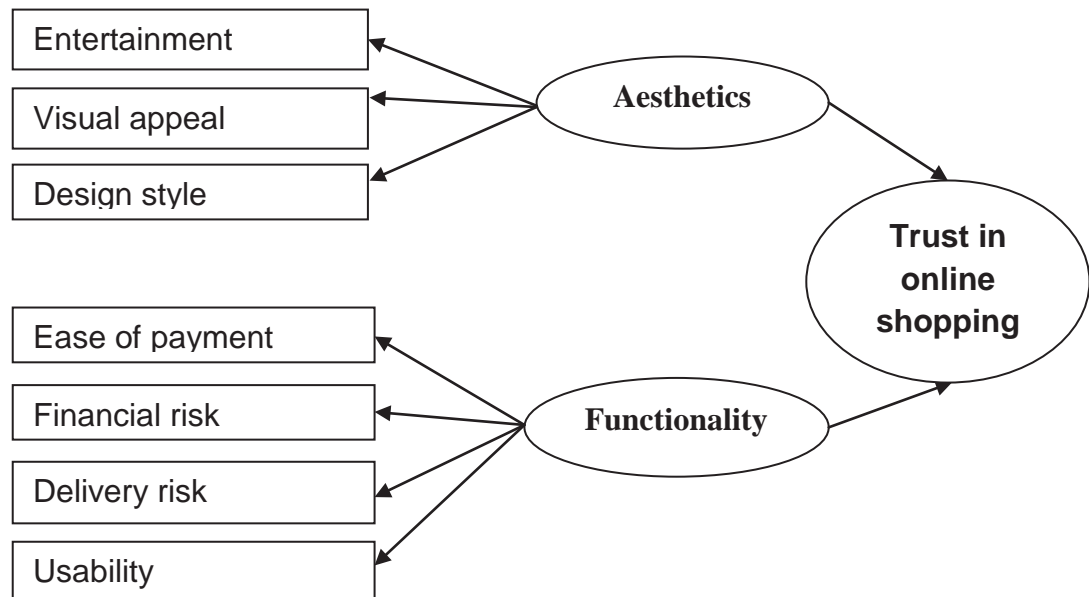


Fig 5.7 Multiple factors of trust in online shopping

Attitudes to online shopping

When the participants were asked to respond to the statement “Have you bought any goods via the internet” (Fig 5.8), most participants have had the experience of online buying.

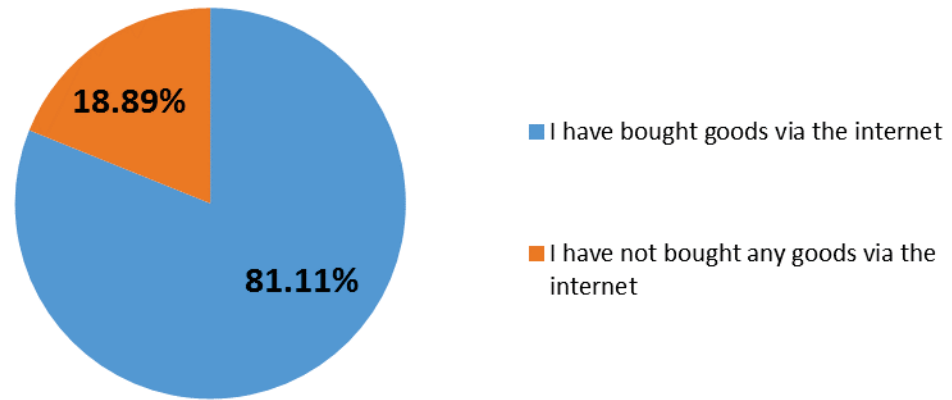


Fig 5.8 Online shopping experience (n=1,238)

When the participants were asked “What is your main reason for buying goods via the internet”(Fig 5.9), convenience seemed the main reason why students prefer to buy online, followed by a lower price and more choices compared with conventional shopping.



Fig 5.9 Reasons for buying goods online (n=1,238)

As to the participants who had not experienced online shopping (Fig 5.10), 63.77% of these participants still seemed to trust online shopping. For this group, trust was not the main reason why these participants refused to buy goods via the internet.

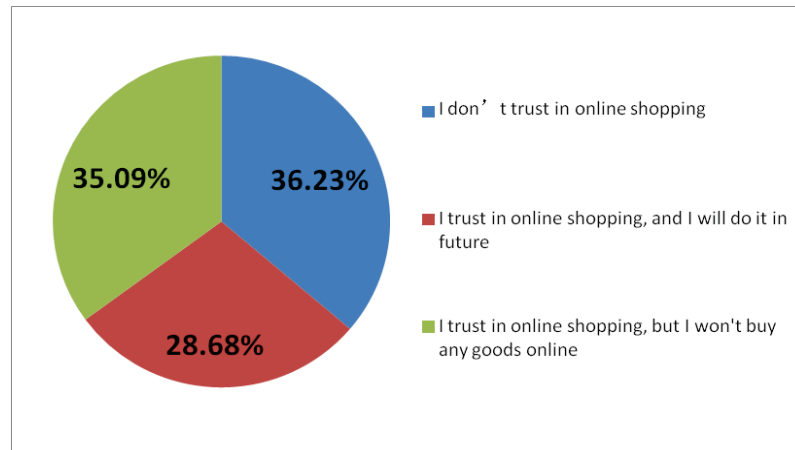


Fig 5.10 Proportions of participants that had not bought goods online (n=234)

When the participants were asked “How often do you buy goods via the internet on the average” (Fig 5.11), 70.47% of participants bought goods online at least once a month or more.

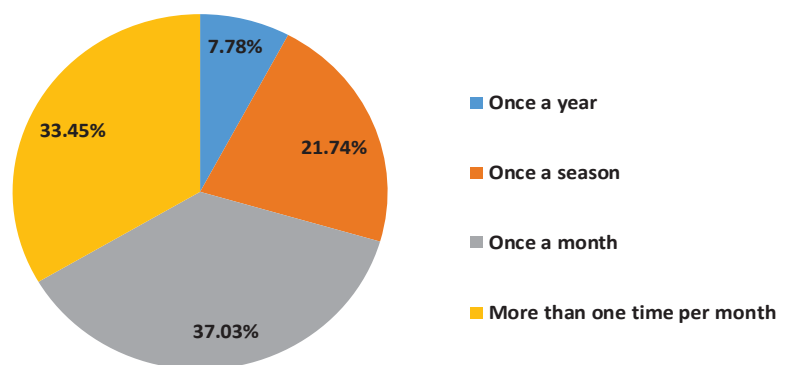


Figure 5.11 Frequency of online shopping (n=1,238)

When the participants were asked “Which of the following goods categories have you bought online before” (Fig 5.12), clothes became the most popular online products, followed by books and videos and virtual products (i.e. E-tickets or hotel booking). In addition, food was also an important online shopping choice.

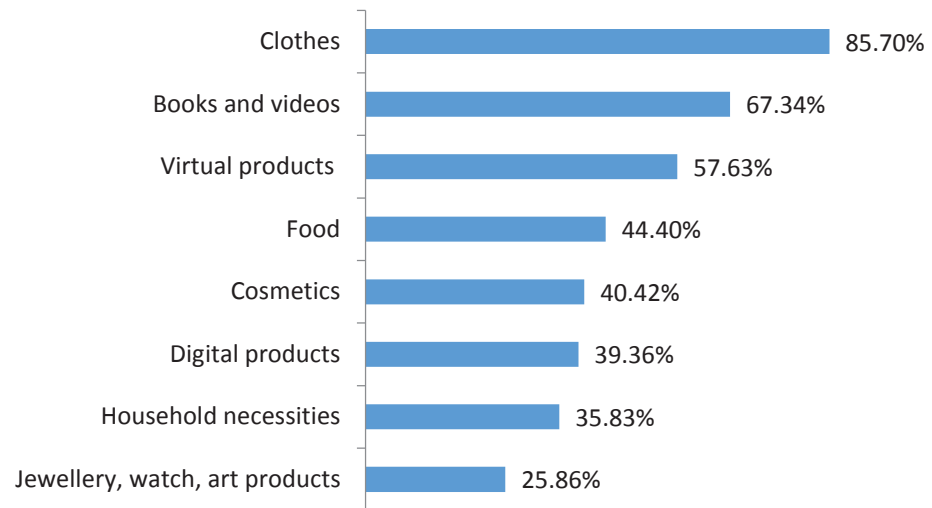


Fig 5.12 Online goods categories (n=1,238)

When participants were asked the question “Which of the following websites do you prefer to log in to buy goods” (Fig 5.13), Jingdong and Taobao were viewed as the two main favorite websites for online shopping, followed by Amazon, Dangdang and Vancle.

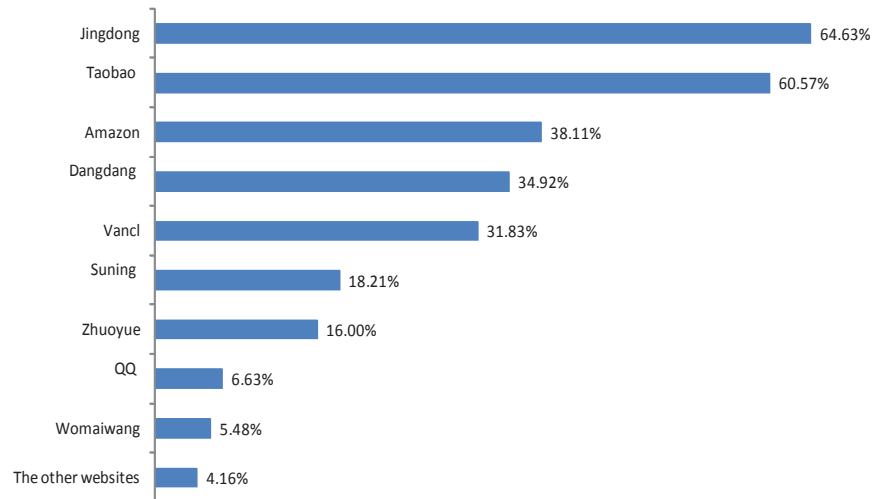


Fig 5.13 List of online shopping websites (n=1,238)

Gender and income are two demographic variables that were explored in this chapter. The results are in the following Table 5.3. Based on the result of Table 5.3, it implies that gender has a very weak influence on the observed variables for trust in online shopping except usability and relevance. In addition, family income seems to have strong influence in several observed variables including visual appeal, usability, interactivity, payment, financial risk and delivery risk. In this study, we have found that female students usually pay much more attention to the website' usability and relevance than male students; while students with higher family incomes can be more interested in visual appeal, usability, interactivity, payment, financial risk and delivery risk regarding the website.

Table 5.3 Demographic variables

	Gender (n=1403)		Family income (n=955)	
	F	Sig.	F	Sig.
Visual	0.111	0.740	3.062	0.047
Design	0.545	0.461	0.069	0.934
Entertainment	2.195	0.139	0.184	0.832
Usability	4.459	0.035	7.313	0.001
Relevance	4.635	0.032	2.334	0.098
Customization	0.289	0.591	0.031	0.969
Interactivity	0.348	0.555	6.227	0.002
Payment	1.660	0.198	4.524	0.011
Financial risk	0.172	0.678	5.819	0.003
Delivery risk	2.508	0.114	4.477	0.012

5.3 Discussion

In this chapter, the first outcome was the development of a multi-scale model of Chinese student trust in online shopping. In terms of Chinese students, this study showed that there are only two dimensions regarding trust in the online shopping environment: Aesthetics and Functionality. Many previous researchers divided the online shopping environment into three dimensions. Bitner (1992) proposed a conceptual trust model of the offline servicescape consisting of three dimensions: ambient conditions, layout, functionality, signs, symbols and artefacts. Considering the online shopping environment, the factors of aesthetic appeal, layout and functionality, and financial security are regarded as the critical dimensions contributing to the e-servicescape (Harris & Goode, 2010; Srinivasan *et al.*, 2002; Szymanski & Hise, 2000; Wolfinbarger & Gilly, 2001; Zeithaml *et al.*, 2002). Compared with the model proposed by Bitner (1992), “ambient conditions” was represented by “aesthetic appeal” while “signs, symbols and artifacts” was replaced by “financial security” (Harris & Goode, 2010). In addition, Wolfinbarger and Gilly (2001) noted that there were four dimensions related to the online shopping environment: convenience, selection, informativeness and

lack of sociality. Furthermore, Szymanski and Hise (2000) listed 5 categories relevant to the online shopping environment: convenience, merchandising, website design, e-satisfaction and financial risk. Compared with Harris and Goode (2010), this study's two dimensions "layout and functionality and financial security" are merged into only one dimension "Functionality".

According to some previous research (Cheung *et al.*, 2005; Gefen *et al.*, 2003; Wolfinbarger & Gilly, 2001), factors influencing online buying intentions are divided into two categories: internal factors and external factors. In this study, the dimension of aesthetics (influenced by entertainment, visual appeal and design) is an external factor. The dimension of functionality (influenced by payment service, financial risk, delivery and usability) is closely related to dynamic online buying behaviour. Payment service, financial risk, delivery and usability can be viewed as the internal factors regarding trust in online shopping.

Basically, both aesthetics and functionality seem to have a similar magnitude of effect on trust in the online shopping environment. However, this might change during the online shopping period. According to McKnight *et al.* (2000), consumers have no direct experience with online shopping during the exploration stage and the level of satisfaction of the website determines the following online purchase behaviour. In this case, the dimension aesthetics might have much more affect in attracting consumers during the exploration stage, particularly for first time online buying. However, the dimension of functionality should have much more influence when consumers start to purchase via the internet, particularly for the active online shopping people.

Based on the outcomes of previous research, ten factors were chosen to examine the nature of what influences trust in websites. In the present trial, only seven factors were

found to be of significant importance: visual, design, entertainment, usability, payment, financial security and delivery. In the present study, “usability” was closely related to the payment service, financial risk and delivery service.

Financial security is viewed as the third dimension (after Aesthetics and Functionality) for trust in a website (Harris & Goode, 2010). Financial security regarding online shopping can mirror how consumers perceive the risk of the online payment process and is widely discussed in previous studies (Montoya-Weiss *et al.*, 2003; Yao, 2008; Chang & Wu, 2012).

In this study, perceived service risk is divided into two different risks: financial risk and delivery risk. Although Harris and Goode (2010) took nine factors into consideration in terms of trust in online servicescapes, the delivery service risk was ignored. This study indicates that delivery service risk should be considered in the perceived online shopping risk. The difference might be explained by Chinese perceptions of risk in terms of online shopping that may be different for people from other countries. In China, usability and delivery were closely related to risks when Chinese consumers think about online shopping. Yao (2008) regarded website service risk as an important perceived risk for online shopping in China.

Chapter 6 Trust in the safety of food purchased online

6.1 Introduction

Although E-commerce is developing rapidly, there are few statistics regarding online food shopping. According to a survey conducted in 2013, 41% of the American respondents had bought food online via smartphone, tablet and desktop (Emarketer, 2014). Similarly, in another survey conducted in 2014, 32% of American people purchased food via the internet regularly (Emarketer, 2014). China Internet Watch (2014) reported that according to data from iiMedia Research, the amount of online food shoppers was predicted to reach 158 million in 2014 with about US\$ 14 billion worth of food transactions. According to Data 100 (2013), nearly one fifth of online consumers in China preferred to purchase imported food via the internet. Among the online imported food purchasers, 59% of respondents were between 17 and 28 years old, from a middle class population. Beijing, Shanghai, Guangzhou, Shenzhen, and Hangzhou have been ranked the top 5 cities according to the number of online food sales.

Research on online food shopping is limited. In Australia, Sacks, Tikellis, Millar and Swinburn (2011) studied the impact of new nutrition labelling in online food purchases. However, their study focused on the introduction of traffic-light nutrition information. In Germany, Monakhova *et al.* (2011) explored the online food market, but they just studied how to scientifically and efficiently classify food categories via the internet. In the USA, Lennon, Johnson, Jasper, Damhorst and Lyons (2009) investigated online food shopping of rural consumers. They found that dissatisfaction with local retailing is a crucial element influencing online shopping. Online shopping increased with the development of telecommunications in the rural areas.

Studies of E-commerce in the Chinese food industry have focused on E-commerce development in agriculture products and supply chain building rather than consumer purchase intention. Geng *et al.* (2007) discussed agriculture industry E-commerce, paying particular attention to the standardization of information technology applications in agricultural industry development. Zhang (2011) reviewed the development of E-commerce in the Chinese food industry examining the advantages, weakness and requirements of E-commerce. Yang (2011) explored how to develop E-commerce in fresh agricultural products in China and focused on the development of the supply chain.

There is a lack of information about the consumer's online food buying in China. Hsu and Chen (2011) found the need for convenience and variety as well as safety and health needs are important motivators contributing to online health food shopping. Liang and Lim (2011) explored the online purchase behaviour of those purchasing specialty foods and divided consumers into two categories: active online food shopping people (adventurous) and inactive online food shopping people (traditionalists). These two types of consumers have significant differences in attitudes toward the online purchase of health and speciality foods relating to perceived risk and buying behaviour intentions. Traditional consumers have a more mature approach in controlling the internet, care more about others' comments and spend more time in obtaining necessary food safety information to make purchase decisions. Adventurous consumers are generally younger, prefer to try new things, and are more positive about online food purchasing. To improve the adventurous consumers' online food buying intentions, the website can emphasize the special features of the food (i.e. new flavour), set up an internet community system and encourage communication with online customers.

Many previous researchers did not believe that online food shopping would be successful as the perception of the safety of food is complex and the perceived risk is high. Food risks associated with spoilage, traceability, quality standards, certification and specification can hinder online trade in the agri-food sector (Wilson, 2000). Ramsey and Funk (2009) studied the effects of food hazards in online dairy products in America. Their research noted that six out of 61 cheeses purchased via the internet were unacceptable due to microbiological hazards. The damage to packs during delivery is another concern with online dairy shopping. Difficulties in traceability are also an issue for dairy on-line shoppers. The European Commission (2005) pointed out that E-commerce in the food industry developed quite slowly, particularly for small and medium sized enterprises. Hsiao, Li and Chen (2005) noticed that cultural inertia and practical technical problems appeared to be the main problems facing Chinese food companies in applying E-commerce.

It is difficult for consumers to assess the true food safety risk when purchasing food as food risk includes raw, intermediate and end products (Batt, 2003; Fischer *et al.*, 2007). Trust is a very important variable for purchase behaviour for food transactions particularly if purchasing from a new vendor (Canavari *et al.*, 2010). With regard to online food shopping, trust becomes more important because of the lack of information and communication through the food supply chain (Canavari *et al.*, 2010).

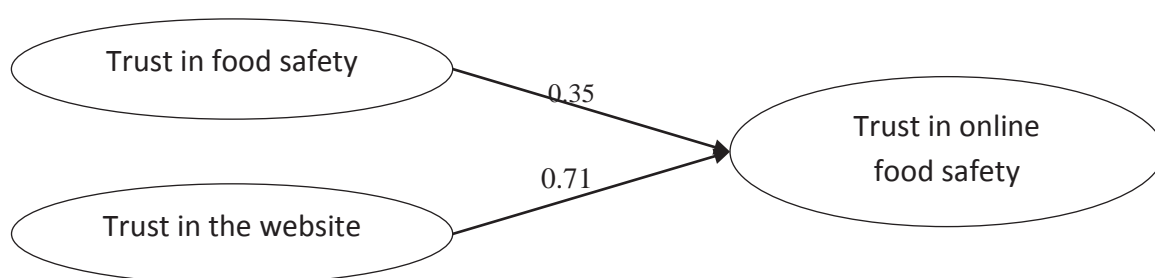
Large research gaps remain in the understanding of online food shopping in China. Some basic questions include what influences online food shopping intentions of Chinese consumers, why Chinese buy food via the internet rather than traditional channels, and why Chinese buy foreign food rather than local food over the internet. There are a lot of unknowns around the purchase of imported food online. This study

aimed to examine how Chinese students think about food safety when they are buying food via the internet and what are Chinese students' attitudes to imported food purchased online.

6.2 Results

Model of trust in online food shopping

When two important determinants (food safety and website) are considered, a new model for Chinese student trust in the safety of food purchased via the internet is outlined in Figure 6.1. The values of the goodness fit indices including χ^2/df , RMSEA and CFI for this model of trust imply a relatively satisfactory result. The loading value of trust in food safety is much lower than the loading value of trust in the website. This implies that online shopping environment has more influence than food safety in developing Chinese university students' trust in online food shopping.



χ^2/df	RMSEA	CFI
5.768	0.080	0.881

Fig 6.1 Trust in the online food safety

Based on the model for trust in food safety, trust in the website and trust in online food shopping, a new multi-factor model for Chinese student trust in the online food shopping is presented in Fig 6.2. In this trust model, there are two important determinants influencing the Chinese student trust in online food safety: trust in the website and trust in food safety.

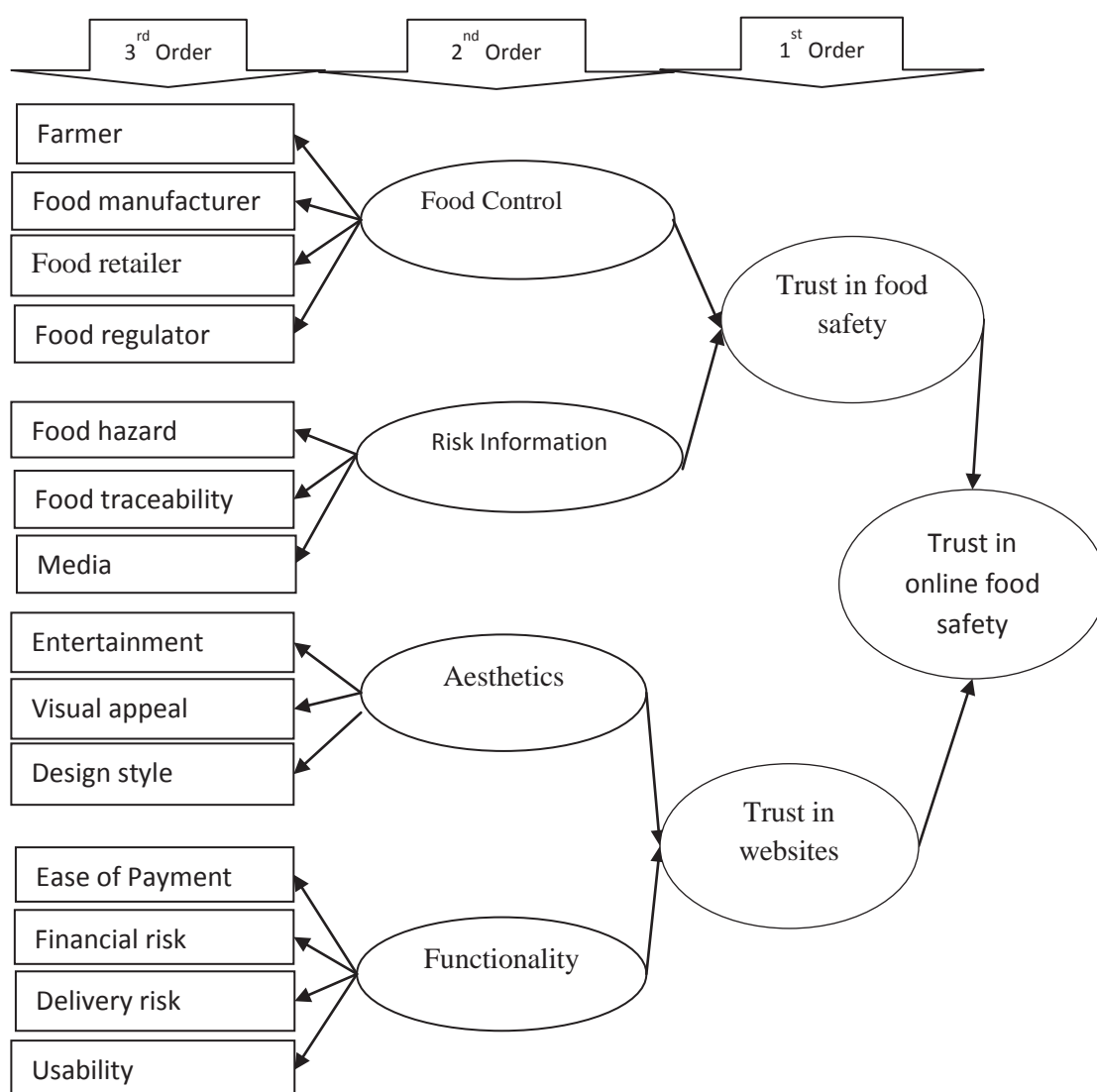


Fig 6.2 Multi-factor model of trust in the online food safety

Participants who bought food online

Based on the survey conducted in China, 592 students had once bought food via the internet. Of these 592 participants, nearly 42% usually purchase food via the internet monthly or more often (Fig 6.3). Compared with 70.47% of participants bought general goods online at least once a month or more (Fig 5.11), Chinese students seem to buy food quite less than buying general goods via the internet.

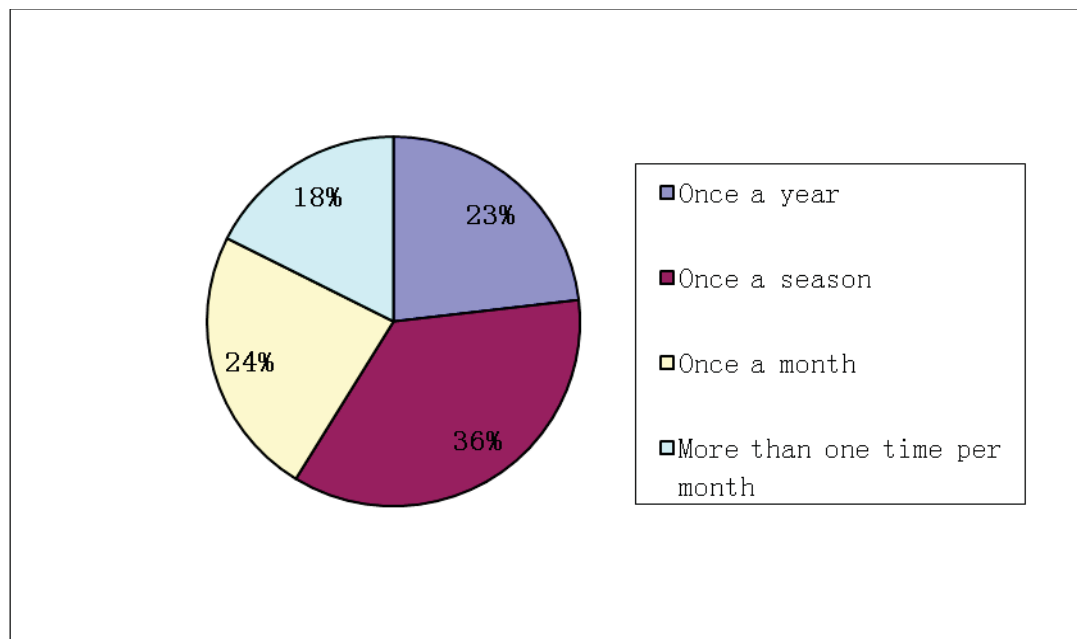


Fig 6.3 Frequency for buying food online (n=592)

When those participants were asked “What is your main reason for buying food via the internet” (Fig 6.4), the responses were fairly evenly spread with good responses in all categories of saving time and convenience, sufficient goods’ choices, lower prices and the availability of unusual products. This finding seems similar to the reasons why students buy general goods online.

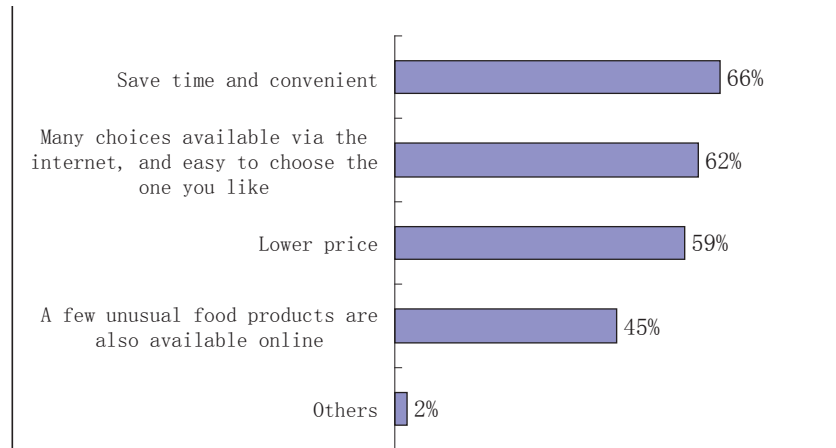


Fig 6.4 Reasons why participants bought food online (n=592)

When those participants were asked “Which of the following websites do you prefer to use to buy food?” (Fig 6.5), most people preferred Taobao (73%) with Jingdong (29%), Dangdang (17%) and Amazon (15%) the next three preferred sites.

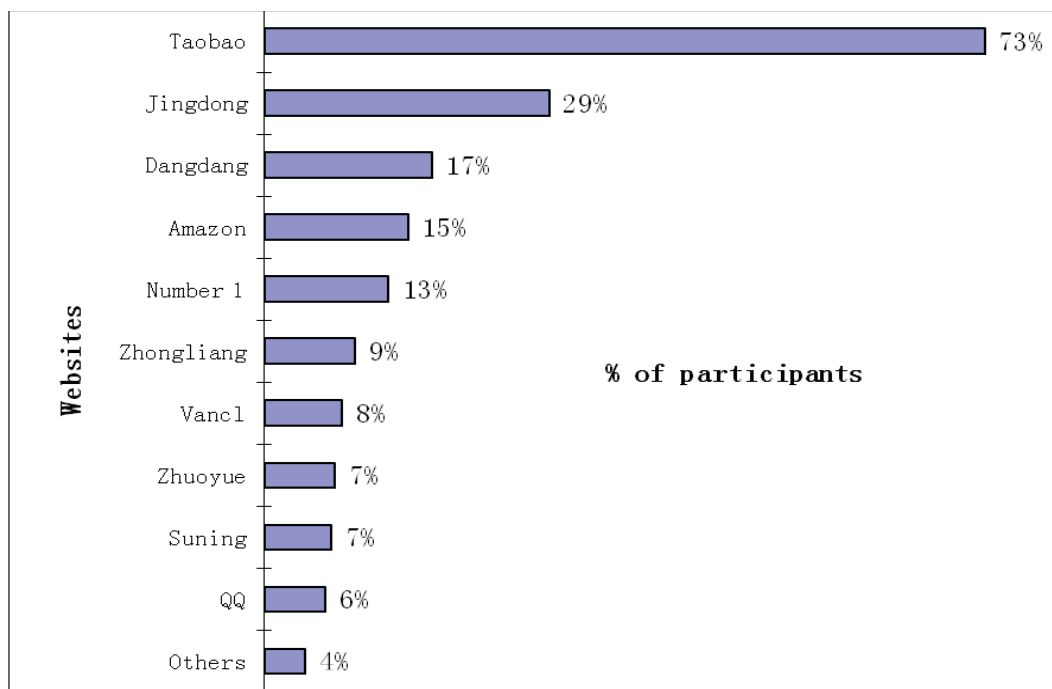


Fig 6.5 Online food shopping websites (n=592)

When those participants were asked “What food do you prefer to buy via the internet?” (Fig 6.6), snacks seemed to be the main online food choice among participants, followed by health food and milk powder.

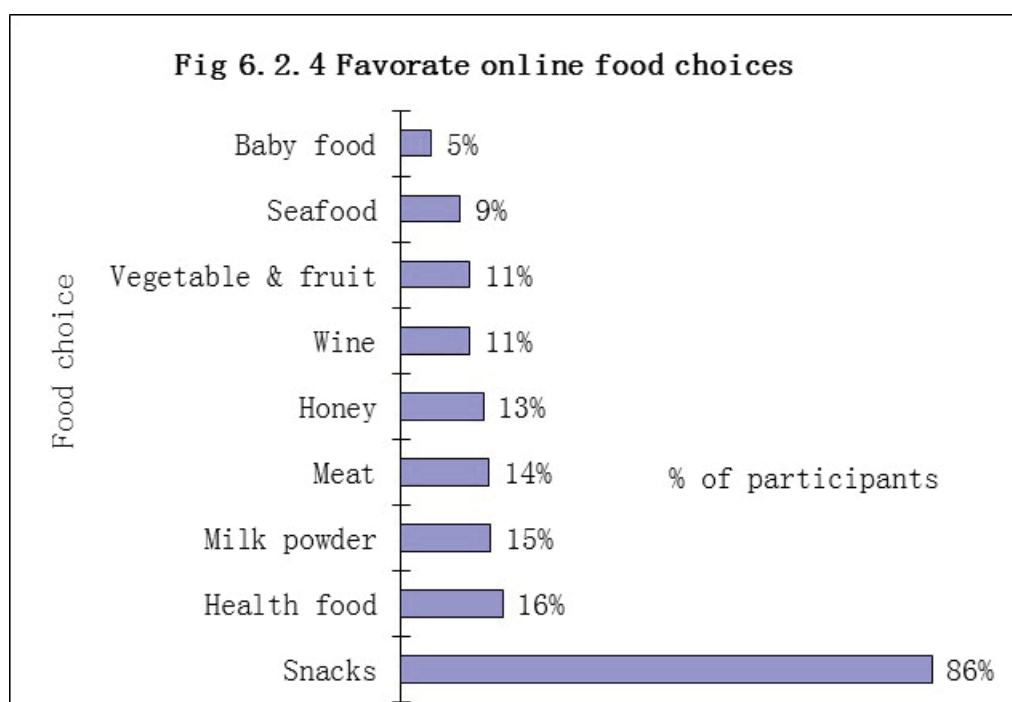


Fig 6.6 Favourite online food choices (n=592)

(Note: The safety of milk powder is of such concern in China that this food is regarded as an independent food group excluding baby food)

When those participants with online food buying experience were asked “How much did food safety influence your buying intentions to buy food via the internet” (Fig 6.7), 84% of participants believe that food safety influences their online food buying decision in terms of milk powder, followed by 82% in snacks and 76% in health food.

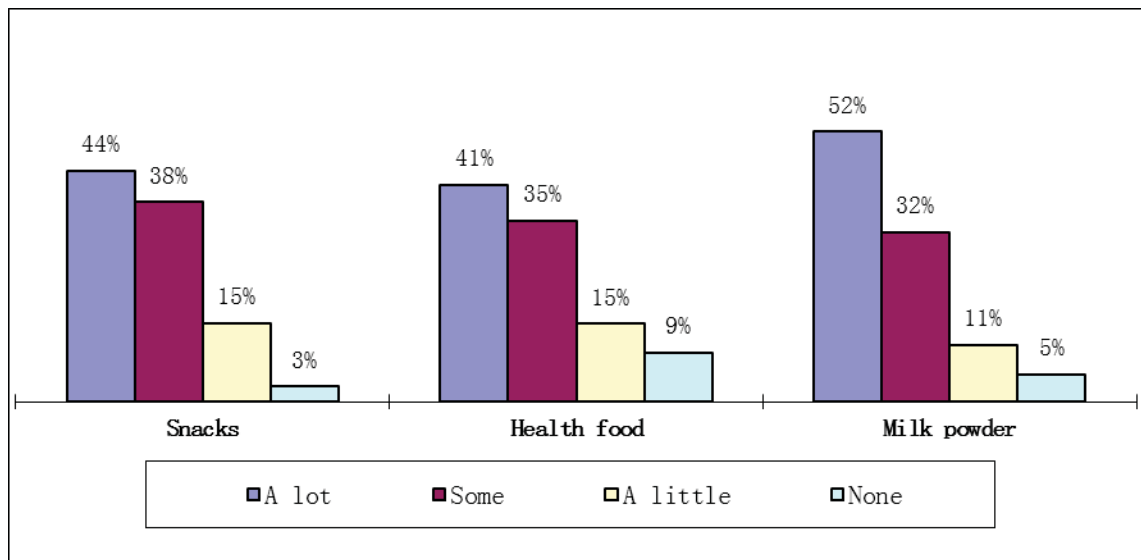


Fig 6.7 How much did food safety influence buying decisions (n=592)

When those participants were asked “How much did the reputation of a website you trust influence your buying intentions to buy food via the internet” (Fig 6.8), 89% of participants believe that food safety influences their online food buying decisions in terms of snacks, closely followed by 88% for milk power and 79% for health food.

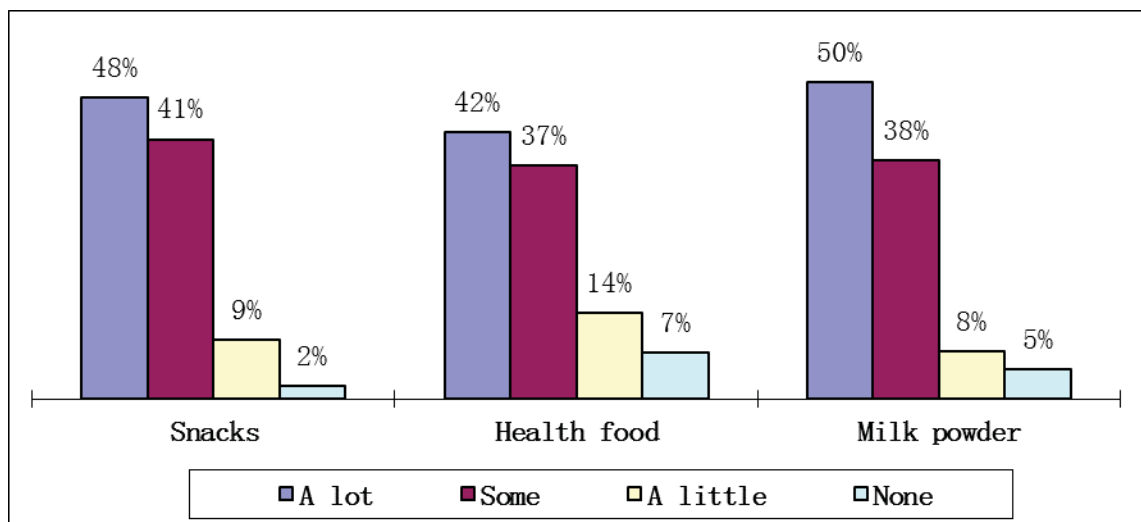


Fig 6.8 How much did the website's reputation influence buying decisions (n=592)

Participants who had bought imported food online

When the 592 participants were asked to respond to the question “Have you bought any food imported from other countries via the internet?”, 225 participants (38%) had purchased imported food online.

When the 225 participants with online imported food buying experience were asked “If you bought any imported food via the internet in which country was it produced? (multi-choices)” (Fig 6.9), EU, USA and South-East Asia were the top three countries-of-origin for online food. New Zealand was ranked number fifth.

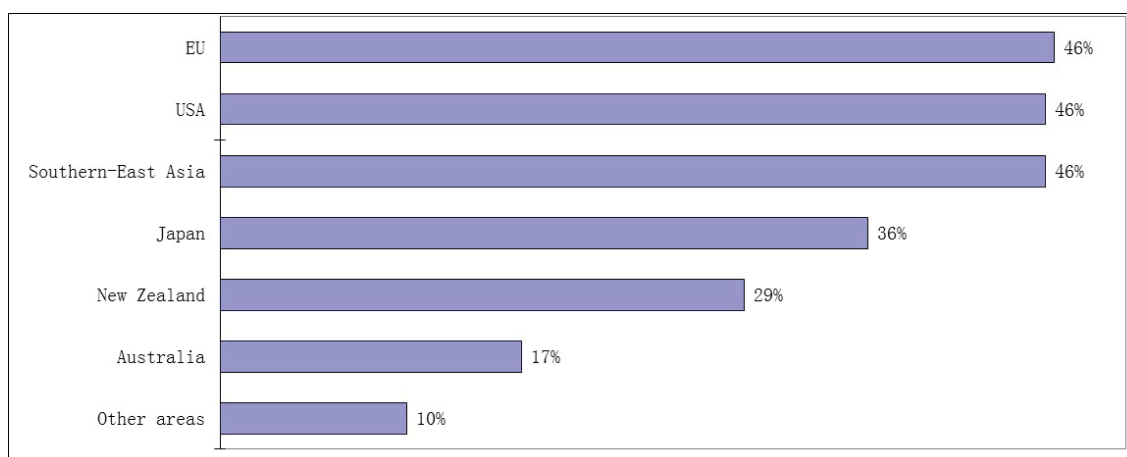


Fig 6.9 Proportions of participants that had bought food online from the above areas (n=225)

When the participants were asked “If you had bought New Zealand food via the internet before, which of the following food groups you have bought ” (Fig 6.10), snacks, milk powder and health food were the most popular New Zealand foods in the Chinese online food shopping market.

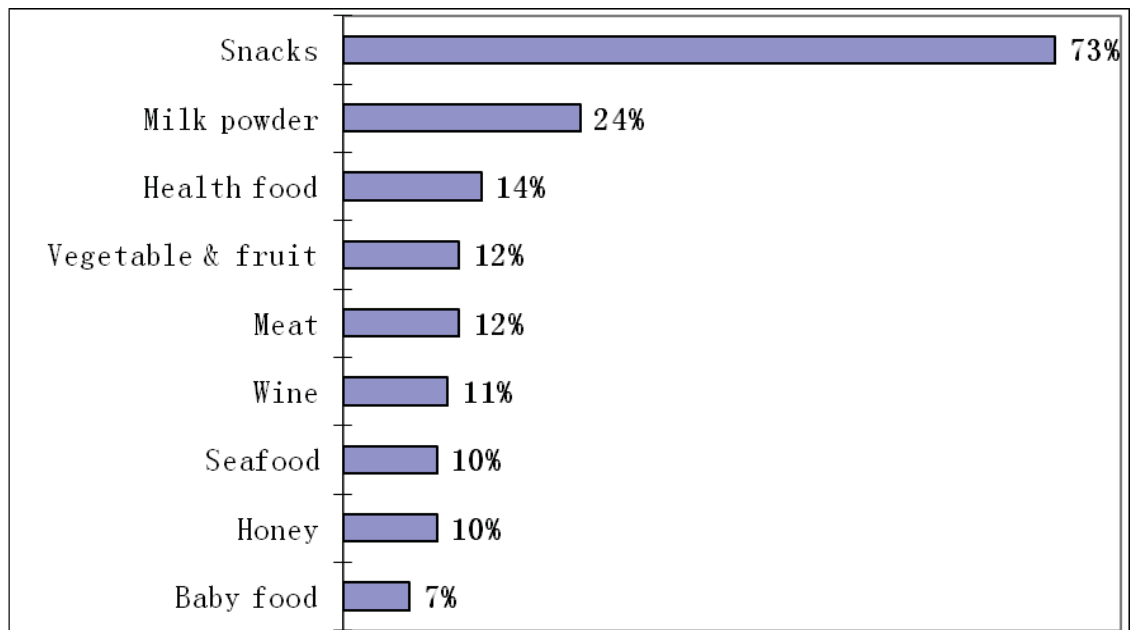


Fig 6.10 Proportions of participants that had bought the above NZ food groups online (n=225)

When the participants were asked “If you had bought New Zealand food via the internet before, please specify the MAIN factor resulting in your buying behaviour” (Fig 6.11).

Image of the country and food safety were ranked the most important reasons why participants decided to buy NZ food online.

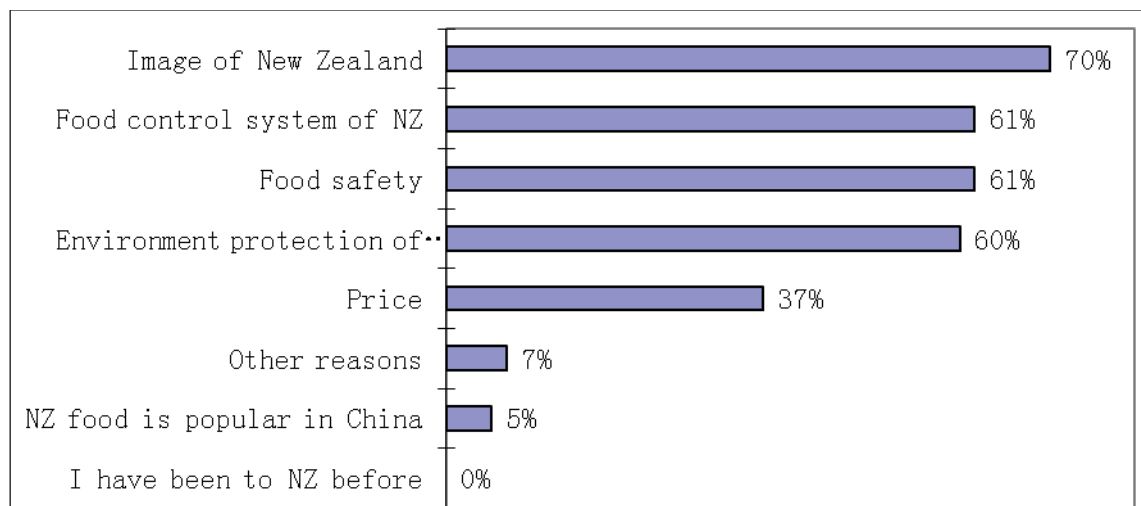


Fig 6.11 Proportions of participants who decided to buy NZ food online because of the above reasons (n=225)

When the participants were asked “If you had not bought any New Zealand food via the internet before, please specify the MAIN reason why you have not bought New Zealand food” (Fig 6.12); more than half of participants had not bought New Zealand food because that they were not familiar with this country.

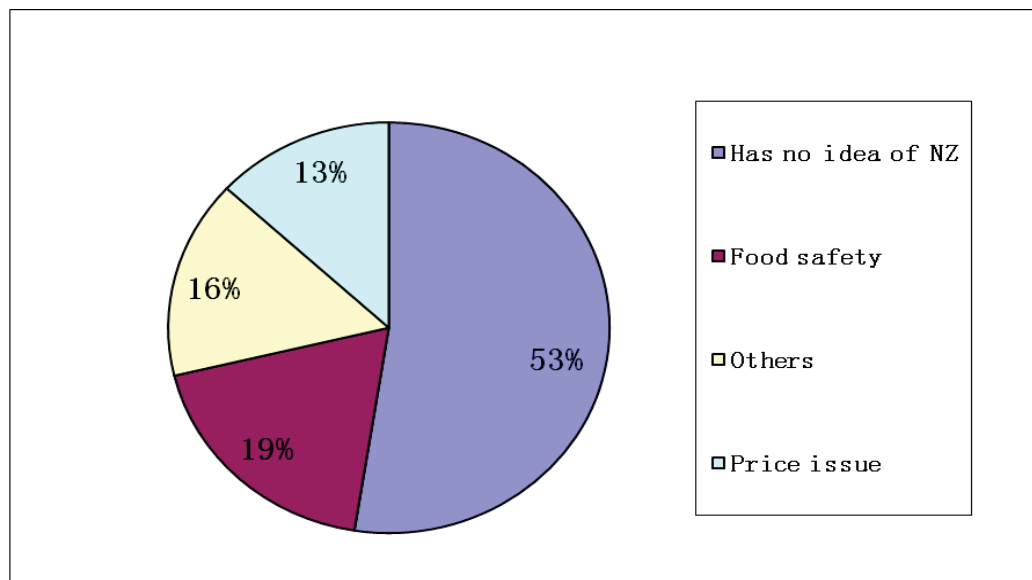


Fig 6.12 Proportions of participants who had not bought NZ food based on the above reasons (n=225)

When the participants were asked “Which of the following imported foods do you prefer to buy” (Fig 6.13), snacks and milk powder are ranked as the two most popular imported foods online.

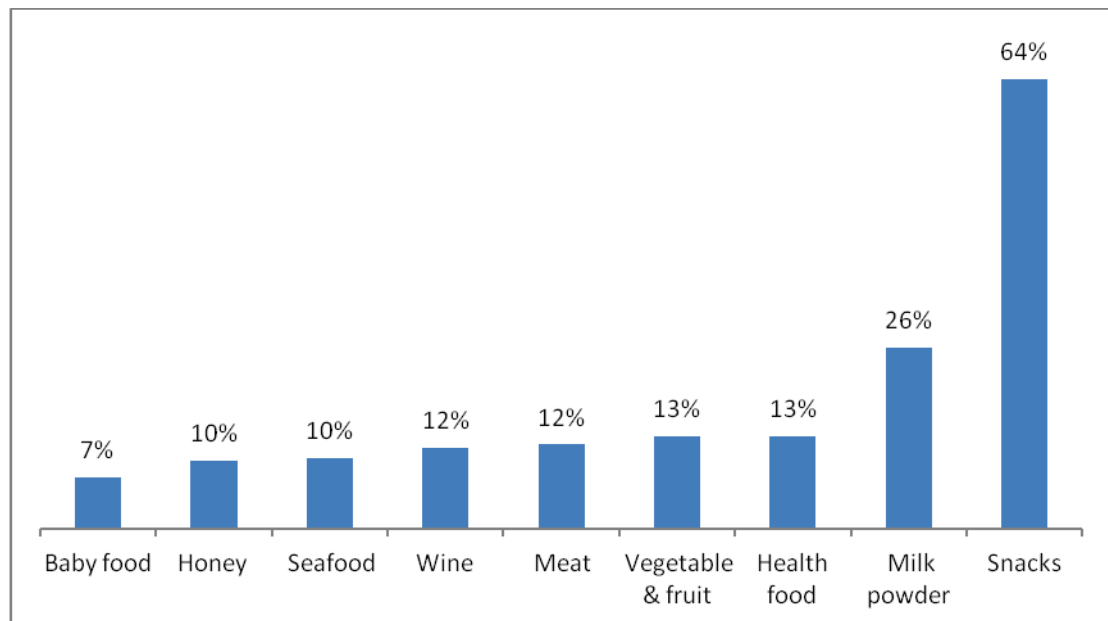


Fig 6.13 Proportions of participants that had bought imported food online (n=225)

6.3 Discussion

Previous research regarding trust in the online shopping environment had not emphasised the importance of product risk (Bitner, 1992; Srinivasan *et al.*, 2002; Szymanski & Hise, 2000; Wolfinbarger & Gilly, 2001; Zeithaml *et al.*, 2002). The trust model for websites proposed by Harris and Goode (2010) was based on their opinion that websites can be used to represent the online buying servicescape. Trust in the website is determined by three dimensions including aesthetic appeal, layout and functionality, and financial security (Harris & Goode, 2010). Schultz and Block (2015) explored ten different product categories and found that product categories will significantly influence online shopping intentions in the USA. However, food was not covered in Schultz and Block's (2015) research. It is hard to find any research on trust in food E-commerce. Hofstede *et al.* (2010) investigated the trust in B2B food trade in the Europe through the perspective of a food buyer in search of a new seller. Hofstede *et*

al. (2010) argued that products, sellers and the market environment are three important determinants for the trust in B2B food trade.

In this study, both the website and food safety are viewed as the two important determinants for the trust in the safety of food purchased online. Compared with the trust in B2B food trade, online sellers and online shopping environment were represented by the determinant “website” in this study. In this case, it will be easier to examine the model of trust in online food safety by only two determinants as this trust’s model is complicated by many factors. Compared with food safety, the online shopping environment seems to have much more influence than food safety in attracting Chinese university students to purchase food online. In this study it was found that the reputation of a website, convenience, price and low risk food (snacks) are the main contributors to buying food online for Chinese university students.

However, food safety still has an important influence in determining the Chinese university students’ online food shopping. Food safety is regarded as one of the issues that could potentially hinder the development of online food shopping (European Commission, 2005; Ramsey & Funk, 2009; Wilson, 2000). Hsiao *et al.* (2005) also pointed out food safety is likely to be a major concern in the development of online food shopping in China. In this study, most participants who purchased online believe that food safety plays an important role in their online food buying intentions as well as the website itself. This might explain why Chinese students preferred to buy low risk food products (i.e. snacks) rather than high risk foods (i.e. meat products, milk powder and seafood).

According to Liang and Lim (2011), online customers can be divided into traditional consumers and adventurous consumers. Normally, young people are more likely to be

adventurous consumers in purchasing food via the internet (Liang & Lim, 2011). This idea is supported by the fact that 59% of online food purchasers' were young, aged between 17 and 28 and based in large cities, including Beijing (Data 100, 2013). In this study, nearly 42% of Chinese university students bought food online and many of them purchased food regularly. Similarly, Chinese university students with online shopping experience can be regarded as being in the adventurous category. Compared with traditional consumers, university students are younger, prefer to try new food products, enjoy more special designs on a website, and care more about the website than food risks. Since the nature of the online shopping environment is interactive between consumers and websites, ensuring consumers have an enjoyable experience is very important for a successful online shopping environment (Hoffman & Novak, 2009). In addition, many researchers found that convenience and physical constraints are the most important reasons why people prefer to buy food online in the UK (Rafiq & Fulford, 2005) and the USA (Morganosky & Cude, 2002). Hsu and Chen (2011) noted convenience was the key reason why consumers decided to buy food online in China. Similarly, in this study convenience is still the most important factor attracting students to buy food online, followed by a large number of brand choices and lower price. In this case, in order to improve university students' online food buying intentions, it is particularly important for online food stores to develop aesthetic appeal and extraordinary functionality of the website, provide a convenient online buying environment and facilitate the communication of food traceability information.

In some developed countries, consumers prefer local or domestic food rather than imported food. In the USA, a growing percentage of imported food, particularly from developing countries, is of concern to American consumers because of potentially hazardous foods that are contaminated through accidental and intentional activities

(Zach, Doyle, Bier, & Czuprynski, 2012). According to Lee, Han, Rodolfo, Nayga and Lim (2011), Korean consumers worry about the safety of beef imported from the USA, as they fear imported beef might be infected by mad cow disease. In the Chinese market, the feeling is different with imported food having a high reputation. Ortega, Wang, and Wu (2009) found that Chinese consumers have positive perceptions of pork imported from the USA. Knight *et al.* (2007a) analysed the specific Chinese culture related to food safety and pointed out that imported food carries a status that is greater than products from China. In the past, Chinese consumers preferred foreign foods mainly because they believed that imported food has a higher quality and premium image compared with local food (Gong, 2003; Knight *et al.*, 2007b; Zhou & Hui, 2003). With the rapid development of the Chinese economy, this premium image of imported food has reduced (Cui & Liu, 2001; Gong, 2003; Kwok, Uncles, & Huang, 2005). However, the recent food safety incidents have severely damaged Chinese consumers' trust in local food safety and once again enhanced the reputation of imported food (Knight *et al.*, 2007a; Song *et al.*, 2010). According to a survey of Data 100 (2013), when Chinese consumers were asked the reasons why they bought imported food rather than local food, 46% of respondents indicated that they believed imported food products were safe, while 30% bought for diversity and 32% bought for fashion. Chinese consumers have started to buy imported food via the internet over the last few years. Compared to traditional food supply channels, nearly one fifth of online consumers in China preferred to purchase imported food via the internet (Data 100, 2013). In this study, about 38% of university students with online shopping experience bought imported food via the internet, which is much higher than the general population of online customers. Europe, the USA and South East Asia were ranked in the top three food exporting countries via the internet for Chinese students. New Zealand was ranked the fifth online

food exporting country and 29% of students preferred New Zealand food when they decided to purchase imported food via the internet. The main reasons why these students decided to buy New Zealand food online were because of the good image of this country and its reputation in food safety, rather than price. The main reason why some Chinese students did not buy New Zealand food is that they were not familiar with this country. In this case, if the New Zealand food industry wants to encourage more Chinese consumers to purchase New Zealand food online in the future, they need to work with the New Zealand government to continue to promote this country to more Chinese consumers. Focusing on university students might be an effective and economic method to influence the future population in China.

In Belgium food and health products accounted for the second largest online shopping market value in 2013. In this study nearly 48% of respondents with online shopping experience, or 30% of all participants, purchased food online. This finding is similar to the online food shopping habits of American shoppers. According to a survey conducted in 2013, 41% of the American respondents had bought food online via smartphone, tablet and desktop (Emarketer, 2014). As to another survey conducted in 2014, 32% of American people purchased food via the internet regularly (Emarketer, 2014). Some researchers had noted that online shopping between developing and developed countries differs significantly and technical constraints are a major barrier to the development of online shopping in developing countries (Canavari *et al.*, 2010). Considering mobile phones are very popular for university students (Jeong & Lee, 2015) and there are more than 500 million Chinese mobile internet users (Rauf, 2014), technical constraints should not be a barrier for current Chinese online food shoppers. How to improve the satisfaction level of mobile websites to attract Chinese university students seems to be important for New Zealand food industries expecting to export food to China.

According to this study, nearly 42% of Chinese university students have bought food online and many of them purchased food regularly. It is therefore predicted that every year there will be approximately 3 million new middle class people entering the workforce that are adventurous online food buyers. Considering mobile phones are very popular for university students (Jeong & Lee, 2015) and that more than 500 million Chinese are mobile internet users (Rauf, 2014), the design of a website that will encourage online food shopping via smartphones is a new challenge for online food sellers.

7 Conclusion

7.1 Introduction

In this study, a model of Chinese students' trust in the safety of food via the internet was developed based on a survey conducted in China. A questionnaire survey was applied to explore Chinese students' trust in online food safety. Two thousand students studying at four universities were surveyed with 1403 returned surveys that were valid for the data analysis. Among the 1403 respondents, 1238 students had the experience of online shopping, 832 students had purchased food online, and 225 students had purchased imported food online. By using SEM and PCA data analysis with LISREL software, 20 independent variables were explored and 14 variables contributing to the trust in online food safety were confirmed. The aim of the present thesis was to provide a basic analysis of the conceptual structure of Chinese student trust in food safety when making purchases using the internet, as well as how that trust is developed and influenced.

Online food shopping has been developing rapidly in China, particularly among the younger population, aged between 18 and 40. With such an increase in online shopping, the degree and nature of university student trust in this type of shopping is important for consumer wellbeing and for the success of companies selling their products in this way. This thesis developed a model for student trust in food safety, a conceptual structure of trust in online shopping, and a combined multi-factor model of student trust in the safety of food throughout the online shopping environment. In this chapter, a brief conclusion is presented first, followed by the main outcomes of this study, implications and recommendations.

7.2 Chinese students' trust in food safety

Determining the overall level of Chinese students' trust in food safety is one important research question of this study. As to Chinese students, the shelf life of food (use by dates on food) is regarded as the number one food risk. Meat products are ranked as the food category of most concern for Chinese university students, while milk powder is only ranked in fifth place as the food product of concern. Compared with the average Chinese consumer, Chinese university students appear to have not been influenced to any great extent by the food incident of 2008, where infant formula milk was contaminated by melamine.

Given the continuing occurrence of food safety incidents in China in the past decade, previous research suggests that Chinese consumers are extremely concerned about food safety issues and the level of trust in food safety is quite low. However, my study found that Chinese university students seem quite confident in food safety. One possible reason to explain this observation is that young university students focus on studying and less time is spent on buying food or being concerned with possible issues with food. Food safety is not a big concern for them. Considering university students have confidence in or are ambivalent to food safety, Chinese university students may be in a transition from ignorance of food safety concerns to being sensitive to certain food risks later in life when they have more time to consider such issues and when they have young families to care for. If there was a serious incident related to food purchased online, these students' trust in online food shopping is likely to change. It will be government's responsibility to educate university students on campus with more information on food safety.

Chinese university students are adventurous online food shoppers. A website with an aesthetic design style, a convenient online buying experience, trusted delivery service, enjoyable communication between the website and consumers, and sufficient electronic food traceability information from farm to fork are important for online food stores in attracting Chinese online shoppers.

7.3 Key outcomes of this study

The first main outcome of this study is the development of a conceptual framework of Chinese student trust in food safety and the confirmation of key factors contributing to trust in food safety (research question b). This addresses research question b "What are the key factors contributing to trust in food safety?" This trust has two dimensions and seven independent influencing factors. The first dimension, Food Control, is influenced by four important factors: farmers, food manufacturers, food retailers and food regulators. Among these four factors, the food manufacturer is most closely related to trust in the food supply, followed by the food retailer, regulator and farmer. In this study, Food Control is the main basis for building student trust in food safety.

Compared to Food Control, another dimension Risk Information represents the changeable and variable part of trust. Risk Information is influenced by three important factors: food hazards, food traceability and the media. In this study, food incidents and food brands do not have a large effect on Risk Information. According to this trust model, Chinese student trust in food safety can be built and can be used to study how one factor influences the overall trust in food safety.

The second main outcome of this study is the development of a model of trust for Chinese students in the online shopping environment. Seven factors that can influence trust in the online shopping environment were confirmed and divided into two

dimensions. This relates to research question c: “What factors can influence trust in the online shopping environment?” In this model, there are only two dimensions regarding Chinese university students’ trust in the online shopping environment: Aesthetics and Functionality. The dimension Aesthetics is influenced by three factors: entertainment, visual appeal and design. This dimension is regarded as an external factor for trust in online shopping. Entertainment, visual appeal and design are influencing factors in relation to the website itself. The dimension Functionality is regarded as an external factor for trust in online shopping, while payment, financial risk, delivery and usability are the internal factors closely related to dynamic online buying behaviour. Both the factors of aesthetics and functionality have a relatively similar influence on trust in online shopping. In China, online shopping risk is high and delivery risk is likely to be closely related to the online shopping logistics environment. Delivery risk is only regarded as one important factor influencing trust in online shopping in China. Because the Chinese online shopping market is growing very rapidly, in the short term the ability of delivery service to cope with the increase is limited, and Chinese people really worry about the quality and honesty of the delivery service. Chinese online shopping industries should take measures to improve the delivery service to attract more Chinese consumers to purchase food via the internet. In addition, since mobile phones are very popular for university students and more than 500 million Chinese are using the mobile internet, it is very important for online food stores to improve website satisfaction, particularly for modes of shopping that involve the mobile internet. The design of mobile websites should be emphasized by both researchers and New Zealand food industries which are expecting to export food to China. Both Aesthetics and Functionality seem to have a similar magnitude of effect on trust in the online shopping environment. However, the dimension Aesthetics might have much more effect on

attracting consumers during the exploration stage, particularly for first time online buying. The dimension Functionality should have much more effect in trust when consumers start to purchase via the internet, particularly for people buying goods online regularly.

The third main outcome of this study is the development of a new combined model with three-order factors for Chinese student trust in the safety of food purchased online. In this multi-factor trust model, 14 key factors contributing to trust in the safety of food purchased online were confirmed and divided into two dimensions. This answers research question d: “What are the key factors contributing to trust in the safety of food purchased online?” Both the website and food safety were viewed as two important determinants for Chinese student trust in online food safety. Compared with food safety, the online shopping environment seems to have much more influence than food safety in attracting Chinese university students to purchase food online. Considering the Chinese food safety environment, however, current Chinese university students might be more concerned about food safety when they have graduated and start to raise children. Although Chinese university students do not care too much about food safety when they are buying food online, this situation might be change considerably if a severe food incident happened in relation to the online food market. Historically, both European and Chinese consumers have had a high level of trust in food safety that shifted to a high level of distrust in food safety. For example, before the BSE crisis European consumers usually had not been concerned about food safety (Rohr *et al.* 2005). However, the BSE crisis resulted in a reduction in consumer trust in both food safety and the government (Gellynck & Verbeke, 2001; Miles & Frewer, 2001; Rohr *et al.*, 2005). Similarly in China, consumers started to become highly concerned about food safety after the melamine-contaminated milk incident in 2008 (Chen, 2008).

Although university students do not appear to care much about the food incidents, they may substantially change their minds if a serious food incident happened. In this case, online food sellers should not ignore the importance of food safety and they should learn how to carry out risk information communication.

The fourth main finding of this thesis is the nature of trust in online food shopping influenced by information transfer. According to previous research, information transfer of food risk is the most important element for trust building (Frewer *et al.*, 1996; Yee *et al.*, 2005). Some researchers (Gellynck *et al.*, 2006) believe that risk information communication is the most logical solution to remove information asymmetry and improve consumer trust. In terms of the online shopping environment, information communication is also very important for attracting consumers to buy food online. When buying food from a new online store, consumers need to acquire sufficient information about both food risk information and the aesthetic and functionality of the online store. Since information transfer is critical for building consumer trust, online sellers may conduct efficient and useful information communication with new consumers to persuade them to buy food products. After the first buying experience, the biggest challenge for online stores is whether consumers can enjoy the process of buying online. As to consumers, the online shopping process is a state like an information flow of navigating the websites (Hoffman & Novak, 2009). The nature of keeping the online shopping environment enjoyable is the interactive communication among consumers and websites.

The fifth main finding of this study is that several influencing factors including traceability, media and delivery risk are regarded as important ways to improve student trust in food safety and to encourage students to buy food online. This finding is

answers the research question e: “How can New Zealand food suppliers enhance Chinese consumers’ online food buying intentions?” Since many of the influencing factors are quite stable when there are no severe food incidents, of the total 14 factors mentioned above, traceability, media and delivery risk seem to be the most efficient and practical for government and industries to encourage more food purchasing via the internet. Evidence of this can be seen by the fact that more than 90% of Chinese students in this survey were willing to pay more to buy food with traceability information. Chinese students were aware that food traceability is increasing with the implementation of food safety regulatory requirements in China. New Zealand was ranked fifth as an online food exporting country for the Chinese online food market. The main reasons why these students decided to buy New Zealand food online were because of the good image of this country and its reputation in food safety, rather than price. The main reason why some Chinese students did not buy New Zealand food is that they were not familiar with this country. In this case, if the New Zealand food industry wants to encourage more Chinese consumers to purchase New Zealand food online in the future, they need to work with the New Zealand government to continue to promote this country to more Chinese consumers. In addition, E-traceability (i.e. 2D barcode or IFID food labels) and trustworthy delivery service might be an efficient measure to enhance the level of trust in online food shopping by students. These suggestions might be helpful for New Zealand food companies who are going to export more food to China.

7.4 Limitations and future research

The first limitation of this study is that the targeted population, university students, does not exactly represent general consumers. This study focuses on the trust of Chinese

university students in the safety of food via the internet. University students, however, are only a certain population group and the findings of this study cannot represent the entire population's trust in online food safety. Influencing factors and the model structure of students' trust could be quite different from other populations. More research on other population groups is necessary in the future.

The second limitation of this study is that some other independent variables should be considered. Although this trust model involves many independent factors, some other factors, such as price, might need to be considered and possibly incorporated into the models in the future. However, the more factors considered, the more complicated the trust model will be. Based on previous research about food safety and online shopping, 20 independent variables have been used. In this study, there are still 14 variables remaining in the refined model of trust in online food safety. In this case, some other variables might be explored, but reducing the number of contributing factors should also be considered for the sake of simplicity.

A third limitation of this study is that the survey was conducted by printed questionnaires. Printed questionnaires take a lot of time to distribute and collect. This also slowed the process of data analysis. Online questionnaires via an email channel might be a better choice for future research. However, a survey conducted via an online questionnaire might result in a low rate of response.

The fourth limitation of this study is that the trust model is designed for Chinese students. Other countries including New Zealand, the USA and the EU may have quite specific and different concerns about food safety during their online food shopping experience. It would be useful for further research to compare China with other countries.

In addition, mobile style online shopping websites (i.e. iOS Apps) should be examined in future research. Although most online shopping happened via computers or laptops in the past, mobile phones will be used more and more to purchase food in China. Factors influencing trust in the online shopping environment using a mobile phone may be quite different; detailed information about IOS or Android APPs needs to be explored.

Reference list

- Abdi, H. (2003). Multivariate analysis. In M. Lewis-Beck, A. Bryman, & T. Futing (Eds.), *Encyclopedia for research methods for the social sciences* (pp. 669-702). Thousand Oaks, CA: Sage Publications.
- Abdi, H., & Williams, L. J. (2010). Principal component analysis. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2(4), 433-459. doi:10.1002/9781118391686.ch12
- Adam, K., & Brülisauer, F. (2010). The application of food safety interventions in primary production of beef and lamb: A review. *International Journal of Food Microbiology*, 141 suppl 1(8), S43-S52. doi:10.1016/j.ijfoodmicro.2009.12.020
- Albright, J. J., & Park, H. M. (2009). *Confirmatory factor analysis using Amos, LISREL, Mplus, and SAS/STAT CALIS. Working Paper. The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing, Indiana University.*
Retrieved from
http://cn.bing.com/academic/profile?id=2166356744&encoded=0&v=paper_preview&mkt=zh-cn#
- Altekruse, S. F., Yang, S., Timbo, B. B., & Angulo, F. J. (1999). A multi-state survey of consumer food-handling and food-consumption practices. *American Journal of Preventive Medicine*, 16(3), 216-221. doi:10.1016/S0749-3797(98)00099-3
- Andsager, J. L. (2000). How interest groups attempt to shape public opinion with competing news frames. *Journalism & Mass Communication Quarterly*, 77(3), 577-592. doi:10.1177/107769900007700308
- Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling*, 16(3), 397-438. doi: 10.1080/10705510903008204
- Bai, B., Law, R., & Wen, I. (2008). The impact of website quality on customer satisfaction and purchase intentions: Evidence from Chinese online visitors. *International Journal of Hospitality Management*, 27(3), 391-402.
- Barnes, S., & Chen, Y. (2007). Initial trust and online buyer behaviour. *Industrial Management & Data Systems*, 107(1), 21-36. doi:10.1108/02635570710719034
- Barnett, J., McConnon, A., Kennedy, J., Raats, M., Shepherd, R., Verbeke, W., & Fletcher, J. (2011). Development of strategies for effective communication of food risks and benefits across europe: Design and conceptual framework of the foodrisk project. *BMC Public Health*, 11(308), 1211-1222. doi:10.1186/1471-2458-11-308
- Batt, P. J. (2003). Building trust between growers and market agents. *Supply Chain Management*, 8(1), 65-78. doi:10.1108/13598540310463378
- Bauer, H. H., Grether, M., & Leach, M. (2002). Building customer relations over the internet. *Industrial Marketing Management*, 31(2), 155-63. doi:10.1016/S0019-8501(01)00186-9

- Beard, T. D. (1991). HACCP and the home: The need for consumer education. *Food Technology*, 45(6), 123-124.
- Bennet, P., Calman, K., Curtis, S., & Fischbacher-Smith, D. (2010). *Risk communication and public health* (2nd ed.). Oxford, UK: Oxford University Press.
- Benson, A. P. (2011). Communicating risk to consumers in domestic and internationally traded products. *Food Control*, 22(9), 1529-1534. doi:10.1016/j.foodcont.2010.07.015
- Berg, L. (2004). Trust in food in the age of mad cow disease: A comparative study of consumers' evaluation of food safety in Belgium, Britain and Norway. *Appetite*, 42(1), 21-32. doi:10.1016/S0195-6663(03)00112-0
- Berg, L., Kjaernes, U., Ganskau, E., Minina, V., Voltchkova, L., Halkier, B., & L., H. (2005). Trust in food safety in Russia, Denmark and Norway. *European Societies*, 7(1), 103-129. doi:10.1080/1461669042000327045
- Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57-71.
- Blunch, N. J. (2013). *Introduction to structural equation modelling* (2nd ed.). London, UK: SAGE Publications Ltd.
- Bock, S. A., Munoz-Furlong, A., & Sampson, H. A. (2001). Fatalities due to anaphylactic reactions to foods. *Journal of Allergy and Clinical Immunology*, 107(1), 191-193. doi:10.1067/mai.2001.112031
- Boer, M., McCarthy, M., Brennan, M., Kelly, A., & Ritson, C. (2005). Public understanding of food risk issues and food risk messages on the island of Ireland: The views of food safety experts. *Journal of Food Safety*, 25(4), 241-265. doi:10.1111/j.1745-4565.2005.00020.x
- Boholm, A. (1998). Comparative studies of risk perception: A review of twenty years of research. *Journal of Risk Research*, 1(2), 135-163. doi:10.1080/136698798377231
- Brewer, M., Sprouls, G., & Craig, R. (1994). Consumer attitude toward food safety issues. *Journal of Food Safety*, 14(1), 63-76. doi:10.1111/j.1745-4565.1994.tb00584.x
- Bruce, D. M. (2002). A social contract for biotechnology: Shared visions for risky technologies? *Journal of Agricultural and Environmental Ethics*, 15(3), 279-289. doi:10.1023/A:1015738727342
- Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford, UK: Oxford University Press.
- Buchanan, R. L., Baker, R. C., Charlton, A. J., Riviere, J. E., & Standaert, R. (2011). Pet food safety: A shared concern. *British Journal of Nutrition*, 106 Suppl 1(1), S78-S84. doi:10.1017/S0007114511005034
- Byrd-bredbenner, C., Maurer, J., Wheatley, V., Schaffner, D., Bruhn, C., & Blalock, L. (2007). Food safety self-reported behaviors and cognitions of young adults: Results of a national study. *Journal of Food Protection*, 70(8), 1917-1926.

- Byrne, B. M. (1989). *A primer of LISREL: Basic applications and programming for confirmatory factor analytic models*. New York, NY: Springer Verlag.
- Callahan, E. (2001). *Troubleshooting your web page*. Redmond, WA: Microsoft Press.
- Calnan, M., & Rowe, R. (2006). Researching trust relations in health care: Conceptual and methodological challenges - An introduction. *Journal of Health Organization and Management*, 20(5), 349-358. doi:10.1108/14777260610701759
- Canavari, M., Fritz, M., Hofstede, G., Matopoulos, A., & Vlachopoulou, M. (2010). The role of trust in the transition from traditional to electronic B2B relationships in agri-food chains. *Computers and Electronics in Agriculture*, 70(2), 321-327. doi:10.1016/j.compag.2009.08.014
- Chang, M. L., & Wu, W. Y. (2012). Revisiting perceived risk in the context of online shopping: An alternative perspective of decision-making styles. *Psychology & Marketing*, 29(5), 378-400. doi:10.1002/mar.20528
- Chang, Y. P., & Zhu, D. H. (2007). Factors influencing new and repeated buyers' intention to shop online in China: A comparatively empirical study. *2007 International Conference on Wireless Communications, Networking and Mobile Computing*, (pp. 3494-3497). Shanghai, China. doi:10.1109/WICOM.2007.864
- Chen, M. (2008). Consumer trust in food safety - A multidisciplinary approach and empirical evidence from Taiwan. *Risk Analysis*, 28(6), 1553-1569. doi:10.1111/j.1539-6924.2008.01115.x
- Cheung, C. M., Chan, G. W., & Limayem, M. (2005). A critical review of online consumer behaviour: empirical research. *Journal of Electronic Commerce in Organizations*, 3(4), 1-19. doi:10.4018/jeco.2005100101
- China Daily. (2013). *Food safety tops public's concerns*. Retrieved from http://usa.chinadaily.com.cn/china/2013-08/21/content_16909023.htm
- China International Electronic Commerce Center. (2016, June 29). *2015 年中国电商报告核心数据发布*. Retrieved from <http://www.chinanews.com/cj/2016/06-29/7921976.shtml>
- China Internet Watch. (2014). *China online food ordering market in 2014*. Retrieved from <http://www.chinainternetwatch.com/8849/online-food-ordering-market-2014/>
- Choe, Y. C., Park, J., Chung, M., & Moon, J. (2009). Effect of the food traceability system for building trust: Price premium and buying behavior. *Information Systems Frontiers*, 11(2), 167-179. doi:10.1007/s10796-008-9134-z
- Chrysochou, P., Chryssochoidis, G., & Kehagia, O. (2009). Traceability information carriers: The technology backgrounds and consumers' perceptions of the technological solutions. *Appetite*, 53(3), 322-331. doi:10.1016/j.appet.2009.07.011
- Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hove, UK: Psychology Press.

- Comrie, F., Masson, L. F., & McNeill, G. (2009). A novel online food recall checklist for use in an undergraduate student population: A comparison with diet diaries. *Nutrition Journal*, 8(13). doi:10.1186/1475-2891-8-13
- Contento, I., Balch, G. I., Bronner, Y. L., Lytle, L. A., Maloney, S. K., Olson, C. M., & Swadener, S. S. (1995). The effectiveness of nutrition education and implications for nutrition education policy, programs, and research: A review of research. *Journal of Nutrition Education*, 27(6), 277-418.
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 96–104.
- Cui, G., & Liu, Q. (2001). Executive insights: Emerging market segments in a transitional economy: A study of urban consumers in China. *Journal of International Marketing*, 9(1), 84-106. doi: 10.1509/jimk.9.1.84.19833
- Data 100. (2013). 数字 100 消费者洞察-网购篇. *China Advertising*, 12, 120-120.
- De Jonge, J. (2008). *A monitor for consumer confidence in the safety of food*. (Doctoral dissertation, Wageningen University, Wageningen, Netherlands). Retrieved from <http://edepot.wur.nl/122060>
- De Jonge, J., Van Trijp, H., Renes, R. J., & Frewer, L. J. (2007). Understanding consumer confidence in the safety of food: Its two-dimensional structure and determinants. *Risk Analysis*, 27(3), 729-740. doi:10.1111/j.1539-6924.2007.00917.x
- De Jonge, J., Van Trijp, H., Renes, R. J., & Frewer, L. J. (2010). Consumer confidence in the safety of food and newspaper coverage of food safety issues: A longitudinal perspective. *Risk Analysis*, 30(1), 125-142. doi:10.1111/j.1539-6924.2009.01320.x
- Delea, K. (2012). Evaluating local and state food and water safety programs. *Journal of Environmental Health*, 74(7), 32-33.
- Denscombe, M. (2007). *The good research guide-for small-scale social research projects* (3rd ed.). Berkshire, UK: Open University Press.
- Dillman, D. A. (2007). *Mail and internet survey: the tailored design method* (2nd ed.). New York, NY: Routledge.
- Doney, P. M., & Cannon, J. P. (1997). An examination of the nature of trust in buyer-seller relationships. *Journal of Marketing*, 61(2), 35-51.
- Donnelly, V. (2001). *Designing easy-to-use websites*. Boston, MA: Addison-Wesley Longman Publishing.
- Drescher, L. S., De Jonge, J., Goddard, E., & Herzfeld, T. (2012). Consumer's stated trust in the food industry and meat purchases. *Agriculture and Human Values*, 29(4), 507–517. doi:10.1007/s10460-012-9375-9
- Dreze, X., & Zufryden, F. (1997). Testing website design and promotional content. *Journal of Advertising Research*, 37(2), 77-91.

- Ekhaml, L. (1996). Make your presence known on the web. *School Library Media Activities Monthly*, 12 (10), 33-35.
- Eldridge, J., & Reilly, J. (2003). Risk and relativity: BSE and the British media. In N. F. Pidgeon, R. E. Kasperson, & P. Slovic (Eds.), *The Social Amplification of Risk* (pp. 138-155). Cambridge, UK: Cambridge University Press.
- Emarketer. (2014). *Another reason to love digital: online food ordering*. Retrieved from <http://www.emarketer.com/Article/Another-Reason-Love-Digital-Online-Food-Ordering/1011200>
- Eom, Y. S. (1994). Pesticide residue risk and food safety valuation: A random utility approach. *American Journal of Agricultural Economics*, 76(4), 760-772.
- European Commission. (2005). *ICT and electronic business in the food and beverages industry*. Retrieved from E-Business Watch: http://www.ebusinesswatch.org/resources/food/SR01b_Food_2005_web.pdf.
- Evans, J., & King, V. (1999). Business-to-business marketing and the world wide web: Planning, managing, and assessing web sites. *Industrial Marketing Management*, 28(4), 343-358.
- FAO. (2011). *The state of world fisheries and aquaculture 2010*. Retrieved from [www.fao.org](http://www.fao.org/fishery/en): <http://www.fao.org/fishery/en>
- FAO. (2014). *Horizon scanning and foresight: An overview of approaches and possible applications*. Retrieved from <http://www.fao.org>: <http://www.fao.org/3/a-i4061e.pdf>
- FAO/WHO. (1998). *The application of risk communication to food standards and safety matters*. Retrieved from <http://www.fao.org/docrep/005/x1271e/x1271e00.htm>
- Finucane, M. L., Slovic, P., Mertz, C. K., Flynn, J., & Satterfield, T. A. (2000). Gender, race, and perceived risk: The white male effect. *Health Risk & Society*, 2(2), 159-172.
- Fischer, C., Gonzalez, M., Henchion, M., & Leat, P. (2007). Factors influencing trust-supporting mechanisms in European agri-food chains. *Food Economics*, 4(1), 40-49.
- Fischler, C. (1988). Food, self and identity. *Social Science Information*, 27(2), 275-292.
- Flavián, C., Guinalíu, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management*, 43(1), 1-14. doi:10.1016/j.im.2005.01.002
- Frewer, L. J., Howard, C., Hedderley, D., & Shepherd, R. (1996). What determines trust in information about food-related risks? Underlying psychological constructs. *Risk Analysis*, 16(4), 473-486.
- Frewer, L. J., Miles, S., Brennan, M., Kuznesof, S., Ness, M., & Ritson, C. (2002a). Public preferences for informed choice under conditions of risk uncertainty. *Public Understanding of Science*, 11(11), 363-372.
- Frewer, L. J., Miles, S., & Marsh, R. (2002b). The media and genetically modified foods: Evidence in support of social amplification of risk. *Risk Analysis*, 22(4), 701-711.

- Fritz, M., & Fischer, C. (2007). The role of trust in European food chains: Theory and empirical findings. *International Food and Agribusiness Management Review*, 10(2), 141-164.
Retrieved from
<http://ifama.org/resources/Documents/Volume%2010%20Issue%202/The%20Role%20of%20T>
- Fryer, P. J., & Bakalis, S. (2012). Heat transfer to foods: Ensuring safety and creating microstructure. *Journal of Heat Transfer*, 134(3), 405-410.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, 58(2), 1-19.
- Gao, H., Knight, J. G., Zhang, H., & Mather, D. (2013). Guilt by association: Heuristic risks for foreign brands during a product-harm crisis in China. *Journal of Business Research*, 66(8), 1044-1051. doi:10.1016/j.jbusres.2011.12.029
- Gao, H., Knight, J. G., Zhang, H., Mather, D., & Tan, L. (2012). Consumer scapegoating during a systemic product-harm crisis. *Journal of Marketing Management*, 28(11/12), 1270-1290. doi:10.1080/0267257X.2011.645859
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Inexperience and experience with online stores: The importance of tam and trust. *IEEE Transactions on Engineering Management*, 50(3), 307-321.
- Gellynck, X., & Verbeke, W. (2001). Consumer perception of traceability in the meat chain. *German Journal of Agricultural Economics*, 50(6), 368-374.
- Gellynck, X., Verbeke, W., & Vermeire, B. (2006). Pathways to increase consumer trust in meat as a safe and wholesome food. *Meat Science*, 74(1), 161-171.
doi:10.1016/j.meatsci.2006.04.013
- Geng, S., Ren, T. Z., & Wang, M. H. (2007). Technology and infrastructure considerations for E-commerce in Chinese agriculture. *Agricultural Sciences in China*, 6(1), 1-10.
doi:10.1016/S1671-2927(07)60010-8
- Gerbing, D. W., & Anderson, J. C. (1985). The effects of sampling error and model characteristics on parameter estimation for maximum likelihood confirmatory factor analysis. *Multivariate Behavioral Research*, 20(3), 255-271.
- Giraud, G., & Halawany, R. (2006). Consumers' perception of food traceability in Europe. *Paper presented at the 98th EAAE Seminar*. Chania, Greece. Retrieved from
<http://ageconsearch.umn.edu/bitstream/10047/1/sp06gi04.pdf>
- Gong, W. (2003). Chinese consumer behavior: A cultural framework and implications. *Journal of American Academy of Business*, 3(1/2), 373-380.
- Goodman, J. R., & Goodman, B. P. (2006). Beneficial or biohazard? How the media frame biosolids. *Public Understanding of Science*, 15(3), 359-375.
doi:10.1177/0963662506062468

- Gossner, C. M., Schlundt, J., Embarek, P. B., Hird, S. L., Beltran, J. J., Teoh, K. N., & Tritscher, A. (2009). The melamine incident: implications for international food and feed safety. *Environmental Health Perspectives*, 117(12), 1803-1808.
- Gregg, D. G., & Walczak, S. (2010). The relationship between website quality, trust and price premiums at online auctions. *Electronic Commerce Research*, 10(1), 1-25.
- Grewal, D., Mullikin, J. L., & Munger, J. (2003). Loyalty in e-tailing: A conceptual framework. *Journal of Relationship Marketing*, 2(3/4), 31-45.
- Grunert, K. G. (2002). Current issues in the understanding of consumer food choice. *Trends in Food Science and Technology*, 13(8), 275-285.
- Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369-391.
- Haimes, Y. Y. (2009). On the complex definition of risk: A systems-based approach. *Risk Analysis*, 29(12), 1647-1654. doi:10.1111/j.1539-6924.2009.01310.x
- Hair, J., Anderson, R. E., Tatham, R. L., & Black, W. C. (2005). *Multivariate data analysis*. Upper Saddle River, NJ: Prentice-Hall.
- Halkier, B., & Holm, L. (2006). Shifting responsibilities for food safety in Europe: An introduction. *Appetite*, 47(2), 127-133.
- Hansen, T., Jensen, J. M., & Solgaard, H. S. (2004). Predicting online grocery buying intention: A comparison of the theory of reasoned action and the theory of planned behaviour. *International Journal of Information Management*, 24(6), 539-550.
- Hansson, S. (2010). Risk: objective or subjective, facts or values. *Journal of Risk Research*, 13(2), 231-238. doi:10.1080/13669870903126226
- Harris, L. C., & Goode, M. M. H. (2004). The four levels loyalty and the pivotal role of trust: A study of online loyalty, trust, satisfaction, value, and service quality. *Journal of Retailing*, 80(2), 139-158.
- Harris, L. C., & Goode, M. M. H. (2010). Online servicescapes, trust, and purchase intentions. *Journal of Service Marketing*, 24(3), 230-243. doi:10.1108/08876041011040631
- Heerde, H. V., Helsen, K., & Dekimpe, M. G. (2007). The impact of a product-harm crisis on marketing effectiveness. *Marketing Science*, 26(2), 230-245.
- Henderson, J., Coveney, J., Ward, P. R., & Taylor, A. (2011). Farmers are the most trusted part of the Australian food chain: Results from a national survey of consumers. *Australian and New Zealand Journal of Public Health*, 35(4), 319-324. doi:10.1111/j.1753-6405.2011.00725.x
- Henderson, J., Ward, P., Coveney, J., & Meyer, S. (2012). Trust in the Australian food supply: Innocent until proven guilty. *Health, Risk & Society*, 14(3), 257-272.
- Hilgartner, S. (1990). The dominant view of popularisation: Conceptual problems, political uses. *Social Studies of Science*, 20(3), 519-539. doi:10.1177/030631290020003006

- Hoeffler, S., & Keller, K. (2003). The marketing advantages of strong brands. *Journal of Brand Management*, 10(6), 421-445.
- Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing*, 60(3), 50-68.
- Hoffman, D. L., & Novak, T. P. (2009). Flow online: Lessons learned and future prospects. *Journal of Interactive Marketing*, 23(1), 23-34.
- Hofstede, G. J., Canavari, M., Fritz, M., Oosterkamp, E., & Sprundel, G. V. (2010). Towards a cross-cultural typology of trust in B2B food trade. *British Food Journal*, 112(7), 671-687. doi:10.1108/00070701011058226
- Hohl, K., & Gaskell, G. (2008). European public perceptions of food risk: Cross-national and methodological comparisons. *Risk Analysis*, 28(2), 311-324.
- Hsiao, R., Li, Y., & Chen, S. H. (2005). *Technology transfer in cross-national context: Experiences of an online market failure in Chinese food industry*. Paper presented at the Pacific Asia Conference on Information Systems. Bangkok, Thailand.
- Hsu, C. H., & Chen, C. H. (2011). Analyzing the purchase motivation of online shopping for health food. *African Journal of Business Management*, 5(12), 4699-4703.
- Hu, T. (2010). An integrated relationship on brand strategy, brand equity, customer trust and brand performance - An empirical investigation of the health food industry. *International Journal of Organizational Innovation*, 2(3), 89-106.
- Huang, L., & Liu, P. (2014). Key technologies and algorithms' application in agricultural food supply chain tracking system in E-commerce. In D. Li, & Y. Chen (Eds.), *Computer and computing technologies in agriculture VII* (pp. 269-281). Berlin, Germany: Springer Berlin Heidelberg. doi:10.1007/978-3-642-54341-8_29
- Jean, R. J., Sinkovics, R. R., & Kim, D. (2008). Information technology and organizational performance within international business to business relationships: A review and an integrated conceptual framework. *International Marketing Review*, 25(5), 563-583. doi:10.1108/02651330810904099
- Jensen, K. (2004). BSE in the UK: why the risk communication strategy failed. *Journal of Agricultural and Environmental Ethics*, 17(4), 405-423. doi:10.1007/s10806-004-5186-3
- Jeong, H., & Lee, Y. (2015). Smartphone addiction and empathy among nursing students. *Healthcare and Nursing*, 88, 224-228.
- Johnson, B. B., & Slovic, P. (1995). Presenting uncertainty in health risk assessment: Initial studies of its effects on risk perception and trust. *Risk Analysis*, 15(4), 485-494.
- Jolliffe, I. T. (2002). *Principal component analysis (2nd ed.)*. New York, NY: Springer.
- Jungermann, H., Pfister, H. R., & Fischer, K. (1996). Credibility, information preferences, and information interests. *Risk Analysis*, 16(2), 251-261.

- Jüttner, U., Schaffner, D., Windler, K., & Maklan, S. (2013). Customer service experiences: Developing and applying a sequential incident laddering technique. *European Journal of Marketing*, 47(5/6), 738-769. doi: 10.1108/03090561311306769
- Kasperson, R. E., Golding, D., & Tuler, S. (1992). Social distrust as a factor in siting hazardous facilities and communicating risk. *Journal of Social Issues*, 48(4), 161-187.
- Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., & Goble, R. e. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis*, 8(2), 177-187.
- Keiningham, T. A., Perkins-Munn, T., & Vavra, T. G. (2005). The brand-customer connection. *Marketing Management*, 14(4), 33-47.
- Keller, K. L. (2003). Brand synthesis: The multidimensionality of brand knowledge. *Journal of Consumer Research*, 29(4), 595-600.
- Keller, K. L. (2009). Building strong brands in a modern marketing communications environment. *Journal of Marketing Communications*, 15(2-3), 139-155. doi:10.1080/13527260902757530
- Kennedy, J., Jackson, V., Blair, I., McDowell, D. A., Cowan, C., & Bolton, D. (2005). Food safety knowledge of consumers and the microbiological and temperature status of their refrigerators. *Journal of Food Protection*, 68(7), 1421-1430.
- Kher, S. V., De Jonge, J., Wentholt, M. T., Deliza, R. D., Cnossen, H. J., Luijckx, N. B., & Frewer, L. J. (2011). Consumer perceptions of risks of chemical and microbiological contaminants associated with food chains: A cross-national study. *International Journal of Consumer Studies*, 37(1), 73-83. doi:10.1111/j.1470-6431.2011.01054.x
- Kim, R. B. (2010). A multi-attribute model of Japanese consumer's purchase intention for GM foods. *Agricultural Economics-Zemedelska Ekonomika*, 56(10), 449-459.
- Klontz, K. C., Timbo, B., Fein, S., & Levy, A. (1995). Prevalence of selected food consumption and preparation behaviors associated with increased risks of food-borne disease. *Journal of Food Protection*, 58(8), 927-930.
- Knight, J., Gao, H., Garrett, T., & Deans, K. (2007a). Quest for social safety in imported foods in China: Gatekeeper perceptions. *Appetite*, 50(1), 146-157.
- Knight, J., Holdsworth, D., & Mather, D. (2007b). Determinants of trust in imported food products: perceptions of European gatekeepers. *British Food Journal*, 109(10), 792-804.
- Knight, J., Holdsworth, D., & Mather, D. (2008). Perspective GM food and neophobia: Connecting with the gatekeepers of consumer choice. *Journal of the Science of Food and Agriculture*, 88(5), 739-744. doi:10.1002/jsfa.3168
- Kriege-steffen, A., Boland, H., Lohscheidt, J., Schneider, F., & Stolze, M. (2010). Transparent food and consumer trust. 4th *International European Forum on System Dynamics and Innovation in Food Networks*, (pp. 452-462). Bonn, Germany. Retrieved from <http://131.220.45.179/ojs/index.php/proceedings/article/viewFile/67/65>

- Kroeze, W., Werkman, A., & Brug, J. (2006). A systematic review of randomized trials on the effectiveness of computer-tailored education on physical activity and dietary behaviors. *Annals of Behavioral Medicine A Publication of the Society of Behavioral Medicine*, 31(3), 205-223. doi:10.1207/s15324796abm3103_2
- Kwok, S., Uncles, M., & Huang, Y. (2005). *Country-of-origin effects in China: An investigation of urban Chinese consumers*. Paper presented at the Australia New Zealand Marketing Academy Conference. Perth, Australia.
- Lachlan, K., & Spence, P. (2010). Communicating risks: Examining hazard and outrage in multiple contexts. *Risk Analysis*, 30(12), 1872-1886.
- Lacobucci, D., & Churchill, G. A. (2010). *Marketing research: methodological foundations*. Mason, OH: South-Western Gengage Learning.
- Lairon, D. (2010). Nutritional quality and safety of organic food. a review. *Agronomy for Sustainable Development*, 30(1), 33-41. doi:10.1051/agro/2009019
- Langford, I. H. (2002). An existential approach to risk perception. *Risk Analysis*, 22(1), 101–120. doi:10.1111/0272-4332.t01-1-00009
- Lao, S. I., Choy, K. L., Ho, G., Tsim, Y., Poon, T., & Cheng, C. (2012). A real-time food safety management system for receiving operations in distribution centers. *Expert Systems with Applications*, 39(3), 2532-2548. doi: 10.1016/j.eswa.2011.08.105
- Lee, J., Han, D. B., Rodolfo, M., Nayga, J., & Lim, S. S. (2011). Valuing traceability of imported beef in Korea: An experimental auction approach. *The Australian Journal of Agricultural and Resource Economics*, 55(3), 360-373. doi:10.1111/j.1467-8489.2011.00553
- Lennon, S. J., Johnson, K. K., Jasper, C. R., Damhorst, M. L., & Lyons, N. (2009). Rural consumers' online shopping for food and fiber products as a form of outshopping. *Clothing and Textiles Research Journal*, 27(1), 3-30. doi: 10.1177/0887302X07313625
- Leonard, L. N. (2012). Attitude influencers in C2C E-commerce: buying and selling. *Journal of Computer Information Systems*, 52(3), 11-17.
- Li, Q., Liu, W., Wang, J., & Dai, Y. (2011). Application of content analysis in food safety reports on the internet in China. *Food Control*, 22(2), 252-256.
- Liang, A. R., & Lim, W. (2011). Exploring the online buying behavior of specialty food shoppers. *International Journal of Hospitality Management*, 30(4), 855-865. doi:10.1016/j.ijhm.2011.01.006
- Lindgreen, A. (2003). Trust as a valuable strategic variable in the food industry: Different types of trust and their implementation. *British Food Journal*, 105(6), 310-327. doi: 10.1108/00070700310481694
- Lindh, H., & Olsson, A. (2010). Communicating imperceptible product attributes through traceability: A case study in an organic food supply chain. *Renewable Agriculture and Food Systems*, 25(4), 263–271. doi: 10.1017/S1742170510000281

- Liu, L., Hu, L. L., Tang, J. J., Li, Y. F., Zhang, Q., & Chen, X. (2012). Food safety assessment of planting patterns of four vegetable-type crops grown in soil contaminated by electronic waste activities. *Journal of Environmental Management*, 93(1), 22-30. doi:10.1016/j.jenvman.2011.08.021
- Liu, R., Pieniak, Z., & Verbeke, W. (2014). Food-related hazards in China: Consumers' perceptions of risk and trust in information sources. *Food Control*, 46, 291-298. doi:10.1080/10705510903008204
- Lofstedt, R. E. (2003). Science communication and the Swedish acrylamide alarm. *Journal of Health Communication*, 8(5), 407-432. doi:10.1080/713852123
- Lofstedt, R. E. (2006). How can we make food risk communication better: Where are we and where are we going? *Journal of Risk Research*, 9(8), 869-890. doi:10.1080/13669870601065585
- Loh, S. S. (2015). *The rise of higher education and the Chinese middle class*. Retrieved from http://works.bepress.com/seowshi_loh/1/
- Lowrance, W. W. & Klerer, J. (1976). Of acceptable risk: Science and the determination of safety. *Journal of the Electrochemical Society*, 123(11), 192. doi:10.1149/1.2132690
- Macnaghten, P., & Urry, J. (1998). *Contested natures*. London, UK: Sage Publication.
- MAFF. (2000). *The BSE inquiry report: The inquiry into BSE and variant CJD in the United Kingdom*. Retrieved from UK Government Web Archive: <http://collections.europarchive.org/tna/20090505194948/http://bseinquiry.gov.uk/report/index.htm>
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, 103(3), 391-410.
- Massey University. (2015). *Code of ethical conduct for research, teaching and evaluations involving human participant*. Retrieved from <http://www.massey.ac.nz/massey/fms/Human%20Ethics/Documents/MUHEC%20Code%202015.pdf?25E570E23E14511DBD28E4A35C2BC2DEdf>
- Mathwick, C., Malhotra, N. K., & Rigdon, E. (2002). The effect of dynamic retail experiences on experiential perceptions of value. *Journal of Retailing*, 78(1), 51-59.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
- McCarthy, M., & Brennan, M. (2009). Food risk communication: Some of the problems and issues faced by communicators on the island of Ireland (IOI). *Food Policy*, 34(6), 549-556. doi:10.1016/j.foodpol.2009.06.005
- McCarthy, M., Brennan, M., Boer, M. D., & Ritson, C. (2008). Media risk communication - What was said by whom and how was it interpreted. *Journal of Risk Research*, 11(3), 375-394.

- McKnight, D. H., Choudhury, D. H., & Kacmar, C. (2000). Trust in E-commerce vendors: A two-stage model. *21st International Conference on Information Systems* (pp. 532–536). Atlanta, GA: Association for Information Systems.
- McKnight, D., & Chervany, N. (2001). What trust means in E-Commerce customer relationships: An interdisciplinary conceptual typology. *International Journal of Electronic Commerce*, 6(2), 35-59. Retrieved from <http://www.jstor.org/stable/27751012>
- McKnight, H. C., & Kacmar, C. (2002). Developing and validating trust measures for E-Commerce: An integrative typology. *Information Systems Research*, 13(3), 334-359.
- Medeiros, L. C., Hillers, V. N., Kendall, P. A., & Mason, A. (2001). Food safety education: What should we be teaching to consumers? *Journal of Nutrition Education*, 33(2), 108-113.
- Mejia, C., McEntire, J., Keener, K., Muth, M., Nganje, W., Stinson, T., & Jensen, H. (2010). *Traceability (product tracing) in food systems: An IFT report submitted to the FDA, Volume 2: Cost considerations and implications*. Retrieved from http://www.ift.org:~/media/GFTC/Resource/Traceability_ProductTracing_in%20Food_Systems_An_IFT_Report_Submitted_to_the_FDA_Volume_2_Cost_Considerations_and_Implications.pdf
- Metlay, D. (1999). Institutional trust and confidence: A journey into a conceptual quagmire. In G. T. Cvetkovich, & R. E. Cvetkovich (Eds.), *Social Trust and the Management of Risk* (pp. 100-116). London, UK: Earthscan.
- Miles, S., & Frewer, L. J. (2001). Investigating specific concerns about different food hazards. *Food Quality and Preference*, 12(1), 47-61. doi:10.1016/S0950-3293(00)00029-X
- Ministry of Commerce of China. (2012). *China electronic commerce development report in 2011*. Retrieved from www.mofcom.gov.cn: http://qyscyxs.mofcom.gov.cn/espc/mme/_news/2011/7/1310113568563.html
- Ministry of Education of China. (2015). *Number of students in high education institutions*. Retrieved from http://en.moe.gov.cn/Resources/Statistics/edu_stat_2014/2014_en02/
- Miyazaki, A. D., & Fernandez, A. (2001). Consumer perceptions of privacy and security risks for online shopping. *Journal of Consumer Affairs*, 35(1), 27-44.
- Mollering, G., Bachmann, R., & Lee, S. (2004). Introduction - Understanding organizational trust-foundations, constellations, and issues of operationalisation. *Journal of Managerial Psychology*, 19(6), 556-570. doi:10.1108/02683940410551480
- Monakhova, Y. B., Loebell-Behrends, S., Maixner, S., Boese, W., Marx, G., & Lachenmeier, D. W. (2011). Automated classification of web pages for identification of suspicious food products - A feasibility study. *Deutsche Lebensmittel-Rundschau: Zeitschrift für Lebensmittelkunde und Lebensmittelrecht*, 107(7), pp. 328-330. Retrieved from https://www.researchgate.net/publication/224941135_Automated_Classification_of_Web_Pages_for_Identification_of_Suspicious_Food_Products_-_a_Feasibility_Study

- Monsuwé, T. P., Dellaert, B. G., & Ruyter, K. D. (2004). What drives consumers to shop online? A literature review. *International Journal of Service Industry Management*, 15(1), 102-121. doi:10.1108/09564230410523358
- Montoya-Weiss, M., Voss, G. B., & Grewal, D. (2003). Determinants of online channel use and overall satisfaction with a relational, multichannel service provider. *Journal of the Academy of Marketing Science*, 31(4), 448-458. doi:10.1177/0092070303254408
- Moodley, S. (2002). E-business in the South African apparel sector: A utopian vision of efficiency? *Developing Economies*, 40(1), 67-100. doi:10.1111/j.1746-1049.2002.tb00911.x
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20-38. doi:10.2307/1252308
- Morganosky, M., & Cude, B. (2002). Consumer demand for online food retailing: Is it really a supply side issue? *International Journal of Retail & Distribution Management*, 30(10), 451-458. doi:10.1108/09590550210445326
- Nambisan, P., & Watt, J. H. (2011). Managing customer experiences in online product communities. *Journal of Business Research*, 64(8), 889-895. doi:10.1016/j.jbusres.2010.09.006
- National Research Council. (1989). *Improving risk communication*. Washington DC: National Academy Press.
- Nonis, S., Hudson, G., & Hunt, S. (2010). Should we label products from clones? An exploratory study of beliefs, attitudes and food safety information on consumer purchase intentions. *Journal of Marketing Development and Competitiveness*, 5(1), 95-106.
- Nunnally, J. C. (1978). *Psychometric theory (2nd ed.)*. New York, NY : McGraw-Hill .
- Ortega, D. L., Wang, H. H., Wu, L., & Olynk, N. J. (2011). Modeling heterogeneity in consumer preferences for select food safety attributes in China. *Food Policy*, 36(2), 318-324. doi:10.1016/j.foodpol.2010.11.030
- Ortega, D., Wang, H., & Wu, L. (2009). Consumer preferences for U.S. Pork in urban China. *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association 2009 AAEA & ACCI Joint Annual Meeting*. Milwaukee, Wisconsin. Retrieved from https://www.researchgate.net/publication/46472353_Consumer_Preferences_for_US_Pork_in_Urban_China
- Oses, S. M., Luning, P., Jacxsens, L., Santillana, S., Jaime, I., & Rovira, J. (2012). Food safety management system performance in the lamb chain. *Food Control*, 25(2), 493-500. doi:10.1016/j.foodcont.2011.11.018
- Papademas, P., & Bintsis, T. (2010). Food safety management systems (FSMS) in the dairy industry: A review. *International Journal of Dairy Technology*, 63(4), 489-503. doi:10.1111/j.1471-0307.2010.00620.x

- Papaioannou, E., Georgiadis, C. K., Moshidis, O., & Manitsaris, A. (2015). Factors affecting customers' perceptions and firms' decisions concerning online fast food ordering. *International Journal of Agricultural and Environmental Information Systems*, 6(1), 48-78. doi:10.4018/ijaeis.2015010104
- Peng, H. F., Wang, C. J., & Cai, J. (2008). An empirical investigation on the adoption of online shopping of university students in China. *International Seminar on Business and Information Management (ISBIM 2008)*, (pp. 498-501). Wuhan, China. doi:10.1109/ISBIM.2008.26
- Pennings, J. M., Wansink, B., & Meulenberg, M. T. (2002). A note on modeling consumer reactions to a crisis: The case of the mad cow disease. *International Journal of Research in Marketing*, 19(1), 91-100. doi:10.1016/S0167-8116(02)00050-2
- Pieniak, Z., Verbeke, W., Scholderer, J., Brunso, K., & Olsen, S. O. (2007). European consumers' use of and trust in information sources about fish. *Food Quality and Preference*, 18(8), 1050-1063. doi:10.1016/j.foodqual.2007.05.001
- Pivato, S., Misani, N., & Tencati, A. (2008). The impact of corporate social responsibility on consumer trust: The case of organic food. *Business Ethics: A European Review*, 17(1), 3-12. doi:10.1111/j.1467-8608.2008.00515.x
- Poortinga, W., & Pidgeon, N. F. (2003). Exploring the dimensionality of trust in risk regulation. *Risk Analysis*, 23(5), 961-972. doi:10.1111/1539-6924.00373
- Priester, J. R. (2010). The use of structural equation models in consumer psychology: A methodological dialogue on its contributions, cautions, and concerns. *Journal of Consumer Psychology*, 20(2), 205-207. doi:10.1016/j.jcps.2010.03.005
- Rafiq, M., & Fulford, H. (2005). Loyalty transfer from offline to online stores in the UK grocery industry. *International Journal of Retail & Distribution Management*, 33(6), 444-460. doi:10.1108/09590550510600861
- Ramsey, L., & Funk, J. A. (2009). Microbiological safety of farmstead cheeses made in the United States and purchased via online shopping. *Food Protection Trends*, 29(3), 148-154.
- Rasco, B. A. (2010). Perceptions of seafood safety. *Journal of the World Aquaculture Society*, 41(2), 258-265. doi:10.1111/j.1749-7345.2010.00353.x
- Rauf, H. (2014). *Trends in China's E-Commerce market*. Retrieved from China Briefing: <http://www.china-briefing.com/news/2014/06/04/trends-chinas-e-commerce-market.html>
- Renn, O., & Levine, D. (1991). Credibility and trust in risk communication. In R. E. Kasperson, & P. J. Stallen (Eds.), *Communicating Risks to the Public* (pp. 175-217). Springer Netherlands. doi:10.1007/978-94-009-1952-5_10
- Rocourt, J., Benembarek, P., Toyofuku, H., & Schlundt, J. (2003). Quantitative risk assessment of *Listeria monocytogenes* in ready-to-eat foods: The FAO/WHO approach. *FEMS Immunology and Medical Microbiology*, 35(3), 263-267. doi:10.1016/S0928-8244(02)00468-6

- Rohr, A., Luddecke, K., Drusch, S., Muller, M. J., & Alvensleben, R. V. (2005). Food quality and safety - Consumer perception and public health concern. *Food Control*, 16(8), 649–655. doi:10.1016/j.foodcont.2004.06.001
- Rose, S., & Dhandayudham, A. (2014). Towards an understanding of internet-based problem shopping behaviour: The concept of online shopping addiction and its proposed predictors. *Journal of Behavioural Addictions*, 3(2), 83-89. doi:10.1556/JBA.3.2014.003
- Rose, S., Clark, M., Samouel, P., & Hair, N. (2012). Online customer experience in E-retailing: An empirical model of antecedents and outcomes. *Journal of Retailing*, 88(2), 308-322. doi:10.1016/j.jretai.2012.03.001
- Rousseau, D. M., Sitkin, S., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23(3), 393-404. doi:10.5465/AMR.1998.926617
- Rowe, G., & Frewer, L. J. (2004). Evaluation of a deliberative conference. *Science Technology & Human Values*, 29(1), 88-121. doi:10.1177/0162243903259194
- Rozin, P., Pelchat, M. L., & Fallon, A. E. (1986). Psychological factors influencing food choice. In C. Ritson, L. Gofton, & J. McKenzie (Eds.), *The Food Consumer* (pp. 107-125). Chichester, UK: John Wiley and Sons Ltd.
- Rust, R. T., & Kannan, P. K. (2002). *E-service: New directions in theory and practice*. Armonk, NY: M. E. Sharpe.
- Sacks, G., Tikellis, K., Millar, L., & Swinburn, B. (2011). Impact of ‘traffic-light’ nutrition information on online food purchases in Australia. *Nutrition*, 35(2), 122-126. doi:10.1111/j.1753-6405.2011.00684.x
- Salo, J., & Karjaluoto, H. (2007). A conceptual model of trust in the online environment. *Online Information Review*, 31(5), 604-621. doi:10.1108/14684520710832324
- Sampson, H. A. (2004). Update on food allergy. *Journal of Allergy & Clinical Immunology*, 113(5), 805-819.
- Sampson, M. A., Muñoz-Furlong, A., & Sicherer, S. H. (2006). Risk-taking and coping strategies of adolescents and young adults with food allergy. *Journal of Allergy & Clinical Immunology*, 117(6), 1440-1445. doi:10.1016/j.jaci.2006.03.009
- Sandman, P. M. (1987). Risk communication: Facing public outrage. *EPA Journal*, 13(9), 21-22.
- Sandman, P. M. (2006). Crisis communication best practices: Some quibbles and additions. *Journal of Applied Communication Research*, 34(3), 257-262. doi:10.1080/00909880600771619
- Schlundt, J. (2008). Food safety. *International Encyclopedia of Public Health*, 5(6), 630-638.

- Schroeder, T., Tonsor, G., Pennings, J. M., & Mintert, J. (2007). Consumer food safety risk perceptions and attitudes: Impacts on beef consumption across countries. *The B.E. Journal of Economic Analysis & Policy*, 7(1), 65. doi:10.2202/1935-1682.1848
- Schultz, D. E., & Block, M. P. (2015). US online shopping: Facts, fiction, hopes and dreams. *Journal of Retailing and Consumer Services*, 23, 99-106. doi: 10.1016/j.jretconser.2014.10.010
- Sharma, A., & Sheth, J. N. (2004). Web-Based marketing: The coming revolution in marketing thought and strategy. *Journal of Business Research*, 57(7), 696-702. doi:10.1016/S0148-2963(02)00350-8
- Shepard, B., & Sherman, D. (1998). The grammars of trust: A model and general implications. *Academy of Management Review*, 23(3), 422-437.
- Shook, C. L., Ketchen, D. J., Hult, G. T., & Kumar, K. M. (2004). An assessment of the use of structural equation modeling in strategic management research. *Strategic Management Journal*, 25(4), 397-404. doi:10.1002/smj.385
- Slovic, P. (1987). Perception of risk. *Science*, 236, 280-285.
- Sodano, V., & Verneau, F. (2006). Social capital and the food system: Some evidences from empirical research. *99th EAAE Seminar 'Trust and Risk in Business Networks'* (pp. 197-207). Bonn, Germany: <http://ageconsearch.umn.edu/bitstream/7764/1/sp06so01.pdf>
- Song, M., Gao, X. O., Liu, L. J., & Nanseki, T. (2010). Reducing food safety risk: Experiences from the adoption of good agricultural practices in China. *Journal of the Faculty of Agriculture, Kyushu University*, 55(2), 379-385.
- Song, M., Liu, L., Wang, Z., & Nanseki, T. (2008). Consumers' attitudes to food traceability system in China - Evidences from the pork market in Beijing. *Journal of the Faculty of Agriculture, Kyushu University*, 53(2), 569-574.
- Sorge, U. S., Lissemore, K., Godkin, A., Jansen, J., Hendrick, S., Wells, S., & Kelton, D. (2011). Changes in management practices and apparent prevalence on Canadian dairy farms participating in a voluntary risk assessment-based Johne's disease control program. *Journal of Dairy Science*, 94(10), 5227-5237. doi:10.3168/jds.2010-3869
- Spiliotopoulou, G. (2009). Reliability reconsidered: Cronbach's alpha and paediatric assessment in occupational therapy. *Australian Occupational Therapy Journal*, 56(3), 150-155. doi:10.1111/j.1440-1630.2009.00785.x
- Srinivasan, S. S., Anderson, R., & Ponnnavolu, K. (2002). Customer loyalty in E-commerce: An exploration of its antecedents and consequences. *Journal of Retailing*, 78, 41-50.
- Starr, C. (1969). Societal benefit versus technological risk. *Science*, 236(3899), 280-285.
- Statistics New Zealand. (2012). *New Zealand in profile: 2012*. Retrieved from Statistics New Zealand: http://search.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-in-profile-2012/exports.aspx

- Stewart, K. J. (2003). Trust transfer on the World Wide Web. *Organization Science*, 14(1), 5-17.
- Sukboonyasatit, D. (2009). *Prediction of peoples' intentions and actual consumption of functional foods in Palmerston North*. (Doctoral dissertation, Massey University, Palmerston North, New Zealand). Retrieved from <http://mro.massey.ac.nz/xmlui/handle/10179/1676>
- Swinyard, W. R., & Smith, S. M. (2003). Why people (don't) shop online: A lifestyle study of the internet consumer. *Psychology & Marketing*, 20(7), 567-597. doi:10.1002/mar.10087
- Szymanski, D. M., & Hise, R. T. (2000). E-satisfaction: An initial examination. *Journal of Retailing*, 76(3), 309-322. doi:10.1016/S0022-4359(00)00035-X
- Taylor, J. (1974). The role of risk in consumer behaviours. *Journal of Marketing*, 38(2), 54-60. doi:10.2307/1250198
- Teisl, M., & Roe, B. (1998). The economics of labelling: an overview of issues for health and environmental disclosure. *Agricultural and Resource Economics Review*, 27(2), 140-149. doi:10.1017/S1068280500006468
- Trevinal, A., & Stenger, T. (2014). Toward a conceptualization of the online shopping experience. *Journal of Retailing and Consumer Services*, 21(3), 314-326. doi:10.1016/j.jretconser.2014.02.009
- Van Kleef, E., Frewer, L., Chrysoschoidis, G., Houghton, J., Korzen-Bohr, S., Krystallis, T., Rowe, G. (2006). Perceptions of food risk management among key stakeholders: Results from a cross-European study. *Appetite*, 47(1), 46-63. doi:10.1016/j.appet.2006.02.002
- Van Loo, E. J., Alali, W., & Rieke, S. C. (2012). Food safety and organic meats. *Annual Review of Food Science & Technology*, 3(1), 203-225. doi:10.1146/annurev-food-022811-101158
- Van Rijswijk, W., Frewer, L., Menozzi, D., & Faioli, G. (2008). Consumer perceptions of traceability: A cross-national comparison of the associated benefits. *Food Quality and Preference*, 19(5), 452-464. doi:10.1016/j.foodqual.2008.02.001
- Veeck, G., Veeck, A., & Zhao, S. (2015). Perceptions of food safety by urban consumers in Nanjing, China. *Professional Geographer*, 67(3), 1-12. doi:10.1080/00330124.2015.1028514
- Verbeke, W. (2001). Beliefs, attitude and behaviour towards fresh meat revisited after the Belgian dioxin crisis. *Food Quality and Preference*, 12(8), 489-498. doi:10.1016/S0950-3293(01)00042-8
- Verbeke, W. (2005). Agriculture and the food industry in the information age. *European Review of Agricultural Economics*, 32(3), 347-368. doi:10.1093/eurrag/jbi017

- Verbeke, W., & Viaene, J. (1999). Beliefs, attitude and behaviour towards fresh meat consumption in Belgium: Empirical evidence from a consumer survey. *Food Quality and Preference*, 10(6), 437-445. doi:10.1016/S0950-3293(99)00031-2
- Verkerk, R. H., & Hickey, S. (2010). A critique of prevailing approaches to nutrient risk analysis pertaining to food supplements with specific reference to the European Union. *Toxicology*, 278(1), 17-26. doi:10.1016/j.tox.2009.12.017
- Wales, C., Harvey, M., & Warde, A. (2006). Recuperating from BSE: The shifting UK institutional basis for trust in food. *Appetite*, 47(2), 187-195. doi:10.1016/j.appet.2006.05.007
- Wang, F., Zhang, J., Mu, W., Fu, Z., & Zhang, X. (2009). Consumers' perception toward quality and safety of fishery products, Beijing, China. *Food Control*, 20(10), 918-922. doi:10.1016/j.foodcont.2009.01.008
- Wang, H., & McCluskey, J. (2010). Effects of information and country of origin on Chinese consumer preferences for wine: An experimental approach in the field. *Agricultural and Applied Economics Association 2010 Annual Meeting*. Denver, CO. Retrieved from <http://ageconsearch.umn.edu/bitstream/61330/2/AAEA%20main%20paper.pdf>
- Wang, P., & Luo, J. (2014). Designing and implement of the fast food E-commerce platform based on B2B2C. *Group Technology & Production Modernization*, 31(3), 58-62.
- Wang, Z., Mao, Y., & Gale, F. (2008). Chinese consumer demand for food safety attributes in milk products. *Food Policy*, 33(1), 27-36. doi:10.1016/j.foodpol.2007.05.006
- White, G. (1945). *Human adjustment to floods: A geographical approach to the flood problem in the United States*. Chicago, IL: University of Chicago.
- WHO/FAO. (2006). *Food safety risk analysis - A guide for national food safety authorities*. Retrieved from www.who.int: <http://www.who.int/foodsafety/publications/micro/riskanalysis06.pdf>
- Wilcock, A., Pun, M., Khanona, J., & Aung, M. (2004). Consumer attitudes, knowledge and behaviour: A review of food safety issues. *Trends in Food Science and Technology*, 15(2), 56-66. doi:10.1016/j.tifs.2003.08.004
- Williams, P., Stirling, E., & Keynes, N. (2004). Food fears: a national survey on the attitudes of Australian adults about the safety and quality of food. *Journal of Clinical Nutrition*, 13(1), 32-39.
- Wilson, P. (2000). *An overview of developments and prospects for E-commerce in the agricultural sector. Report A.1. Studies and overall approach*. Retrieved from European Commission: <http://collection.europarchive.org/dnb/20070702132253/http://ec.europa.eu>
- Wolfenbarger, M., & Gilly, M. C. (2001). Shopping online for freedom, control and fun. *California Management Review*, 43(2), 34-55. doi:10.2307/41166074

- Woolgar, S. (1996). Psychology, qualitative methods and the ideas of science. In S. T. Richardson (Eds.), *Handbook of Qualitative Research Methods* (pp.11-24). Leicester, UK: British Psychological Society.
- Wu, X. G., & Zhang, Z. N. (2005). The growth of Chinese professionals: A new middle class in the making. In Y. Guo (Eds.), *Handbook of Class and Social Stratification in China* (pp. 292-313). Cheltenham, UK: Edward Elgar Publishing Ltd.
doi:10.4337/9781783470648.00028
- Wynne, B. (1992). Uncertainty and environmental learning - Reconceiving science and policy in the preventive paradigm. *Global Environmental Change*, 2(2), 111-127.
- Wynne, B. (2001). Creating public alienation: Expert cultures of risk and ethics on GMOs. *Science As Culture*, 10(4), 445-481. doi:10.1080/09505430120093586
- Yang, X. (2011). The network marketing of fresh agricultural products in China. *Asian Journal of Agricultural Research*, 3(4), 125-127.
- Yao, X. (2008). *Empirical study on online shopping perceived risk in China*. Paper presented at the International Conference on Management of Technology. Taiyuan, China.
- Yee, W. M., Yeung, R. M., & Yeung, J. (2005). Food safety: Building consumer trust in livestock farmers for potential purchase behaviour. *British Food Journal*, 107(11), 841-854. doi:10.1108/00070700510629788
- Yeung, R. M., & Morris, J. (2001). Food safety risk consumer perception and purchase behaviour. *British Food Journal*, 103(3), 170-187. doi:10.1108/00070700110386728
- Yeung, R. M., & Yee, W. M. (2003). Risk reduction: An insight from the UK poultry industry. *Nutrition and Food Science*, 33(5), 219-229. doi:10.1108/00346650310499749
- Yeung, R. M., & Yee, W. M. (2012). Food safety concern incorporating marketing strategies into consumer risk coping framework. *British Food Journal*, 114(1), 40-53.
doi:10.1108/00070701211197356
- Yin, S., & Wu, L. H. (2008). An analysis of online shopping intention of Chinese consumers and its influencing factors - An empirical study on Shanghai, Nanjing and Wuxi cities, China. *4th International Conference on Wireless Communications, Networking and Mobile Computing*, (pp. 1-4). Dalian, China. doi:10.1109/WiCom.2008.2182
- Zach, L., Doyle, M. E., Bier, V., & Czuprynski, C. (2012). Systems and governance in food import safety: A U.S. perspective. *Food Control*, 27(1), 153-162.
doi:10.1016/j.foodcont.2012.03.013
- Zeckhauser, R. J., & Viscusi, W. K. (1990). Risk within reason. *Science*, 248(4955), 559-564.
doi:10.1126/science.2333509
- Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. *Journal of the Academy of Marketing Science*, 30(4), 362-375. doi:10.1177/009207002236911

- Zhang, W. (2010). Study on food industry development based on the E-Commerce. *10th Conference on Man-Machine-Environment System Engineering*, (pp. 462-465). Sanya, China.
- Zhang, Y., Deng, X., Wei, D., & Deng, Y. (2012). Assessment of E-Commerce security using AHP and evidential reasoning. *Expert Systems with Applications*, 39(3), 3611-3623. doi:10.1016/j.eswa.2011.09.051
- Zhang, Y., Fang, Y., Wei, K. K., Ramsey, E., Mccole, P., & Chen, H. (2011). Repurchase intention in B2C E-commerce - A relationship quality perspective. *Information & Management*, 48(6), 192-200. doi:10.1016/j.im.2011.05.003
- Zheng, L., Favier, M., Huang, P., & Coat, F. (2012). Chinese consumer perceived risk and risk relievers in E-shopping for clothing. *Journal of Electronic Commerce Research*, 13(3), 255-274.
- Zhou, L., & Hui, M. (2003). Symbolic value of foreign products in the People's Republic of China. *Journal of International Marketing*, 11(2), 36-58. doi:10.1509/jimk.11.2.36.20163

Appendix 1 Cover letter for questionnaires

Statements

Hello everyone,

Thank you for participating in this survey.

The survey is about consumer trust in the safety of both food purchased via the traditional channels (such as supermarket) and food purchased via the internet. Your participation is entirely voluntary, but we are very delighted for your participation. All information collected is completely confidential.

This survey has been reported to Massey University (New Zealand) according to the Code of Ethical Conduct for Research, Teaching and Evaluations involving Human Participants. The survey is regarded as the low risk research involving human participants.

To answer these questions, you just need to tick a box or write in the space provided. If you have any questions, please contact Swen.

Thank you very much for your help.

Swen Wang

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Appendix 2 Questionnaire

Part 1

Q1.1 Listed below are several items about attitudes to food safety. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I am optimistic about the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that food products are safe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generally, food products are safe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel uncomfortable regarding the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.2 Listed below are several items about farmers. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Farmers have the competence to control the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Farmers have sufficient knowledge to guarantee the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Farmers are honest and open about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Farmers give special attention to the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.3 Listed below are several items about manufacturers. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Manufacturers have the competence to control the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufacturers have sufficient knowledge to guarantee the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufacturers are honest and open about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufacturers give special attention to the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.4 Listed below are several items about food retailers. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Retailers have the competence to control the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers have sufficient knowledge to guarantee the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers are honest and open about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retailers give special attention to the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.5 Listed below are several items about food Regulators. Regulators include the government, the third party food certification authorities and food testing laboratories. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Regulators have the competence to control the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulators have sufficient knowledge to guarantee the safety of food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulators are honest and open about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulators give special attention to the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.6 To what extent are you concerned about the following food risks?

	A Lot	Some	Don't know	Little	None
– the use of approved additives in food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– toxic or harmful non-food raw materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– farming conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– animal diseases (i.e. mad cow disease)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– Genetically modified foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– bacteria and viruses that can cause food infections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– hormones and antibiotics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– pesticides and veterinary drug residues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– Use by dates on food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
– Others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.7 To what extent are you concerned about food safety of the following categories?

	A Lot	Some	Don't know	Little	None
A: Snacks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B: Milk powder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C: Meat products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D: Vegetable & fruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E: seafood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F: Wine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G: Honey	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H: Health food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I : Baby food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.8 Food industries argue that if food products can be traced (e.g. you can find out where the meat livestock is farmed via 2D barcode, and it will be easy to recall the specific food contaminated), the levels of food safety can be improved. Listed below are several items about food traceability. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Traceability can reduce the level of food risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am optimistic about the safety of food products that can be traced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not think that 2D barcode can improve the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generally, food products are safe if they can be traced via 2D barcode	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.9 Comparing a food item that can be traced to its place of production with an identical product that cannot be traced, how much more would you be prepared to pay for the food that can be traced via 2D barcode?

- ☐ >20%
- ☐ 11-20%
- ☐ 1-10%
- ☐ 0
- ☐ Not at all

Q1.10 Listed below are several items about food brands. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Generally, food that has a popular brand is safe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry about the safety of food no matter its brand is famous or not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food companies with a good reputation are honest and open about the safety of food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident in the safety of food with a global brand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.11 How safe do you believe food is from the following areas?

	A Lot	Some	Don't know	Little	None
South-east Asia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
USA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New Zealand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Japan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Australia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1.12 Listed below are several items about food incidents. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I feel uncomfortable regarding the continuing food incidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can recall a particular incident where the safety of food was compromised or threatened	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not worry about any food incidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a result of the occurrence of food safety incidents I am suspicious about certain food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 1.13 Do you recall a particular incident where the safety of food was compromised or threatened?

- ☐ Yes
- ☐ No (If you choose NO, please jump to the question 1.16)

Q 1.14 Which of the following food was related to that incident?

- ☐ A: Snack food
- ☐ B: Milk powder
- ☐ C: Meat products
- ☐ D: Vegetable & fruit
- ☐ E: seafood
- ☐ F: Wine
- ☐ G: Honey
- ☐ H: Health food
- ☐ I: Baby food
- ☐ J: Other foods

Q 1.15 What was your MAIN source of information about the food safety incident?

- ☐ Printed media (Newspaper, magazine)
- ☐ TV / Radio
- ☐ Online news agent websites
- ☐ Online social network (microblog, Wechat, QQ, BBS)
- ☐ Interpersonal (family, friends, or colleagues)

Q 1.16 How do the following issues affect your judgement about the reliability of the information regarding food safety?

	A Lot	Some	Don't know	Little	None
The source of information is one you trust (such as newspaper, TV, radio, internet)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The transparency of the information is possible to judge and the openness of the information is possible to judge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information was released immediately	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All information is available to the public through every stage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific evidence exists about the incident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media' comments about the incident are well balanced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All stakeholders are invited to participate in through every stage (firms, experts, customers, media, non-profit organizations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Questionnaire Part 1 is finished, please turn to the Part 2, thanks

Part 2

Q 2.1 Have you bought any goods via the internet?

- ☐ Yes (If you choose Yes, please jump to the question 2.3)
- ☐ No

Q 2.2 Please specify the MAIN reason why you do not buy goods online, and you can jump to the Question Part 3

- ☐ I do not trust online shopping
- ☐ I trust online shopping, and I will do it in future
- ☐ I trust online shopping, but I won't buy any goods online for other reasons

Q 2.3 What is your main reason to buy goods via the internet?

- ☐ Lower price
- ☐ Save time and convenient
- ☐ Many choices available via the internet, and easy to choose the one you like
- ☐ A few unusual food products are also available online
- ☐ Others

Q 2.4 How often do you buy goods via the internet on the average?

- ☐ Once a year
- ☐ Once a season
- ☐ Once a month
- ☐ More than one time per month

Q 2.5 Which of the following goods categories have you bought online before? (Multi-choices)

- ☐ Food
- ☐ Books and videos
- ☐ Clothes
- ☐ Cosmetics
- ☐ Jewellery, watch, art products
- ☐ Digital products
- ☐ Household necessities
- ☐ Virtual products (i.e. electronic tickets or flights)
- ☐ Others

Q 2.6 Which of the following website do you prefer to use to buy goods? (Multi-choices)

- ☐ Taobao
- ☐ Jingdong
- ☐ Dangdang
- ☐ Amazon
- ☐ QQ
- ☐ Suning
- ☐ Zhuoyue
- ☐ Yiqu
- ☐ Vanc
- ☐ Huicong
- ☐ Womaiwang
- ☐ Others _____

Q 2.7 Listed below are several items about the visual appeal of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The way it displays food is attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the way this website looks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.8 Listed below are several items about the design style of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Website design is conservative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Website design is adventurous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.9 Listed below are several items about the entertainment value of the website you selected above. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I think that this website is very entertaining	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The enthusiasm of this website captures my attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.10 Listed below are several items about the usability of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
It is not easily navigated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are convenient ways to maneuver among related pages and between different sections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigation through this website is intuitively logical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This website is difficult to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This website is user-friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.11 Listed below are several items about the relevance of information of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
There is a great deal of irrelevant information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical details about products can be easily accessed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.12 Listed below are several items about the customization and personalization of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
This website is tailored toward me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I wanted to, I could customize this website to what I like (such as changing coolers, layout, fonts etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.13 Listed below are several items about the interactivity of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
This website helps me to compare products and prices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that this is not a very engaging website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.14 Listed below are several items about the ease of payment of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Payment procedures seem to take a long time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paying for goods is straightforward	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paying for goods involves entering a lot of details	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.15 Listed below are several items about the financial risk of the website you selected (i.e. credit card). Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
When buying from this website I am not reassured by the financial security procedures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, this website seems security conscious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.16 Listed below are several items about the delivery risk of the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
When buying from this website I am not reassured by the delivery procedures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, this website seems security conscious for delivery service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 2.17 Listed below are several items about trust in the website you selected. Please rate the items according to your degree of agreement or disagreement with each item.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
This website is interested in more than just selling me goods and making a profit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are no limits to how far this website will go to solve a service problem I may have	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This website is genuinely committed to my satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think some of this website's claims about its service are exaggerated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, I feel that I can trust this web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 2 is finished, please turn to the Part 3, thanks

Part 3

Q 3.1 Have you bought any food via the internet?

- ☐ Yes (If you choose Yes, please jump to the question 3.3)
- ☐ No

Q 3.2 Please specify the MAIN reason why you do not buy food online, and you can turn to answer

Question Part 5

- ☐ I trust online shopping, but I do not trust the safety of food online, so i won't buy any food online
- ☐ I trust online shopping, and I also trust the safety of food online, but I do not want to buy food via the internet for other reasons
- ☐ I trust online shopping, and i also trust the safety of food online. I will buy food in the next few years

Q3.3 How often do you buy food via the internet?

- ☐ Once a year
- ☐ Once a season
- ☐ Once a month
- ☐ More than one time per month

Q3.4 What is your main reason to buy food via the internet?

- ☐ Lower price
- ☐ Save time and convenient
- ☐ Many choices available via the internet, and easy to choose the one you like
- ☐ A few unusual food products are also available online
- ☐ Others

Q 3.5 Which of the following website do you prefer to use to buy food? (Multi-choices)

- ☐ Taobao
- ☐ Jingdong
- ☐ Dangdang
- ☐ Amazon
- ☐ QQ
- ☐ Suning
- ☐ Zhuoyue
- ☐ Yiqu
- ☐ VancI
- ☐ Huicong
- ☐ Zhongliang
- ☐ Others _____

Q 3.6 What food have you prefer to buy via the internet? Multi-choices

- ☐ A: Snacks
- ☐ B: Milk powder
- ☐ C: Meat products
- ☐ D: Vegetable & fruit
- ☐ E: Seafood
- ☐ F: Wine
- ☐ G: Honey
- ☐ H: Health food
- ☐ I: Baby food

Q 3.7 For each of the following food, how much did food safety influence your previous buying decisions to buy via the internet, compared with other shopping channels (e.g. supermarket)?

	A lot	Some	Don't know	A little	None
A: Snacks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B: Milk powder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C: Meat products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D: Vegetable & fruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E: seafood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F: Wine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G: Honey	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H: Health food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I : Baby food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q 3.8 For each of the following food, how much did the reputation of a website you trust influence your buying intentions to buy food via the internet?

	A lot	Some	Don't know	A liitle	None
A: Snacks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B: Milk powder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C: Meat products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D: Vegetable & fruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E: seafood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F: Wine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G: Honey	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H: Health food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I : Baby food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 3 is finished, please turn to Part 4, thanks.

Part 4

Q 4.1 In China, have you bought any food imported from other countries via the internet? If yes, please continue with the following questions; If not, you can jump to the Question Part 5.

- ☐ Yes
- ☐ No

Q 4.2 If you bought any imported food via the internet, which country was it produced? (Multi-choices)

- ☐ South-East Asia
- ☐ Europe
- ☐ USA
- ☐ New Zealand
- ☐ Japan
- ☐ Australia
- ☐ Others

Q 4.3 If you had not bought any New Zealand food via the internet before, please specify the MAIN reason why you have not buy New Zealand food

- ☐ Food safety
- ☐ Price issue
- ☐ Has no idea of the country: New Zealand
- ☐ Others

Q 4.4 If you had bought New Zealand food via the internet before, please specify the MAIN reason resulting in buying behaviour.

- ☐ Food safety
- ☐ Price
- ☐ Image of New Zealand
- ☐ Food control system of NZ
- ☐ Environment protection of NZ
- ☐ I have been to NZ before
- ☐ NZ food is popular in China
- ☐ Other reasons

Q 4.5 Which of the following imported food you prefer to buy?

- ☐ Snacks
- ☐ Milk powder
- ☐ Meat products
- ☐ Vegetable & fruit
- ☐ Seafood
- ☐ Wine
- ☐ Honey
- ☐ Health food
- ☐ Baby food

Part 4 is finished, please turn to Part 5, thanks

Part 5

Q 5.1 Are you?

- ☐ Male
- ☐ Female

Q 5.2 What age category do you fall in?

- ☐ Below 18
- ☐ 18-30
- ☐ 31-40
- ☐ 41-50
- ☐ 51-60
- ☐ Above 60

Q 5.3 What is your study degree?

- ☐ Undergraduate degree
- ☐ Postgraduate degree
- ☐ Others

Q 5.4 Which of the following categories best describes your family annual net income? (You can skip this question)

- ☐ Under ¥ 80,000
- ☐ ¥80,001-200,000
- ☐ ¥ 200,000 over

The entire survey is finished. Thanks for your participating and please submit the questionnaire to the contact person

Appendix 3 Questionnaire Totals

	Number
Questionnaires sent to students	2,000
Questionnaires received	1,700
Valid questionnaires	1,403
Participants who bought online	1,238
Participants who bought food online	592
Participants who bought imported food online	225