

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**An Exploratory Analysis of the Factors Impacting on Chinese
Consumer Trust in Lactic Acid Bacteria Preserved Beef and Its
Mediation Impact on Purchase Intention**

**A thesis presented in partial fulfillment of the requirement of the degree
Masters in Agricommerce**

Massey University

Palmerston North

New Zealand

**Jinya Chen
2019**

ABSTRACT

Every year, worldwide, millions of people die and many are hospitalized due to food-borne diseases and illnesses caused by the consumption of contaminated food. Food safety has continued to be a concern for consumers, the food industry, and regulatory agencies. In China, there is almost a constant stream of reports about various food safety issues. Chinese consumers are concerned about the need for healthier and safer food. The development of science has provided more opportunities and possibilities to change the way we live. However, consumers' overall confidence in Chinese food is not high and they are increasingly skeptical about new food.

This research focuses on a new and not yet launched biological food, Lactic Acid Bacteria preserved vacuum-sealed chilled beef (LAB beef), as an example to examine what factors would have a significant correlation with consumers' trust in this product and to examine if trust is the key factor impacting on consumers' purchase intention. In order to complete the study objectives, a self-completed social survey was conducted in Shanghai City and Chengdu City, totaling 514 respondents. The analysis methods used included a measure of correlation, Gamma, principal component analysis and structural equation modeling. SPSS, Excel and Amos software were used.

One outcome of this research was the finding that a number of socio-demographic factors were not strongly correlated with consumer trust in LAB beef, unlike some previous research that found such relationships with trust in new food technologies. Personal beef consumption habits, consumers' past purchase experience with current used beef, products, product knowledge and food safety concerns based on their awareness, experience and media exposure were found to be important in establishing trust in LAB beef. The second outcome of this research is the confirmation of the

importance of trust in determining consumers' willingness to buy LAB beef, as well as the confirmation of the mediation effect of trust in explaining the underlying causal relationship between a number of independent variables and the dependent variable, willingness to buy.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to my supervisory panel. I am very grateful to Associate Professor. Peter Tozer, Professor Steve Flint and Dr. Paul Perry for their invaluable advice and continuous support throughout my research and thesis writing. My deep appreciation goes to Dr. Paul Perry for his patient guidance on my survey and methodology design. I also wish to deeply thank my colleagues who offered their understanding about my study and provided their help to me when I needed a hand to sort out some other urgent work. Without their help I could not have balanced my work and study. I wish to present my deep thanks to Ms Iona McCarthy for her help on planning my Master program and her help in dealing with my study stress due to time constraints.

My deepest appreciation goes to my family. I am so lucky to have such a good pair of parents. Thanks to my parents for their generous support and help in my study, and thanks for their kind assistance in looking after my son when I was busy with my work and study. Thanks to my husband who played the role of my science advisor and shared lots of updated relevant food science information with me. Lastly, I wish to thank my little son Ivan; thank you so much for keeping my study in your mind and offering me quiet time by doing reading while I study. For most of my time, you are my angel, but no matter whenever it is, you are my everything. Without the support of my family, I could not have completed this study.

Table of Contents

Abstract	I
Acknowledgements.....	III
List of Figures	VII
List of Tables	VIII
List of Abbreviations	IX
Chapter One Introduction	1
1.1 Food preservation challenges.....	1
1.2 Food preservation situation in China	2
1.3 The movement of food preservation	4
1.4 Lactic Acid Bacteria in China.....	5
1.5 Problem statement and rationale of for study	6
1.6 Research aims and objectives	8
1.6.1 Aim of the research.....	8
1.6.2 Specific objectives	8
1.6.2 Research Scope and delimitation	8
1.8 Structure of the thesis.....	10
Chapter Two Literature Review.....	10
2. 1 Introduction.....	10
2.2 Determinants of trust in new food technology.....	14
2.2.1 Personal bonds	15
2.2.1.1 Socio-demographic Factors	15
2.2.1.2 Food purchasing and eating habit	17
2.2.2 Past collaboration.....	17
2.2.2.1 General Food safety concern	17

2.2.2.2 Knowledge	18
2.2.2.3 Satisfaction level.....	18
2.2.3 Communication.....	19
2.3 Section summary.....	19
2.4 Hypotheses development	21
2.4.1 Hypothesis related to personal bonds dimensions	21
2.4.2 Hypothesis related to past collaboration.....	22
2.4.3 Hypothesis related to communication.....	22
2.4.4 Hypothesis related to mediation effect of trust	22
Chapter 3 Methodology	23
3.1 Introduction.....	23
3.2 Research method.....	23
3.2.1 Selected research strategy	23
3.2.2 Population and geographic location of sampling.....	24
3.2.3 Sampling method	26
3.2.4 Questionnaire design.....	26
3.2.5 Research ethics.....	28
3.2.6 Pilot testing	28
3.2.7 Conduct of survey	28
3.3 Data analysis	29
3.3.1 Descriptive statistics	29
3.3.2 Data reliability and validity measurement	30
3.3.3 Method for examining the correlation between independent variables and dependent variable (trust)	31
3.3.4 Method for examining the mediation effect.....	32

3.3.4.1 Structural equation modeling (SEM).....	32
3.3.4.2 Principal component analysis	33
3.4 Section summary.....	34
Chapter 4 Data Analysis.....	36
4.1 Introduction.....	36
4.2 Descriptive statistics	36
4.3 Data reliability and validity tests	45
4.4 Correlation between independent variables and trust	47
4.4.1 Association between socio-demographic and trust perception.....	47
4.4.2 Association between the eating/consumption/purchase place habits and trust perception.....	48
4.4.3 Association between knowledge level and trust perception	50
4.4.4 Associaton between satisfaction levels on the type of beef currently purchased and trust perception	51
4.4.5 Association between concern levels and trust perception.....	52
4.4.6 Association between media exposure and trust perception	53
4.5 Section summary.....	54
4.6 Results of structural equation model analysis.....	58
4.6.1 Principal component analysis	58
4.6.2 Results from the mediation effect test of trust between independent variables and dependent variable (willingness to buy)	63
4.6.2.1 Results of past collaboration.....	64
4.6.2.2 Results of media expousure	68
4.6.2.3 Results of personal bonds	69
4.7 Summary.....	75

Chapter Five Discussion and Interpretation	76
5.1 Introduction.....	76
5.2 Summary of results	76
5.3 Hypothesis discussion.....	82
5.3.1 Hypothesis related to socio-demographic factors	82
5.3.2 Hypothesis related to personal habits	87
5.3.3 Hypothesis related to past collaboration	88
5.3.4 Hypothesis related to communication.....	90
5.3.4 Hypothesis related to trust	91
Chapter Six	94
Implications and Conclusion.....	94
6.1 Theoretical implications.....	95
6.2 Marketing implications	95
6.2.1 Marketing segmentation	95
6.2.2 Distribution channel.....	96
6.2.3 Marketing campaign	97
6.3 Limitation and future research	104
6. 4 Conclusion	104
References	106
Appendix	116
English version questionnaire	116
Chinese version questionnaire	130

List of Figures

Figure 2.1 Diagram of a mediation model	14
Figure 2.2 The proposed conceptual framework of trust and willingness to buy.....	20
Figure 3.1 The geographic location of Shanghai City in China map.....	25
Figure 3.2 The geographic location of Chengdu City in China map.....	25
Figure 4.1 Summary of respondents' perception on Lactic Acid Bacteria	41
Figure 4.2 Summary of respondents' frequency of eating beef.....	42
Figure 4.3 Summary of respondents' purchase place of purchasing beef	43
Figure 4.4 Summary of respondents satisfaction level on the three attributes of currently purchased beef.....	44
Figure 4.5 Summary of respondents' confidence level in the food safety and prolonged shelf-life of LAB beef.....	45
Figure 4.6 Summary of respondents' willingness level to purchase LAB beef.....	45
Figure 4.7 The path diagram of concern complex model	64
Figure 4.8 The path diagram of knowledge complex model	66
Figure 4.9 The path diagram of satisfaction complex model.....	67
Figure 4.10 The path diagram of media complex model.....	68
Figure 4.11 The path diagram of consuming complex model	69
Figure 4.12 The path diagram of purchase place model.....	71
Figure 4.13 The path diagram of socio-demographic principal component model.....	72
Figure 6.1 The suggested marketing plan for LAB beef providers	95

List of Tables

Table 1.1 Selected food safety issues related to food preservation	3
Table 1.2 Timeline of the evolution of food preservation techniques	4
Table 2.1 The different definition of trust	12
Table 3.1 Independent and dependent variables in questionnaire	27
Table 4.1 Demographic summary of respondents	37
Table 4.2 Summary of the confidence level in the food safety of general purchased food	39
Table 4.3 Summary of concern level in selected food safety issues.....	39
Table 4.4 Summary of respondents' knowledge level of three types of food preservation and health risk of chemical preservation.....	40
Table 4.5 Summary of respondents' frequency of using media sources for getting food safety knowledge	42
Table 4.6 Summary of respondents' frequency in purchasing different type of beef..	44
Table 4.7 Summary of data reliability and validity test.....	46
Table 4.8 Association between socio-demographic and trust in LAB beef.....	47
Table 4.9 Association between personal habits and trust perception	48
Table 4.10 Association between knowledge level and trust perception	50
Table 4.11 Association between satisfaction level on the purchased beef and trust perception.....	51
Table 4.12 Association between consumer concern level and trust perception	53
Table 4.13 Association between media exposure and trust perception	53
Table 4.14 Summary of different levels of association between independent variables and trust in LAB beef (trust in food safety of LAB beef).....	55

Table 4.15 Summary of different levels of association between independent variables and trust in LAB beef (trust in prolonged shelf-life of LAB beef)	57
Table 4.16 Principal component analysis of consumer socio-demographic variables.	59
Table 4.17 Principal component analysis of other observed independent variables ...	60
Table 4.18 Summary of principal component analysis.....	62
Table 4.19 Summary of mean and standard deviation of principal component	64
Table 4.20 Summary of path coefficient of concern complex model.....	65
Table 4.21 Summary of path coefficients of knowledge complex model	66
Table 4.22 Summary of path coefficients of satisfaction complex model.....	68
Table 4.23 Summary of path coefficients of media complex model	69
Table 4.24 Summary of path coefficient of consuming complex model.....	70
Table 4.25 Summary of path coefficients of purchase place model	71
Table 4.26 Summary of path coefficients of socio-demographic model	74
Table 5.1 Summary of proposed structural equation model	81
Table 5.2 The summary of hypothesis	93

List of Abbreviations

AVE-Average variance extracted

CFI-Comparative fit index

CMIN/DF-Chi-square difference test

KMO-Kaiser-Meyer-Olkin

LAB beef-Lactic Acid Bacteria preserved vacuum-sealed chilled beef

LAB-Lactic Acid Bacteria

RMSEA-Root mean square error of approximation

SEM-Structural equation modeling

WHO-World Health Organization

Chapter One Introduction

Every year, worldwide, millions of people die and many are hospitalized due to food-borne diseases and illnesses caused by the consumption of contaminated food (Notermans et al., 1995; Redmond and Griffith, 2003; Osaili, Obeidat, Abu Jamous and Bawadi, 2011). Food safety has continued to be a concern for consumers, the food industry, and regulatory agencies (Osaili, Obeidat, Abu Jamous and Bawadi, 2011). One approach to reduce food safety issues has been to regulate every single aspect of food processing and to avoid potential food-borne health hazards to consumers through food handling, preparation and storage. It can start from the consideration of food origins (i.e, food labeling, food handling, food preservation, etc.) to governmental policies on food management and inspection.

1.1 Food preservation challenges

Food preservation is one of the most neglected pillars of food security (Aste, Pero and Leonforte, 2017). Food preservation extends the shelf life of food by preventing the growth of problematic microorganisms, as well as inhibiting the oxidative and enzymatic spoilage of food. Food engineers and food scientists have been searching for alternative process and preservation technologies that can preserve the quality of the food product, as well as being hazard free to the environment and more cost-effective (Lavilla and Gayan, 2018).

Artificial food additives can meet the challenges of preserving the freshness of food for extended periods. In the past, there were no such arguments or doubt about traditional artificial preservatives as they occupied a unique position in ensuring food supply. However, in recent years, food additives have become a public concern due to gradually rising public awareness of health concerns (Kumar et al., 2013). Food additives can also have adverse side effects. Some food preservatives, for example,

sodium benzoate, are known to raise health concerns. Benzoate was found to cause hypersensitivity in people with asthma, however it was not conclusive if the preservative was responsible for the increase (Barrett, 2007). Sodium nitrite is a preservative used in meat products to control bacteria growth to prevent botulism, but this additive can react with proteins, or during cooking at high heat, to form carcinogenic N-nitrosamines (Field, 2008). This has raised attention from the International Agency for Research on Cancer of the World Health Organization and has caused a re-examination of natural preservatives which occur in food products (Simon, 2015; Gallagher, 2015).

Furthermore, some microorganisms have developed resistance to preservatives (Brul and Coote, 1999). Due to the potential health concerns of adding preservatives into food, legislation has restricted the use of food additives. Nowadays, people expect food to offer more flavor, safety, nutrition, convenience and be associated with more sustainable production practices (Bruhn, 2017).

1.2 Food preservation situation in China

In China there are two principal categories of preservation technology, chemical synthesis and natural preservatives (Diao and Zhu, 2012). However, due to the price advantages and convenience of chemical preservatives, chemical preservatives play the major role in the Chinese food industry (Li, Yuan, Fu and Yang, 2017). In China there is specific food preservative legislation in effect, but some food manufacturers still take risks and fail to comply with the legislation, conducting illegal production practices such as exceeding standards and the use and misuse of preservatives to extend the shelf life of products (Li, Yuan, Fu and Yang, 2017). Unethical practices include the heavy use of chemical preservatives in disinfection and bacterial control

to lower the bacterial population and thus the color of products can be maintained (Li, Yuan, Fu and Yang, 2017).

Despite threats from unethical food enterprises, from a macro perspective, there is room to improve Chinese legislation relating to food preservation (Chen, 2001). For example, some agents that have been recognized as low-toxicity by the US and Europe, are not yet recognized in China. When Chinese food enterprises plan to produce or use these agents, they will have to go through a series of complicated application processes and there is no guarantee of approval (Chen, 2001). Chen (2001) also suggested that compared to the problems of macro legislation, some micro problems are more dominant. Regional protectionism, the disorderly conduct of law enforcement officers, and short-sightedness of food businesses all induce the misuse and overuse of food preservatives. Table 1.1 lists a few reported food preservative issues in China.

Table 1.1 Selected food safety issues related to food preservation

Name of food preservatives	Year	Incidents
Benzoic Acid	2015	Benzoic acid is a food additive that is allowed to be used to prevent food corruption and spoilage, but it can cause harm to the human body if overly used. The Beijing Municipal Administration of Food and Drug Administration reported that 24 kinds of food were found to be uncertified and 13 of them were found to exceed the standard for benzoic. The 13 types include pickled radish, crispy melon, and pickled pepper (Beijing Morning Post, 2015).
Dienoic Acid	2016	According to the news from the Taiwan Medicine and Food Department, a batch of imported seaweed from the US was recognized as unqualified due to exceeding the standard for Dienoic Acid.
Formalin (Formaldehyde)	2019	Formalin is a colorless liquid with a pungent smell. The major component of Formalin is formaldehyde, which is highly irritating and a toxic gas soluble in water. The use of formalin is actually quite extensive. Formaldehyde can bind to the amino group of protein and solidify the protein, so it can be used as a tissue fixing agent and preservative in medicine. However, according to the news of the Chongqing Morning Post (2019), an unethical food businessman used Formalin in Duck blood as to maintain the color and freshness. Adding formalin into food can lead to cancer (Chong Qing Morning Post, 2019).

1.3 The development of food preservation

Food preservation is a key to food quality and food safety (Singh, 2018). Food preservation technology has evolved along with the history of humanity. A history of food preservation techniques is listed in Table 1.2. Many of these historical food preservation techniques are still used today. With more understanding of food microbiology, i.e., microbial interaction inside the food system, the primary focus of food preservation is moving toward bio-preservation, which is the use of bio-preservatives, either natural or controlled microbiota or antimicrobials for food preservation (Ananau et al., 2007). The use of Lactic acid bacteria (LAB) represents an excellent ecological approach to preserving food (Ananou et al., 2007). Beneficial bacteria such as LAB or the fermentation products produced by LAB are used in bio-preservation to control spoilage and improve safety (Yousef and Carolyn, 2003).

Table 1.2: Timeline of the evolution of food preservation techniques

~500,000 BC	Fire Cooking
12,000 BC	Sun Drying
600 AD	Jam Preparation
1400 AD	Curing
1784 AD	Refrigeration
1809 AD	Canning
1871 AD	Pasteurization
1945 AD	Vacuum Packing
2000+ AD	Chemical Preservatives

Source: Dehydrator Blog, 2019.

Bacteriocins produced by LAB are antimicrobial active against foodborne bacteria, with their primary role being in helping compete for nutrients and inhibiting the growth of undesirable microorganisms in foods. The commercial production of bacteriocins provides a source of natural preservatives (Soomro et al., 2002). There is

a wide range of LAB bacteriocins identified with nisin, the most widely recognized as a safe and effective preservative produced by *Lactobacillus lactics*, approved for use in more than 50 countries including the USA and Europe (Jack et al.,1995; Alzamora et al., 2000; Delves-Broughton et al., 1996). Nisin inhibits the growth of many psychrotrophic spoilage bacteria and is used in food fermentation and shelf-life extension. LAB is also the most common form of microbes considered as probiotics.

1.4 Lactic Acid Bacteria in China

In China LAB are mainly used in the dairy sector. Lactic acid bacteria and relevant dairy products have received extensive recognition from Chinese consumers, and now the national annual total production of LAB relevant dairy products has reached 500,000 tons, with an annual growth rate of 25% (Liu and Song, 2010), taking a 53.1% market share of the total LAB relevant market (Cai, 2016). Other applications involving LAB include medical care (12.5% of total market share), fermented kimchee (31.2%), probiotics (1.88%), fermented meat products (1.88%) and LAB feed (0.62%) (Cai, 2016).

Accompanying the promotion and popularization of LAB dairy products in China, is an awareness of Chinese consumers about the health benefits of LAB. However, the commercial value of LAB has not been fully explored. Innovative products related to LAB are limited. Chinese scientists are investigating innovative applications for LAB. Research on the expansion of LAB use in food preservation is an increasingly popular topic in China (Zhang, Zhou, Su and Su, 2012) with studies on *Penumatophorus japonicas* (Zhou et al, 2010), egg (Wu, 2016), chilled pork (Ban, 2017), bean curd (Li and Zhang, 2016) and chicken (Zhao, et al., 2016).

However, this science-based research does not necessarily guarantee the success of a product in the market as consumers are often conservative towards change (Lavilla

and Gayan, 2018). Compared to other products consumers are particularly cautious when it comes to the perception and acceptance of foods (Lavilla and Gayan, 2018). In China, food safety incidents have pushed consumers to become more aware and more skeptical of food safety (Liu and Niyongira, 2017).

1.5 Problem statement and rationale of for study

In this study, LAB preserved vacuum-sealed chilled beef is being proposed as an alternative to the conventional raw beef Chinese consumers purchase. LAB protected vacuum-sealed chilled beef uses a specific concentration of LAB spread evenly on chilled beef and then is vacuum-sealed. The organic acids and other substances produced by LAB inhibit the production and growth of various bacteria that can spoil beef, thus delaying spoilage and prolonging the shelf-life of beef.

In an experiment by Bai, Sun and Shanguan (2004), the results showed the shelf life of LAB preserved vacuum-sealed chilled beef could be extended from 3 days to 15 days using standard packaging. The color, drip loss, muscle elasticity and other physical and chemical measures surpassed other reference groups which include: vacuum-sealed only, vacuum-sealed plus chemical preservation group (potassium sorbate), vacuum-sealed plus chemical preservation (potassium sorbate + vitamin C), and vacuum-sealed plus compound preservation (potassium sorbate + VC + composite phosphate).

Research on beef by Deng and Liu (2016) compared unpacked beef stored at room temperature with applied lactobacillus fermentation broth on normal raw beef and then vacuum sealed and stored in refrigerator at 4⁰C. In Deng and Liu's research, they then compared the shelf life of the normal unpacked raw beef stored at room temperature with the shelf life of the chilled vacuum-sealed, lactobacillus-fermentation-broth-preserved beef. Their results showed the normal

unpacked raw beef lasted for six days, however, when the concentration of lactobacillus broth was 3%, the beef lasted for twelve days. Deng and Liu (2016) concluded that lactobacillus broth restrains the growth of Gram-positive bacterium, Gram-negative diplococcus, yeast, and mould. There was also a strong antibacterial effect on *Staphylococcus aureus* and *Bacillus*.

There are two reasons for the focus on beef in this study. Firstly, LAB preserved beef has been a mature topic in science field, yet there is no specific research about its real potential market value and whether Chinese consumers can recognize its advantages and have confidence on it. Secondly, in 2010, Verbeke, Pérez-Cueto, de Barcellos, Krystallis, and Grunert proposed that due to the health and nutritional properties of meat, consumers seem to have fewer safety concerns with respect to meat compared to other types of food. Dastile, Francis and Muchenje (2017) found that factors impacting on consumers' judgments of meat safety include the hygiene at the place of purchase, the freshness of meat, and the expiry date on labeling. Meanwhile, consumers could also note other appearance factors like color, drip loss, and smell through their senses further contributing to their judgment of meat safety (Font-i-Furnols and Guerrero, 2014). However, there is a shortage of specific studies on the factors which impact on Chinese consumers' food safety judgment of beef. Furthermore, Liu and Niyongira (2017) found that in China, due to rising personal income, Chinese consumers have reallocated the proportions of meat, grains, tubers, vegetables, and legumes in their daily diet. Chinese consumers are now consuming more meat at the expense of other foods. The impact of rising income and dietary changes on food safety requirements are not yet fully measured. Apart from that, there is no evaluation of Chinese consumers' satisfaction levels around the food safety of the beef they currently purchase; consequently, it does not help to provide a

solid commercial market orientation to food safety science research.

To better fit science research into marketing needs and to help in identifying Chinese consumers' acceptance of new food technology, it is important to find out the factors which impact on Chinese consumers' trust in new food technology and to identify the ways Chinese consumers build up their food safety trust of LAB beef, as well as how they frame their willingness to buy the product.

1.6 Research aims and objectives

1.6.1 Aim of the research

To identify and evaluate factors which impact on Chinese consumers' trust perception of LAB preserved chilled vacuum-sealed beef and to examine the mediation effect of trust between observed independent variables and the dependent variable - purchase intention.

1.6.2 Specific objectives

1. To identify the factors which influence consumers' trust perception in LAB preserved vacuum-sealed chilled beef (LAB beef).
2. To evaluate which factor has the greatest impact on Chinese consumers' trust in LAB beef.
3. To examine if consumers have the intention to purchase LAB beef only after building trust in LAB beef.

1.7 Research scope and delimitations

In this research, due to time and budget constraints, author did a questionnaire survey in convenience groups through personal network. However, as to minimize the sampling bias, author did the survey in two cities Shanghai City and Chengdu City. Also as to avoid the bias from gender, age, career and location, in this research, the samples' age coverage across from 18 to 65 plus. Both female and male were

surveyed, career type varies and the income associated with career type was also throughout low level to high level. Respondents' recognition of LAB preserved beef may vary with the different allocation of facilities like education resource and shopping convenience, in this research, the author purposely investigated three levels of living areas including urban, township and village.

1.8 Structure of the thesis

This thesis comprises six chapters. Chapter 1 is the introduction including background to the research topic, problem statement and research aims. Chapter 2 is a literature review which provides the theoretical foundation for this research. Three factors impacting on consumers' trust in new food biotechnology were extracted from previous research. By combining these three factors, a model with three conceptual frameworks is developed for investigating factors which have an impact on Chinese consumers' food safety trust perception then the most significant sequential effect on the willingness to buy. Chapter 3 describes the details of data collection, and methods for of analysis including frequency distributions, correlations, factor analysis, and structural equation models, the reasons for employing the techniques are also explained.. Chapter 4 focuses on data analysis. It firstly measures the correlations between the three conceptual frameworks (personal bonds, past collaboration, and media exposure) and the trust in the dimensions (food safety and prolonged shelf-life) of LAB beef. Secondly, it investigates the mediation effect of trust for the independent variables impacting on purchase intention. Chapter 5 summarizes and compares the results of the data analysis. Study limitations, future study possibilities and conclusions are presented in chapter 6.

Chapter Two Literature Review

2.1 Introduction

To identify the possible factors impacting on Chinese consumers' trust in LAB beef, this chapter reviews some relevant literature on consumers' trust in food safety. To examine the mediation effect of the influence of trust on purchase intention, this chapter also reviews existing literature that covers the causal relationship between trust and willingness to buy.

First, this chapter is mapped out by the definitions of each attribute of the research topic including LAB beef, trust and mediation effect. Then, underlying factors impacting on Chinese consumers' trust in LAB beef are identified. Lastly, based on the literature review this chapter displays a developed model with three key drivers for establishing Chinese consumers' trust in LAB beef.

Because there is only a limited number studies specifically about consumers' perception of the safety of food preservation, while there are a huge amount of studies on novel food technology (e.g. genetically modified food) both internationally and nationally, this study will refer to the literature about consumers' general perception of food safety and consumers' risk-benefit perception of genetically modified food.

The concept of Lactic Acid Bacteria and LAB preserved vacuum-sealed chilled beef

Lactic acid bacteria (LAB) are the bacteria that are produced through the fermentation of certain foods. There are many different types of LAB and they are commonly found in nature. Most of them have essential functions for the well-being and health of the human body. These bacteria naturally live in the gastrointestinal tracts of humans and other mammals.

When a particular concentration of lactic acid bacteria is evenly spread onto chilled beef and then vacuum-sealed, it is called LAB preserved vacuum-sealed chilled beef. The organic acids and other substances produced by LAB inhibit the production and growth of various bacteria that can spoil beef, thus delaying spoilage and prolonging the shelf-life of beef.

The concept of trust

“Trust is one of those rare concepts in social science that is routinely invoked by journalists, moral philosophers, politicians, and even natural scientist” (Robbin, p.972). Gundlach and Murphy (1993) concluded that trust is the most universally accepted variable explaining all human interaction and exchange. The meaning of trust varies across the different disciplines (Santo and Fernandes, 2008).

In interpersonal literature, trust is an expression of the psychological reaction point of view (Larzelere and Huston, 1980; Rempel et al., 1985) and it is the root of individuals’ interpersonal histories (Remple et al., 1985). In interpersonal literature, trust positively impacts on group work performance. Coleman (1990) studied the work efficiency of a farmer community and found that “ one farmer got his hay baled by another and where farm tools are extensively borrowed and lent, [trust] allows each farmer to get his work done with less physical capital in the form of tools and equipment (p.304, 307).” From an economic perspective, Williamson (1993) says that trust is a calculative point of view. Arrow (1972) stated that “virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence” (Arrow, 1972, p.357).

From a commercial marketing perspective, the meaning of trust however holds many other perspectives. Singh and Sirdeshmukh (2000) stated that trust is the “emotional security that makes consumers think that the other (brand, employee or the firm) will fulfill their expectations of results or behavior expectations of brand quality, of contact with the personnel or of the overall relationship with the firm.” Consumers’ trust will offset the negative impacts from the factors which may cause consumers concern in any risky situation (Bener, 2000; Guinaliu and Tores, 2006). Table 2.1 lists various definitions of consumers trust.

Table 2.1 Different definitions of trust

No	Definitions of consumer trust	Authors	Year
1	“Customers should be able to trust their service providers, feel safe in their dealings with the service provider and be assured that their dealings are confidential”.	Parasuraman et al	1985
2	“A belief that the partner in a negotiation will not exploit or take advantage of the other's vulnerability”.	Dwyer, Schurr, and Oh	1987
3	“A partner’s belief that the other partner will perform actions that will result in positive outcomes, as well as not take unexpected actions that would result in negative outcomes”.	Anderson and Narus	1990
4	“A willingness to rely on an exchange partner in whom one has confidence”.	Moorman, Deshpandé, and Zaltman	1993
	“The variable most universally accepted as a basis of any human interaction or exchange is trust”	Gundlach and Murphy	
5	“In the retail environment trust is consumer’s confidence in a retailers reliability and integrity which implicitly assumes that one can have trust in organizations or firms”	Doney and Cannon	1997
6	“Trust is seen as an expression of security between partners when making an exchange, or in another type of relationship”	Garbarino and Johnson	1999
7	“Expectations held by the consumer that the store, its people, and its products are dependable and can be relied on to deliver on their promises”	Sirdeshmukh et al	2002

Source: Singh, 2016.

Consumers’ trust and purchase intentions are highly correlated (Wang, 2015). Many scholars have argued that trust is a prerequisite for successful commerce because consumers hesitate to make purchases unless they trust the seller (Genfen, 2002; Urban et, al., 2000; Rachbini, 2018). There have been a number of pilot research projects about the impact of trust on consumers’ purchase intention in different

product sectors and their results show trust induces purchase intention. For example, in Wijoseno and Ariyanti's (2015) study concerning consumer trust and its impact on online purchase intention in Indonesia, their results showed trust is a key factor for motivating consumers to purchase online. In the research of Zakaria *et al.* (2015), they studied the impact of trust in Halal logo certification on consumers purchase intention of Halal frozen food. Zakaria *et al.* found that the Halal logo certification cannot directly motivate consumers' purchase intention unless consumers trust the logo. In Wang's research (2015) about Chinese university students' trust in purchasing food online, trust was shown to play a major role in explaining why Chinese university students have the intention to purchase food online in the context of China being a challenging food environment with high general food safety concerns. In conclusion, as Gambetta (1988) and Tonkin *et al.* (2016, p.118) say "consumer trust in the food system is essential to ensure a cooperative and functioning market for system actors and to manage complexity and uncertainty for consumers."

The concept of mediation effect

Mediation effect has been used to explain a known relationship by exploring the underlying mechanism or process by which one variable influences another variable through a mediator variable (Cohen *et al.*, 2003). Unlike research that studies the direct impact or causal relationship between independent and dependent variables, in the mediation model, we firstly study the influence of the independent variable on a possible mediator variable, then study the impact of the mediator on the dependent variable. With some unclear causal relationships between independent and dependent variables, a mediation effect may help to clarify the nature of the relationship

between variables (Mackinnon, 2008). Figure 2.1 briefly illustrates the mediation model.

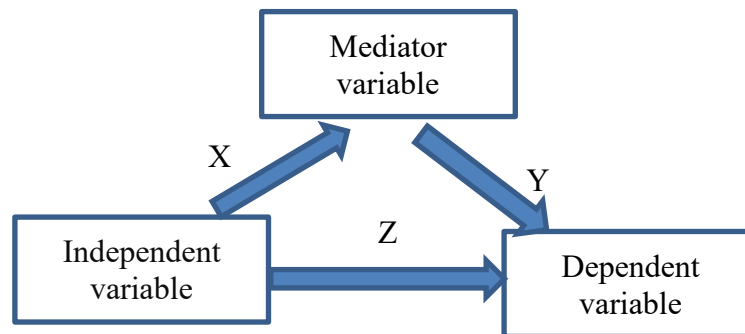


Figure 2.1 Diagram of a mediation model

Source: Based on Kenny, 2018.

2.2 Determinants of trust in new food technology

Lyndhurst (2009) proposed that the success of new technology in the market is highly dependent on consumer acceptance and opinion. Supporting this proposition, Lavilla and Gayan (2018) suggested the success in the market of a novel food with new technology is highly dependent on the consumers' perception of the benefits and risks of the product. In the process of formatting consumers' opinion about innovative food products, several criteria have been suggested as useful for defining opinions (Evans et al. 2009, Popa and Popa, 2012, Lavilla and Gayan, 2018). These criteria intrinsically linked together comprise sensory characteristics of the product, consumer cognition, socio-demographic factors, social culture, and attitudinal variables (Cardello, 2003, Lavilla and Gayan, 2018).

Bruce (2002) and Wang (2015) proposed that the public establishes their trust towards modern food biotechnology based on rational benefit-risk analysis. Fritz and Fischer (2007) conducted a survey in Europe to identify the critical determinants of establishing trust in the food sector and they concluded that the existence of personal bonds, past collaboration, and good quality communication are the three empirical factors for stimulating trust.

2.2.1 Personal bonds

2.2.1.1 Socio-demographic Factors

Socio-demographic variables such as gender, age, education, number of children, and income have been shown to impact on people's risk perception (Dosman, Adamowicz, and Hrudey, 2001; Frewer, 2000; Mariani et al., 2007; Tonsor, Schroeder, and Pennings, 2009; Zepeda, Douthitt, and You, 2003; Wang, 2014), which in turn influences people's attitudes and trust. In a study about the food sector, gender differences which are relevant to social norms and cultural beliefs (Steptoe et al., 1995) played a big role in explaining consumer's choice (Ares and Gámbaro, 2007). Each gender has a different way of interpreting healthiness (Missagia, Oliveira and Rezende, 2013). In previous research, it has been shown that females are more highly aware, and have better knowledge of nutrition than males (Steptoe et al., 1995), and females tend to have a greater awareness of food safety risks than males (Baker, 2003; Frewer, 2000; Rosati and Saba, 2004; Wang, 2014).

Age difference is another factor to explain consumer attitudes towards food safety and towards their purchase behavior. Declines in the immune system function make older adults more vulnerable to food-borne illness, which therefore causes adults sixty years old and above to be more likely to follow recommended food safety practices than those who are below sixty years old (Anderson, Verrill and Sahyoun, 2011). Some studies have found older adults have more food safety knowledge than younger people and are less willing to eat risky foods (Levy, 2008; Alterkruse, 1999; Klontz, 1995). Therefore, in terms of considering the impact of age in influencing consumers choice on new food technology, Valor and Sieber, 2003 say that “young people tend to be the early adopters of technology, not only in Europe but in the US and Japan (p.2).”

Education level is an important factor shaping consumers' views. In the modern food production sector, accompanying the changing sources of food supply, the methods of producing and distributing food are also changing (Institute of Medicine (US) and National Research Council (US) Committee, 1998). People need to make decisions as to whether or not to accept the changes. Many scholars have argued that people with higher education levels have a comparative advantage in dealing with change (Shultz, 1964, 1975; Nelson and Phelps, 1966; Welch, 1970, 1973; Khaldi, 1975; Wozniak, 1984; Barte and Lichtenberg, 1987; Riddell and Song, 2012). Therefore, in terms of adapting to new food technology, it is reasonable to believe that people with higher education levels will be more adaptable.

In previous research, income has been identified as an important demographic distinction which influences people's attitudes towards new food technology. In the research of Huang et al. (2006), about Chinese consumers' willingness to accept GM food, they recognized that low-income groups had higher trust in GM food, while, people with higher incomes presented higher interest in non-GM food. This can be explained as incomes increase, people have the ability to choose the food which offers minimal potential food hazards (Baker, 2003; Dosman, et al. 2001; Wang, 2014). Beydoun and Wang (2016) suggested that "Socioeconomic constraints on individual and household can lead to poorer diet quality."

Another socio-demographic factor correlated with people's income is the food environment in the community where people live. Several studies have noted that in low-income communities, there is limited access to quality or healthy food, whereas, in high-income communities, people have more facilities offering better and safer food (Lisabeth et al., 2011). A possible motivation of exposure to a safer food environment is that people will be more sensitive to potential food hazards, and more

willing to accept new healthy foods due to the food information people can source from the environment.

Household structure, including the number of dependent children also needs to be considered. In China, families with dependent children tend to have higher concerns about the risks associated with dairy products (Qiao, et al., 2012; Wang, 2014). There are some other observed factors like location of living (city, township or village), and career type related to income and people's sources of food safety knowledge, which in turn influences peoples' attitudes and trust in new food technology. Another observed factor is marital status that may also impact on food safety concerns, as it is relevant to household structure. The role individuals play in food shopping also may also have an important impact on trust in new food technology as primary food shoppers have more opportunities to be exposed to food knowledge and information.

2.2.1.2 Food purchasing and eating habits

There are many factors influencing consumer decision-making at the individual level, like tastes and personal habits (Steptoe et al., 1995). The influence of eating habits on food choices and purchase is critical with regard to consumer acceptance of foods, an increase in consumer acceptance related to habitual consumption having been observed. Previous experience with a food enables visual assessment of a product and prediction of its characteristics in a situation where it is not possible to taste the product. Past experience with similar products provides references not only when a product is evaluated without an opportunity to sample it, but also when it is eaten.

2.2.2 Past collaboration

2.2.2.1 General Food safety concern

In a study about the factors impacting on consumers' risk perception of food, people's food safety concerns generated from past experience are identified (Mariani,

et al., 2007; Tonson, et al. 2009; Wang, 2014). Wang (2014) concluded that people's direct and indirect exposure to food incidents increase people's risk concerns about food safety, which in turn reduces trust in food.

2.2.2.2 Knowledge

“Customer knowledge is the combination of experience, value, and insight information which is needed, created and absorbed during the transaction and exchange between customer and enterprises (Henning et al., 2002)”. Similarly, Campbell (2003) stated that customers' knowledge is generated from the systematic processing of organized and structured information. Lyndhurst (2009) proposed that in terms of judging a technology, people rely on their pre-existing knowledge and values of the technology. Kahan et al. (2007) and Priest (2005) suggested that pre-existing knowledge of a technology could be considered as a parameter for examining the level of support for a technology. Lyndhurst (2009) also proposed that positive information or knowledge tends to help people shape positive views, whereas negative information or knowledge forms negative views. With many emerging food technologies which often need safety assessment (Augustin et al, 2016; Wilcock, Pun, Khanona, and Aung, 2004; Lusk, Andrea and Bieberstein, 2014), consumers' lack of knowledge often causes their reluctance to accept the new food technology (Lusk et al., 2014).

2.2.2.3 Satisfaction level

“Customer satisfaction has been discussed extensively as a central element of a firm's marketing concept during the past two decades (Churchill and Suprenant, 1982; Oliver, 1988; Tse and Wilton 1988; Anderson and Sullivan, 1993).” In marketing, satisfaction level is a measure of how well products and services delivered meet customers' needs and expectations. Another view is from Garbarino and Johnson

(1999) and Sharma, Niedrich and Dobbins (1999) who proposed that satisfaction is a cumulative view and it actually measures the general level of satisfaction based on all past experience with the firm.

Holt (1999) proposed that customer satisfaction tends to enhance the relationship between buyer and seller, and it is also believed to lead to lower complaint behavior and less effort put in by consumers to seek variety (Sharma, Niedrichs and Dobbins 1999). When customers in business transactions already have the experience that the products or services of suppliers are able to meet their needs and expectations, and customers are satisfied then the customer tends to trust the supplier (Ganesan 1994, Geyskens, Steenkamp and Kumar 1999, Helfert and Gemuenden 1998). Customer satisfaction could be considered as a leading indicator of consumer purchase intention (Farris et al., 2010).

2.2.3 Communication (Media Exposure)

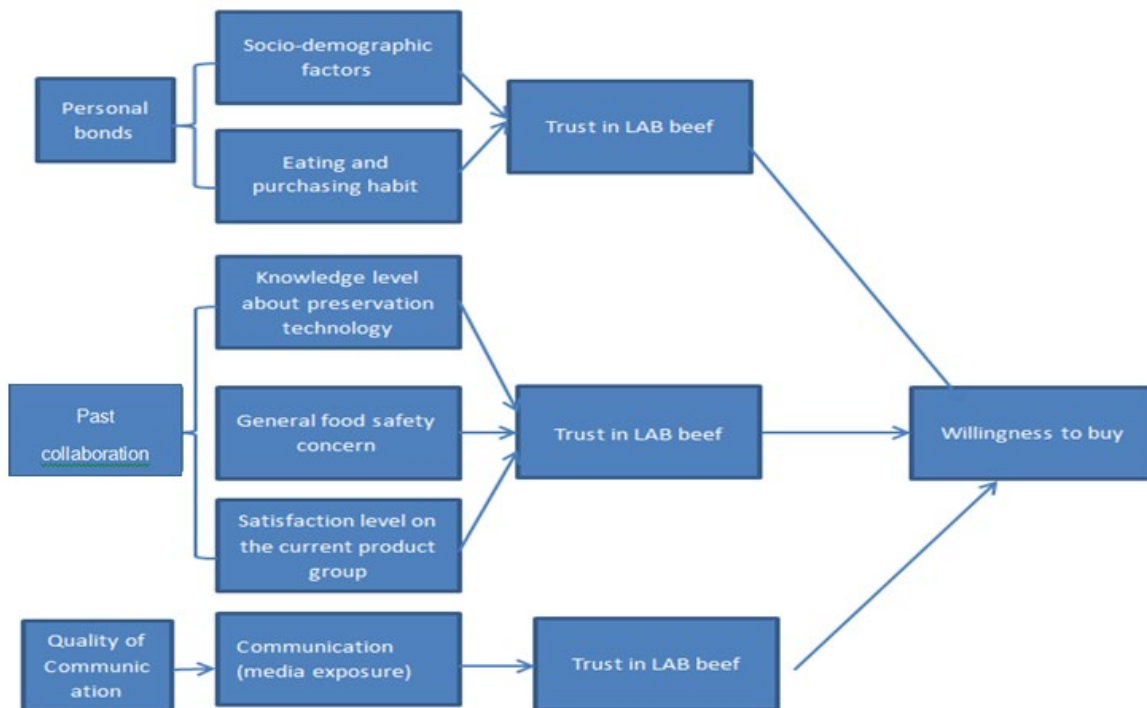
Nowadays, consumers have access to various sources of information and experience (Senecal and Nantel 2004; Hajili, 2014). In the food sector, media coverage has an important impact in influencing public perception and consumer behavior toward new food technologies (McCluskey, Kalaitazandonakes and Swinnen, 2015). Despite the role of translating new science to consumers that media usually plays (McCluskey, Kalaitazandonakes and Swinnen, 2015), media coverage can also raise public concerns about food safety issues (Pennings and Garcia, 2001; Verbeke, Frewer, Scholderer, 2007).

2.3 Section Summary

Through the literature review, there are three dimensions which relate to consumer's trust of LAB beef identified. In the personal bonds dimension, eleven socio-demographic factors (gender, age, marriage status, income, education, career

type, household structure, city of living, location of living, supermarket nearby and primary food shopper) and personal eating and purchasing habits are included. In the collaboration dimension, people’s knowledge about technology, general food safety concerns, and satisfaction level of the current similar beef product are included. Finally, communication exposure is included in the communication dimension. Throughout the literature review, the relationships between trust and purchase intention are also identified which then drive consumer willingness to buy. A framework with the factors impacting on consumers’ trust in LAB beef and with the mechanism of how the factors are distributed in the three dimensions to influence consumers’ purchase intention can be established (Figure 2.2).

Figure 2.2: Conceptual framework of consumers’ trust in LAB beef and the mediation effect on trust on purchase intention



2.4 Hypotheses development

Based on the literature review, the hypotheses presented serve the following two research objectives:

1. To identify the most important factors which influence consumers' trust in LAB beef.
2. To examine if all the individual attributes impact on willingness to buy only after establishing trust in LAB beef.

2.4.1 Hypotheses related to personal bonds dimension

2.4.1.1 Hypotheses related to socio-demographic variables

H1: Males trust in LAB beef more than females

H2: Younger people tend to trust in LAB beef more than older people

H3: Education level is positively related to consumers' trust in LAB beef

H4: High income consumers' trust in LAB beef more than low income groups

H5: The number of dependent children positively relate to consumers' trust in LAB beef.

H6: People's trust in LAB beef varies according to the type of career.

H7: People who are married tend to trust in LAB beef more than unmarried.

H8: People's trust level in LAB beef is differentiated by the city of living, and the people living in more developed cities tend to have higher trust in LAB beef.

H9: People living in different locations (city, town and village) have different levels of trust in LAB beef, and people who live at city level have the highest trust in LAB beef.

H10: In peoples' food environment, the availability of a supermarket induces higher trust in LAB beef

H11: Primary food shoppers tend to have higher trust in LAB beef.

2.4.1.2 Hypotheses related to personal eating and purchasing habits

H12: The frequency of consumers eating beef is positively related to their trust in LAB beef.

H13: The frequency of consumers purchasing different types of beef is positively related to their trust in LAB beef.

2.4.2 Hypotheses related to past collaboration

H14: Consumers' knowledge level on preservation technology is positively related to trust in LAB beef

H15: Consumers' general food safety perception is negatively related to trust in LAB beef.

H16: Consumer's satisfaction level with their current purchased beef product is positively related to trust in LAB beef.

2.4.3 Hypotheses related to communication

H17: The frequency of media exposure is positively related to the trust in LAB beef.

2.4.4 Hypotheses related to the mediation of trust

H18: Trust is a key driver for stimulating purchase intention.

H19: All the consumer's attributes can only work on purchase intention through the mediation of trust.

Chapter 3 Methodology

3.1 Introduction

Based on the conceptual framework of *consumer trust on the business relationship* developed by Fritz and Fischer (2007), this study is going to examine what factors impact on Chinese consumer food safety trust perceptions of a new food biotechnology (LAB beef) and how these perceptions affect consumer purchase intentions. In this chapter, two sections are covered. The first section provides information about the methods of generating data including survey media, sampling groups, sampling locations, questionnaire design, survey ethics, pilot testing and the conduct of the survey. The second section explains the methodologies used for examining the study aims and hypotheses including data reliability and validity tests, frequencies, Gamma coefficients and structural equation modeling.

3.2 Research method

3.2.1 Selected research strategy

The main subject of this research focuses on Consumer perceptions and purchase intentions towards LAB preserved vacuum-sealed chilled beef. According to Bhattacharjee (2012), a survey is an ideal and systematic method to collect data about preferences, thoughts, and behaviors, and therefore, survey research will be used in this study. Survey research can be conducted by standardized questionnaires and interviews (Bhattacharjee, 2012).

Due to time and budget constraints, an online structured and standardized self-administered questionnaire is employed in this study. There are many advantages to conducting online surveys. Firstly, the popularity of the internet, apart from providing more communication channels to different social groups, also offers a convenient way for researchers to access a variety of groups (Fox et al., 2001, Nie et

al., 2002, Wright, 2017). Secondly, unlike face to face interviews and mail surveys, online research saves time by allowing researchers to generalize a large number of respondents in a short period of time and reduce the costs associated with paper based surveys (Bachmann and Elfrink, 1996; Couper, 2000; Llieva et al., 2002; Yun and Trumbo, 2000; Wright, 2017).

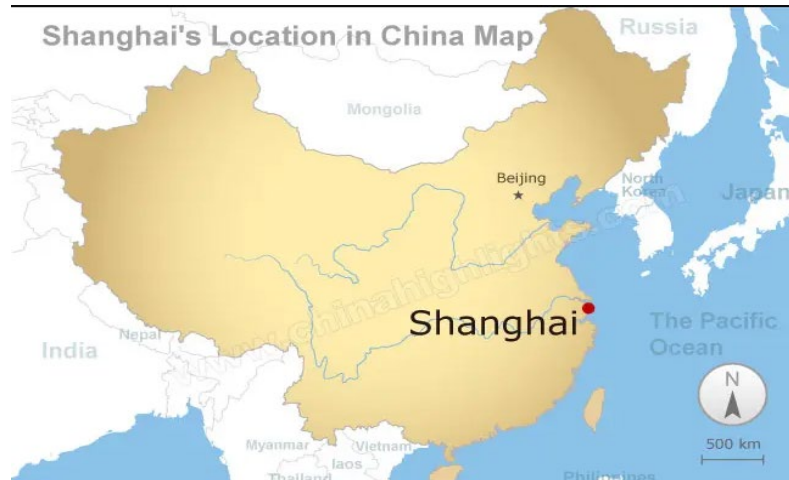
There are also some disadvantages with online questionnaire research. Firstly, there is sampling bias (Bhattacharjee, 2012). An online survey could systematically exclude people who do not have access to the internet, and it will include a disproportionate number of respondents who use the internet frequently (Bhattacharjee, 2012). Apart from this, an online questionnaire will also systematically exclude groups who have difficulties in reading. Secondly, a low response rate is another common issue that needs to be considered. As an example, consider the response rate of an online questionnaire directed to Australian medical practitioners (Aitken et al. 2008) that had a response rate of only 8.7%. Bhattacharjee (2012) concluded that survey research is notorious for low response rates no matter the medium. Thirdly, a structured, standardized questionnaire limits respondent answers on questions (Babbie, 2010; Wang, 2014).

3.2.2 Population and geographic location of sampling

The survey was conducted in Shanghai City and Chengdu City, using the author's personal network as a means of getting a substantial number of respondents in a timely fashion at minimal cost. It is, of necessity, a convenience sample. Shanghai City is the national economic center of China and it is the largest city. It is located at the bottom of the Yangtze River Delta, on the shores of the East China Sea. It sits in the middle of the east coast of China, having an excellent geographic position and

access to transportation. In 2018, the resident population of Shanghai was 24.2 million.

Figure 3.1: The geographic location of Shanghai in China map



Source: chinahighlights.com

Chengdu City is located in the west of Sichuan Province on the upper reaches of the Yangtze River. Chengdu is an essential national central city in Western China, and serves as a business logistics center and transportation hub in the western area. The resident population in Chengdu city is 11.9 million. The China State Department nominated Chengdu City as an outstanding high tech innovation and production base. Chengdu City is also a critical national commercial trading center for grain and cooking oil, vegetables, fruits, and Chinese medicinal materials.



Figure 3.2: The geographic location of Chengdu City in China map

Source: chinahighlights.com

3.2.3 Sampling method

To achieve a high response rate with limited time and money, the author conducted this survey through personal social networks. To reduce potential sampling bias and to diversify the range of respondents, the author purposely approached different organizations and industries, including a large scale high-level precise instrument processing plant, tertiary academic institutions, state-owned construction entrepreneurs, government departments, and other small to medium private businesses. Unemployed and retired groups were also invited to participate through a direct online invitation or a face-to-face invitation.

3.2.4 Questionnaire design

The questionnaire in this study was based on the model of Fritz and Fischer (2007) who examined and tested the impact of personal bonds, past collaboration, and communication on establishing trust in a food business. The questionnaire from Wang's (2014) study of consumer risk perceptions of dairy products in China also helped to identify significant general and common place food safety concerns.

The questionnaire firstly examines the impact from personal bonds and past collaboration communication on the trust perception of LAB beef. The individual bonds include factors concerning the respondent social demographic characteristics, food purchasing and eating habits. Knowledge levels about preservation techniques and general food safety concerns are examined as part of the past collaboration. Media exposure is the only attribute considered as a communication factor. Secondly, the questionnaire examines the relationship between consumer trust perception of LAB beef and willingness to buy. See the following Table3.1 for details of the items in the questionnaire.

Since this study aims to examine Chinese consumer trust level in LAB beef, rather

than doing sensory evaluation that includes sight and taste testing, this research cannot assume that all the respondents already have some understanding of LAB beef. Therefore, a definition and some information about LAB beef were provided in the questionnaire. It should be kept in mind, according to Deliza et al (2005), that the disclosure of technology and its purpose to people induces more positive views towards the technology.

Table3.1: Independent and dependent variables in questionnaire

Variable category	Clusters	Groups	Variable names	Type of question	Question Number
Independent variables	Personal bonds	Social demographic	Gender	Dichotomous	Q31
			Age	Single Choice	Q32
			Education level	Single Choice	Q33
			Marriage status	Single Choice	Q34
			No of children under 18	Single Choice	Q35
			Annual household income	Single Choice	Q36
			Career type	Single choice	Q37
			City of Residence	Single Choice	Q38
			Location of Residence	Single Choice	Q39
			Supermarket facility	Dichotomous	Q40
			Primary food shopper	Dichotomous	Q41
		Eating Habit	The frequency of eating beef	Scaled	Q16
		Purchasing Habits	The frequency of buying beef	Scaled	Q15
			Type of purchase place	Single choice	Q17
	Most often purchased beef type		Single choice	Q18	
	The frequency of purchasing different types of beef		Scaled	Q19	
	Factors impacting on a purchase decision		Ranking	Q20	
	Past collaboration	General social food safety perception	General food trust	Scaled	Q1
			Major social food safety concerns	Scaled	Q3
			Satisfaction level of current beef	Scaled	Q25
Knowledge		Knowledge level of three preservation techniques	Scaled	Q4-Q11	

		about science	If heard of Lactic Acid Bacteria before?	Dichotomous	Q12
	Media exposure	Media exposure	The frequency of using different media sources	Scaled	Q14
Dependent variables		Trust in LAB beef	Trust in the food safety of LAB beef	Scaled	Q26
			Trust in the prolonged shelf-life of LAB beef	Scaled	Q27
		Purchase intention	Willingness to buy	Scaled	Q28
			Willingness to pay	Single choice	Q29

3.2.5 Research ethics

Prior to introducing the questionnaire to the respondents, the research project was subjected to Massey University Human Ethics procedures and through peer review, it was judged to be low risk. Every participant was informed about the purpose of the research and their rights, including voluntary participation and the right to terminate the survey at any time. Participants were assured about confidentiality and their privacy.

3.2.6 Pilot testing

The questionnaire was initially designed in English. To minimize translation errors and ensure the descriptions on the survey are understandable, pilot testing was conducted. Forty government department workers in China were invited to answer the questionnaire. Respondent feedback included suggestions for simplifying sentences, re-ordering questions and providing more information about what is LAB beef.

3.2.7 Conduct of survey

The survey took place between 10 December 2018 and 30 January 2019. Unlike traditional online questionnaires which may need respondents to use a smartphone to open a link, this survey was completely undertaken through the popular online communication tool, Wechat, using a smartphone or computer. After the e-version of

the questionnaire was designed on a specific questionnaire website (Wunjuanxing.com), the website automatically produced a unique two-dimension code for this questionnaire and then sent this two-dimension code to the author's Wechat. The code was saved and then sent to respondents through Wechat again. Respondents opened the survey link through scanning the two-dimension code via the scanning function on Wechat. All of the respondents were encouraged to save the code and send the code to their network. It was authority (registration) free to access the questionnaire page after scanning the code, and no personal information needed to be provided before logging in.

By setting up submission restrictions, the online system automatically ensured the completeness of all the questionnaires. However, minor cleaning was necessary to delete those questionnaires which were obviously not telling true answers, for example the whole questionnaire were answered with a single option. The final total of valid surveys was 514.

3.3 Data Analysis

There was no data entry step. The questionnaire website (Wenjuanxing) automatically summarized the data into a file which could be used directly. SPSS Version 25, SPSS Amos 25 Graphics and Excel 2010 were used to analyze the data. SPSS Version 25 was used for fundamental descriptive data analysis, such as frequency and cross-tabulation. SPSS Amos 25 Graphics was used to analyze the structural equation model and Excel 2010 was used mainly for drawing charts.

3.3.1 Descriptive statistics

A brief overview of the frequency distribution relating to each variable will be summarized to provide a background picture about respondent socio-demographic characteristics, personal habits, attitudes, and tendencies.

3.3.2 Data reliability and validity measurement

There is a crucial point in social science surveys, especially studies concerned with the characteristics of individuals where researchers are concerned about whether their measurements will achieve the study aims and goals, providing a good representation of the required characteristics (Price, 2013). They use a set of measures to confirm that the data collected has the capacity to achieve the study intentions of researchers' (Price, 2013). There are two dimensions commonly examined. They are reliability and validity.

In statistics, reliability is used to measure the overall consistency and stability of a variable. (Trochim, 2006). In this research, the internal correlation coefficient, Cronbach's Alpha, is employed to measure the reliability of the collected data. The reasons for choosing Cronbach's alpha include, firstly, such internal correlation coefficients are widely used (Webb, et.al., 2006). Secondly, this research is testing Chinese consumers' recognition of preserved LAB beef, which is part of the study about psychology, and as Webb, et al (2006) and Yang, et al (2001) both concluded that among the internal correlation coefficients Cronbach's alpha coefficient is the most universally applied in psychology. Thirdly Cronbach's Alpha is based on the administration of a single survey. This research was done through convenience groups, however, in the practical process the survey is anonymous and the survey system doesn't allow one respondent to do the questionnaire twice, which makes the research unrepeatable on the same convenience groups, and thus Cronbach's Alpha is suitable for this case. In the research by De Jonge (2008), Harris & Goode (2010) and Wang (2015), when the value of Cronbach's Alpha reached 0.7 or more, the reliability of the data was verified.

Validity is used to measure the extent to which a test accurately measures the value it

claims to measure (Mcleod, 2013). Validity raises concerns about the meaning of test results (Messick, n.d.), which makes it a crucial issue in psychological and education testing (Popham, 2008). Referring again to the research of De Jonge (2008), Harris & Goode (2010) and Wang (2014), this research applies the same validity measurement used by these studies, average variance extract (AVE) to measure the validity of data. AVE is a measure of amount of variance that is captured by a construct in relation to the amount of variance due to measurement error (Fornell & Larcker, 1981; Henseler, Ringle & Sarstedt, 2014). When the value of AVE is no less than 0.50 then the validity of data is deemed acceptable (De Jonge, 2008; Harris & Goode, 2010; Wang, 2014).

3.3.3 Method for examining the correlation between independent variables and dependent variable (trust)

In this research, Goodman and Kruskal's Gamma (γ) and significance level (p) are used to measure the correlation between the independent factors and consumer trust in both food safety and prolonged shelf-life of LAB preserved vacuum-sealed chilled beef. The γ coefficient is one the most useful measures of ordinal association (Rousson, 2007). Ruiz & Hüllermeier (2012) concluded that in contrast to other correlation measurements, for example Pearson's r correlation which is a correlational measure for interval and ratio level variables the advantage of the Gamma coefficient (a rank or ordinal level correlation measure) is that it is based only on the ordering of the observed values of a variable, which makes Gamma more applicable for variables only measuring rank order.. Babbie (2010) proposed that the Gamma coefficient is the only one of several measures of association for ordinal level variables that is appropriate for a ranked measure with many tied observations, which is the case for most of the variables in this study. The value of γ ranges

between -1.0 and 1.0; the closer the value is to -1.0, the stronger the negative relationship and the closer to 1.0, the stronger the positive relationship. A value of 0.0 indicates the lack of a relationship between the two variables (Rousson, 2007).

The empirical model of γ coefficient is:
$$\gamma = \frac{N_c - N_d}{N_c + N_d}$$

Where:

N_c is the total number of pairs that rank the same (concordant pairs)

N_d is the number of pairs that don't rank the same (discordant pairs)

Based on previous research of Wang (2014), the strength of the correlation between dependent variables and independent variables can be grouped into three levels including relatively high (the absolute value of γ exceeds 0.2), medium high (the absolute value of γ between 0.1 and 0.2) and low (the absolute value of γ less than 0.1). And also, according to Wang (2014) and Wang (2015), the correlation relationship is significant only when the value p does not exceed than 0.05.

3.3.4 Methods for examining the Mediation effect

3.3.4.1 Structural equation modeling (SEM)

In this study, structural equation modeling (SEM) will be employed to examine the mediation effect of trust between the independent variables and willingness to buy. SEM is a useful statistical tool to determine and verify a proposed process and model (Meyden and Sesen, 2015; Kursunoglu and Onder, 2019), and it can examine the direct and indirect interrelationships existing among multiple dependent and independent variables (Kursunoglu and Onder, 2019)

SEM is a combination of factor analysis and path analysis (Hox and Bechger, n.d). Factor analysis is a technique used for reducing a large number of variables into a small number of representative latent variables. Path analysis is an extension of

multiple regression (Streiner, 2005), and is able to examine complicated situations such as where there are several dependent variables and those variables are in a chain, in which variable A influences B, then B in turn affects variable C (Streiner, 2005).

In this research, there are forty-one observed independent variables (eleven socio-demographic factors and another thirty selected observed independent variables), two mediators (trust in food safety of LAB beef and trust in the prolonged shelf-life of LAB beef) and one dependent variable (willingness to buy). It would be complicated to examine the mediation effect of each mediator between every single independent variable and the dependent variable. It is thus necessary to find a small number of representative latent variables. The examination of the mediation effect is in fact an analysis of how independent variables impact on trust, and then in turn how trust influences willingness; in this fashion SEM supports the study aims.

Three indices of model fit will be applied to test if the data is suitable for a structural equation model. The first one is the Chi-square difference test (CMIN/DF). According to Albright & Park (2009), when the value of CMIN/DF does not exceed 5.0, then the model fits the data appropriately. Another one is the Comparative Fit Index (CFI), which measures how two models match each other. The value of CFI ranges from 0 to 1. The closer the value of CFI is to one, the better the fit of the model. The last index is the Root Mean Square Error of Approximation (RMSEA). RMSEA analyzes the discrepancy between hypothesized models. It tells how well the model, with unknown, but optimally chosen parameter estimates, and the population covariance matrix fit (Hooper, Coughlan & Mullen, 2008). According to Hair et al (2005) the maximum acceptable value of RMSEA is 0.08.

3.3.4.2 Principal component analysis

To apply a structural equation model for testing the mediation effect of trust, the first

step is to reduce the dimensions by using principal component analysis. Principal component analysis can be used to find a representative variable to represent the data set. There are two principal component analyses, confirmatory and exploratory principal components analysis. In this research, confirmatory principal component analysis will be used. To test if the data is suitable for principal component analysis, there are two indices, the Kaiser-Meyer-Olkin (KMO) and Barlett's test of Sphericity. According to Hair et al. (2005), when the KMO value is above 0.5, it is acceptable; the bigger the KMO is, the more suitable the data set is for principal component analysis. Another index is Barlett's Test of Sphericity. Jolliffe (2002) proposed that when Barlett's Test value is below 0.05, the data is suitable for factor analysis.

3.4 Section Summary

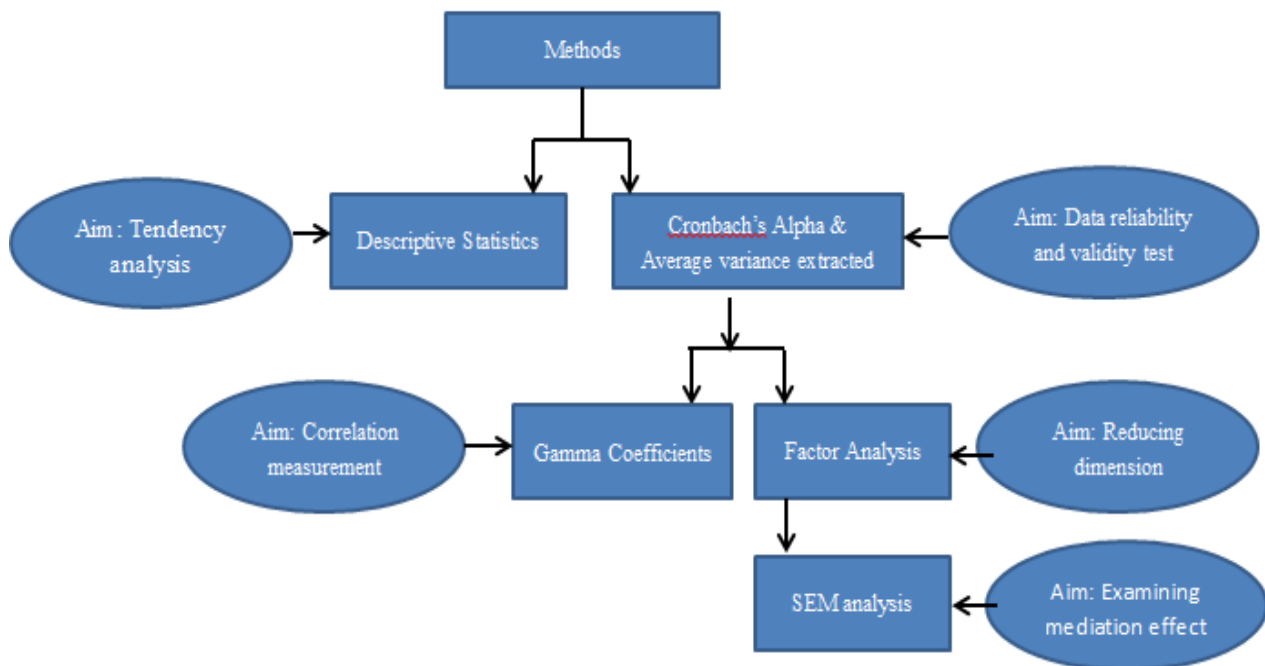


Figure 3.3 Summary of methods

In summary, the methods applied in research serve three aims. The first aim is to picture a basic tendency by using descriptive statistics. The second aim is to measure the correlation between independent variables and trust in LAB beef, and the third

aim is to examine the mediation effect of trust. Before fulfilling the second and third aims, it is needed to test the reliability and validity of data. Gamma coefficient is applied to measure the correlation. To examine the mediation effect, the first step is to apply factor analysis as to reduce the dimensions and find the representative variables, then use SEM to measure the path coefficients from representative variables to mediator and dependent variable (willingness to buy).

Chapter 4 Data Analysis

4.1 Introduction

In this chapter, the first section summarizes respondent socio-demographic characteristics followed by the analysis of frequencies and distributions of key variables. In the second section correlation-analysis measurements and significance level between independent variables and dependent variables are included. The third section presents the results of factor analysis and the structural models for testing the mediation effect of trust.

4.2 Descriptive statistics

The respondents were 58.56% female and 41.44% male (see Table 4.1). The major age group of respondents was from 26 to 55 years old, which made up 78% of the total number of respondents. The next largest age group 18 to 25 was 15.18%, with the group 56 to 66 and above making 6.03% of the total. Respondent education level was dominated by those at a senior high school, diploma or bachelor's degree level; the total percentage of respondents falling in these three categories was 77.05%. Of the total respondents, 79.96% of respondents were married. Family structure varied, however having one child was the predominant group with 51.36%, and the second largest group having no children was at 31.19% of respondents, while the groups with two children or more made up 17.45% of the total. In the annual household income section, the major group was the ¥ 30,000-¥ 49,999 group (NZ\$1 ≈ CHN ¥ 4.67) comprising 22.76% of the total, closely followed by the group earning ¥ 29,999 and below (16.15%), and the group with income more than ¥ 200,000 at 13.62%. Although 38.91% of total respondents categorized their career into the "Others" group, those in private business were 22.96% of respondents followed by those in state-owned businesses (9.34%), and those working in government at 6.42%.

People who were unemployed were 6.81%, then students, the retired, academic institute staff and self-employed (15.56%). The residential location of respondents was almost evenly distributed in three categories (city, town, and village) with 32.02%, 35.06%, and 32.02% respectively. In the question “Is there is a supermarket nearby?” 64.04% respondents answered “yes”, while 19.65% answered “no”, and 15.95% of total respondents answered, “don’t know”. In the last question, “Are you the primary food shopper?” the number of primary food shoppers (44.36%) was less than the non-primary food shoppers (55.64%).

Table 4.1 Demographic summary of respondents

	Sample N=514		Overall Shanghai City Population	Overall Chengdu City Population	National Population			
	%	Number	%	%	%			
Gender								
Male	41.44%	301	49.62%	37.74%	51.9%			
Female	58.56%	213	50.38%	62.26%	48.1%			
Total	100%	514	100%	100%	100%			
Age								
18-25	15.18%	78	81.3%	79.35%	70.16%			
26-35	32.88%	169						
36-45	25.88%	133						
46-55	20.04%	103						
56-65	5.25%	27						
66 or above	0.78%	4	10.1%	9.71%	8.91%			
Total	100%	514						
Education Level								
Junior School and Below	18.68%	96	No data available					
Senior High School	21.79%	112						
Diploma	27.63%	142						
Bachelor Degree	27.63%	142						
Master Degree	3.5%	18						
Ph.D	0.78%	4						
Total	100%	514						
Marriage Status								
Married	79.96%	411				No data available		
Single	14.98%	77						
Partner	1.17%	6						
Divorced	3.31%	17						
Separated	0.19%	1						
Willow (Single)	0.39%	2						
Total	100%	514						
No of Children under 18								
None	31.19%	164	No data available					
One	51.36%	264						

Two	14.01%	72		
Three	1.17%	6		
More than three	1.56%	8		
Total	100%	514		
Annual Household Income (Yuan)				
Less than 29,999	16.15%	83		
30,000-49,999	22.76%	117		
50,000-69,999	14.79%	76		
70,000-89,999	6.81%	35		
90,000-99,999	7.78%	40		
100,000-149,999	11.87%	61		
150,000-199,999	6.23%	32		
More than 200,000	13.62%	70		
Total	100%	514		
Career Type				
Government Staff	6.42%	33		
Private business staff	22.96%	118		
National owned company staff	9.34%	48		
Academic institute staff	3.11%	16		
Student	2.14%	11		
retired	4.47%	23		
Self-employed	5.84%	30		
Unemployed	6.81%	35		
others	38.91%	200		
Total	100%	514		
Location of Living				
Village	32.01%	165		No data available
Town	35.06%	183		
City	32.03%	166		
Total	100%	514		
Any supermarket selling chilled beef nearby?				
Yes	64.04%	331	No data available	
No	19.65%	101		
Don't know	15.95%	82		
Total	100%	514		
Primary food shopper?				
Yes	44.36%	228		
No	55.64%	286		
Total	100%	514		

Table 4.2 Summary of the confidence level in the safety of general purchased food

In general, how confident are you in the safety of the food you consume?	Percentage %	No of respondents
1 Not at all	13.23%	68
2	10.89%	56
3	31.71%	163
4	24.32%	125
5 Very confident	19.84%	102
Total	100%	514
Average (Score)	3.27	

Table 4.2 shows the distribution of respondents confidence in the safety of purchased food. The groups who were confident or very confident (four and five stars) on the safety of the purchased food constituted 44.16%, which is less than half of the total respondents, while 55.84% respondents were neutral to not at all confident, giving an average confidence score of only 3.27.

Table 4.3 Summary of concern level in selected food safety issues

	Very much	Somewhat	A little	Not at all	Don't know	Total
A: Food hygiene	37.94% 195	28.06% 147	23.54% 121	4.86% 25	5.06% 26	100% 514
B: Food poisoning (food contamination due to bacteria and viruses)	37.74% 194	25.88% 133	22.37% 115	9.34% 48	4.67% 24	100% 514
C: Food additives	54.28% 279	25.68% 132	14.59% 75	1.95% 10	3.5% 18	100% 514
D: Expiry date (Food overdue)	42.80% 220	26.46% 136	19.26% 99	7.39% 38	4.09% 21	100% 514
E: Residue of hormones, steroids, and antibiotics in food	54.09% 278	24.90% 128	12.84% 66	3.89% 20	4.28% 22	100% 514
F: Genetically modified food	47.67% 245	26.07% 134	15.18% 78	5.64% 29	5.45% 28	100% 514
G: The feed given to livestock	34.24% 176	33.66% 173	19.84% 102	5.64% 29	6.61% 34	100% 514
H: Animal disease (e.g. mad cow)	48.05% 247	25.88% 133	15.76% 81	6.03% 31	4.28% 22	100% 514

Table 4.3 summarizes respondents concern levels regarding different food safety issues. Food additives were of most concern (54.28%), while only 1.95% of respondents had no concern with food additives. The next highest concern was for residues of hormones, steroids, and antibiotics in food (54.09%). Animal disease was a concern for 48.05% of respondents, followed by genetically modified foods (47.67%). Food poisoning was a major concern for a relatively low proportion of

respondents (37.74%) with 9.34% showing no concern with food poisoning.

Table 4.4 presents the respondent knowledge levels on different preservation technologies and their view of the potential health risk caused by chemical preservatives. Few respondents had a strong knowledge of chemical food preservation (7.2%). Those with some or a little knowledge of chemical preservation were 53.5% (21.79%+31.71%) of the respondents, while 32.3% claimed to have no knowledge of chemical preservation. Only 3.31% of respondents claimed to have a good knowledge of biological preservation, with 37.74% of total respondents having no knowledge of biological preservation. A large number of respondents (39.11%) had no knowledge of the health risks associated with chemical preservatives. For physical preservation knowledge, 26.46% of respondents did not know anything about this topic. In summary, many respondents in this survey had poor knowledge of food preservation.

Table 4.4: Summary of respondent knowledge level of three types of food preservation and the health risk associated with using chemical preservation

	Chemical	Health risk	Physical	Biological
Very much	7.20% 37	4.67% 24	3.89% 20	3.31% 17
Somewhat	21.79% 112	14.79% 76	19.65% 101	15.76% 81
A little	31.71% 163	33.46% 172	42.22% 217	32.49% 167
Not at all	32.30% 166	39.11% 201	26.46% 136	37.74% 194
Don't know	7% 36	7.98% 41	7.78% 40	10.70% 55
Total	100% 514	100% 514	100% 514	100% 514

As shown in Figure 4.1, knowledge of LAB before starting this survey was high at 69.46% (N=357) of respondents, while 30.54% (N=157) did not know about LAB before taking this survey. The number of respondents with knowledge of LAB was more than twice the number who had not heard of LAB, suggesting that LAB has had substantial exposure amongst Chinese consumers.

Table 4.5 shows the responses about their frequency of using different media sources for food information. From Table 4.5 it can be seen that many respondents are

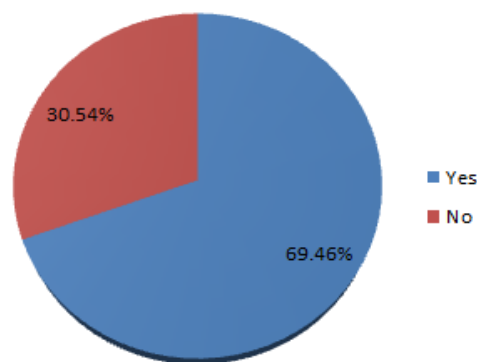


Figure 4.1 Summary of respondents' perception of Lactic Acid Bacteria (LAB) *

frequent users of online media, with 55.7% (36.83%+18.87%) using online media either daily or weekly. The proportion of respondents who never use online media was low (12.65%). The second most popular media source for food safety information was from food packaging, with 44.16% (18.09% +26.075) of respondents using this source daily or weekly. However there was a large group that never use packaging as a source of food safety information (17.21%). The use of radio was much lower than other media sources (19.84%) with 8.75% using radio daily and 11.09% weekly. Many (50.19%) claimed they never use radio.

Table 4.5 Summary of respondent frequency of using media sources for getting food safety knowledge.

	Daily	weekly	Monthly	Less than monthly	Never	total
TV	12.06% 62	22.76% 117	23.35% 120	22.37% 115	19.46% 100	100% 514
Radio	8.75% 45	11.09% 57	10.51% 54	19.46% 100	50.19% 258	100% 514
Word of mouth	10.89% 56	19.07% 98	21.40% 110	28.02% 144	20.62% 106	100% 514
Food packaging	18.09% 93	26.07% 134	21.21% 109	17.51% 90	17.21% 88	100% 514
Online	36.83% 187	18.87% 97	17.51% 90	14.59% 75	12.65% 65	100% 514
Paper Media	10.31% 53	16.15% 83	19.65% 101	26.65% 137	27.24% 140	100% 514

Figure 4.2 shows only a small number of respondents (3.11%) eat beef daily. A much larger group (26.85%) eats beef once every few months. The group who eat beef more than once a month (23.35%) and the group who eat beef once a month (16.93%) take the second and third places, respectively. The overall proportion distribution suggests the majority of respondents are not frequent beef consumers.

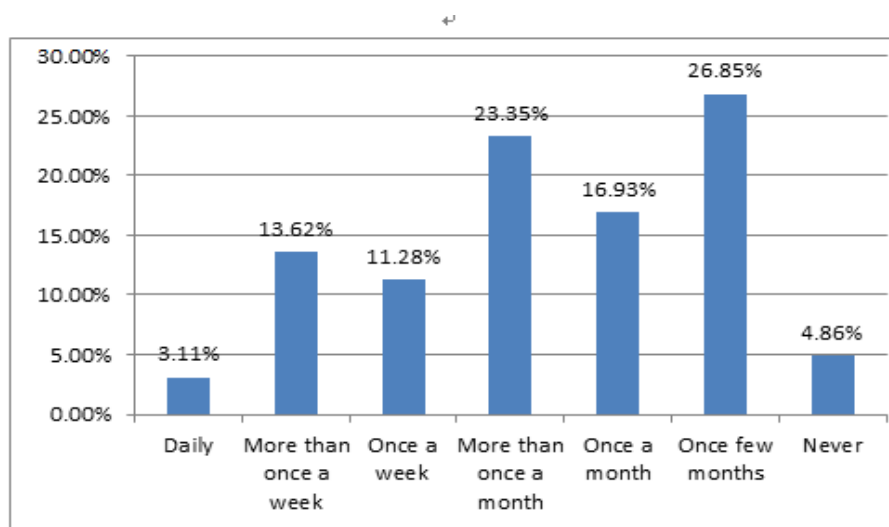


Figure 4.2 Summary of respondent frequency of eating beef

Figure 4.3 Summary of respondent shopping place for purchasing beef

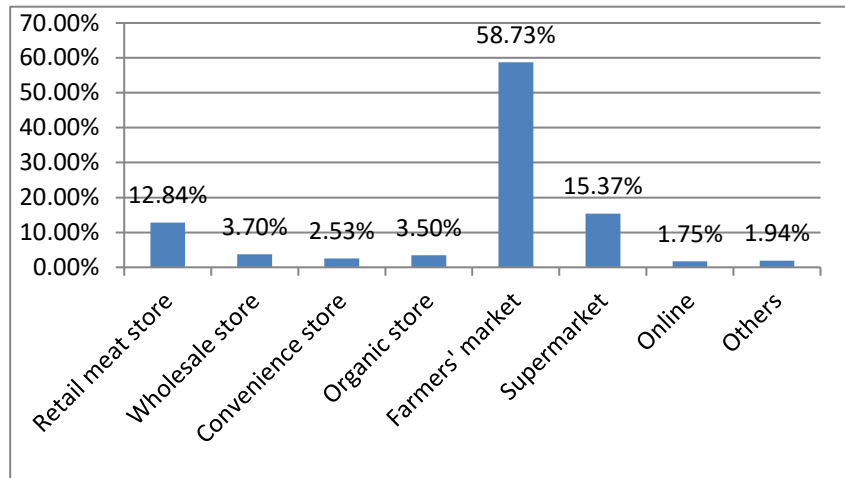


Figure 4.3 shows farmers markets (wet markets) were where most of the survey participants (58.37%) purchased beef; 15.37% of respondents bought beef at a supermarket most frequently, and purchasing at a retail meat store was the third highest with 12.84%. The lowest proportion of beef purchases was "online shopping" with 1.75% of respondents using this method.

As Table 4.6 shows, the proportions of frequent buyers of each type of beef were very similar with 10.5% purchasing chilled vacuum-sealed beef, 10.31% chilled cling-wrapped beef, 10.7% chilled cut-ready unwrapped beef, 11.09% chilled un-cut beef, 11.48% un-chilled uncut beef and 11.28% un-chilled cut-ready beef. Interestingly, in the "once every few months" column, respondent purchasing frequencies on different types of beef are also very close, with a range from 24.32% to 29.83%. Additionally, in the column of "never," no number is significantly different to the others, which makes it hard to indicate which kind of beef takes a smaller market, although chilled meat, vacuum sealed and cling wrapped appear to be the least preferred meat to purchase. There were only a small number of respondents who were frequent beef buyers (daily and weekly buyers) of all types of beef.

Table 4.6 Summary of respondent frequency in purchasing different type of beef

How often do you purchase the following types of beef?	Daily	Weekly	More than once a month	Once a month	Once every few months	Never	Total
A: Chilled vacuum-sealed beef	3.89% 20	6.61% 34	13.42% 69	13.23% 68	29.83% 151	33.46% 172	100% 514
B: Chilled cling wrapped beef	3.31% 17	7.00% 36	10.89% 56	9.53% 49	24.32% 125	44.94% 231	100% 514
C: Chilled cut-ready unwrapped beef	4.86% 25	5.84% 30	8.37% 43	9.34% 48	27.24% 140	44.36% 228	100% 514
D: Chilled un-cut beef	4.67% 24	6.42% 33	8.75% 45	8.95% 46	24.51% 126	46.69% 240	100% 514
E: Un-chilled uncut beef	4.09% 21	7.39% 38	12.06% 62	13.23% 68	29.96% 154	33.27% 171	100% 514
F: un-chilled cut-ready beef	4.67% 24	6.61% 34	11.28% 58	9.92% 51	29.18% 150	38.33% 197	100% 514

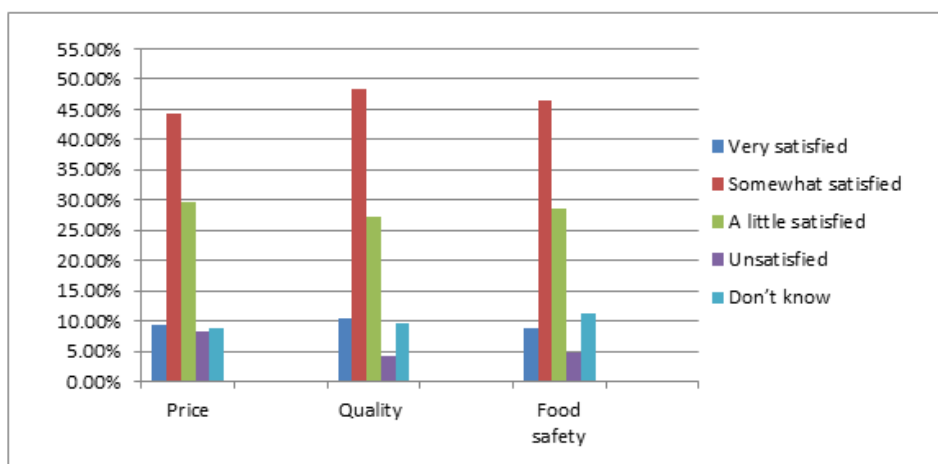


Figure 4.4 Summary of respondents' satisfaction level on the three attributes of currently purchased beef.

The satisfaction levels for price, quality and food safety were all very similar, with the exception of the “unsatisfied” group for price which was around twice that for quality and food safety (Figure 4.4). For price, quality and food safety, close to half the respondents were somewhat satisfied (48.44% for quality, 46.5% for food safety, and 44.16% for price). The second highest satisfaction level was “a little satisfied”, and around 1/3 of total respondents expressed little satisfaction. Those grading the three attributes as “very satisfied” represented around 10% of respondents.

Overview of consumer trust in LAB preserved beef and willingness to buy

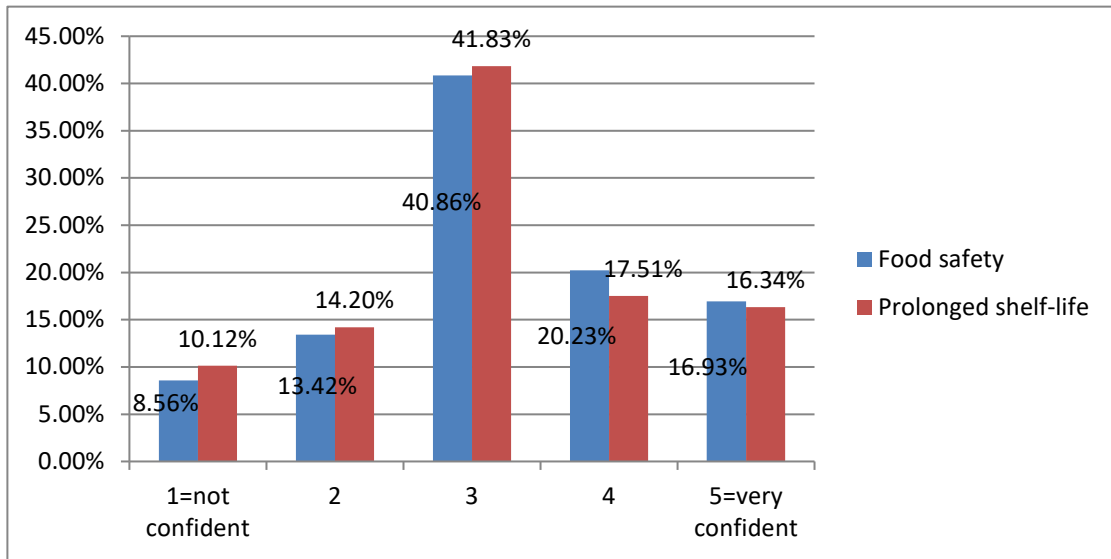


Figure 4.5 Summary of respondent confidence level in the food safety and prolonged shelf-life of LAB beef

As shown in Figure 4.5, the response to questions around confidence in the food safety and prolonged shelf-life of LAB beef were both close to a normal distribution with a mean mid-way between “not confident” and “very confident”. The means of trust in food safety and extended shelf-life are 3.24 and 3.16 respectively, which are both numerically a little higher than the median of 3. These results suggest a reasonable level of confidence in the food safety of LAB beef, with more than 70% of respondents providing a score of 3 or greater.

Figure 4.6 shows that although respondent purchase intention for LAB beef varies, there is still a large group of “somewhat likely” which makes up a substantial proportion of total respondents at 59.14%. The number of respondents who don’t know how willing they are to purchase LAB beef is 22.75%. The group who had a clear purchase intention (very likely) made up 14.59% of respondent, while a small remainder, 3.7% of respondents, were not willing to buy LAB beef.

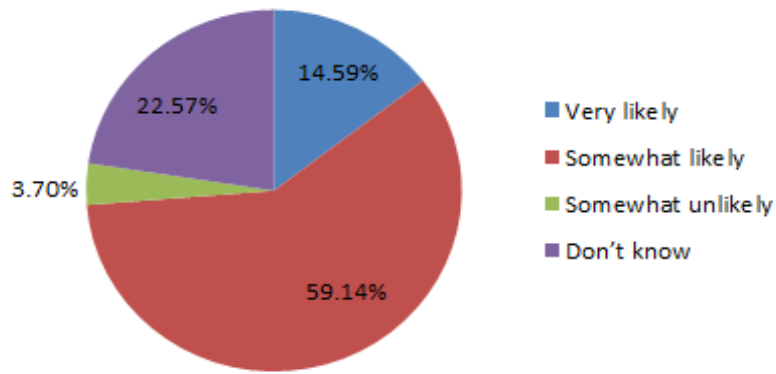


Figure 4.6 Summary of respondent willingness level to purchase LAB beef.

4.3 Data reliability and validity tests

Table 4.7 shows that Cronbach's α for all thirty-four observed variables related to the establishment of confidence regarding LAB beef and the level of willingness to buy are over 0.8. It also shows that the AVE values for most variables are larger than 0.5, with only "Heard of Lactic Acid Bacteria before doing this survey?" (0.484), the value of "Frequency of eating beef" (0.435), and the value for "Most often purchased beef place" (0.435) are slightly lower than 0.5 thresholds. The values of Cronbach's α and AVE generally indicate that the data with respect to the observed variables are reliable and valid for further analysis.

Table 4.7: Summary of data reliability and validity test

Observed Variables	AVE	Cronbach's □
Concern Level on Food Safety Issues (Food Hygiene)	.647	.897
Concern Level on Food Safety Issues (Food Poisoning)	.648	.897
Concern Level on Food Safety Issues (Food Additives)	.778	.897
Concern Level on Food Safety Issues (Expiry Date)	.708	.898
Concern Level on Food Safety Issues (Residue of Hormones, Steroids, etc.)	.785	.898
Concern Level on Food Safety Issues (Genetically Modified Food)	.638	.897
Concern Level on Food Safety Issues (The Feed Given to Livestock)	.551	.898
Concern Level on Food Safety Issues (Animal Disease)	.708	.898
Knowledge Level about Chemical Food Preservation	.673	.896
Knowledge Level about Health Risk Caused by Chemical Food Preservation	.694	.896
Knowledge Level about Physical Food Preservation	.709	.896
Knowledge Level about Biological Food Preservation	.699	.897
Heard of LAB Before This Survey?	.484	.900
The frequency of Using TV to Get Food Safety Knowledge	.657	.896
The frequency of Using Radio to Get Food Safety Knowledge	.517	.897
The frequency of Using Word of Mouth to Get Food Safety Knowledge	.650	.895
The frequency of Using Food Packaging to Get Food Safety Knowledge	.686	.895
The frequency of Using Online to Get Food Safety Knowledge	.695	.895
The frequency of Using Press Media to Get Food Safety Knowledge	.624	.895
The frequency of Eating Beef	.478	.895
Most Often Purchasing Beef Place	.435	.899
The frequency of Purchasing Chilled Vacuum-Sealed Beef	.646	.895
The frequency of Purchasing Chilled Cling Wrapped Beef	.760	.895
The frequency of Purchasing Chilled Cut-Ready Beef	.767	.895
The frequency of Purchasing Chilled Un-Cut Beef	.788	.895
The frequency of Purchasing Un-Chilled Un-cut Beef	.633	.896
The frequency of Purchasing Un-Chilled Cut-ready Beef	.605	.896
Satisfaction level of Current Purchased Beef on "Price" Attribute	.763	.897
Satisfaction level of Current Purchased Beef on "Quality" Attribute	.860	.897
Satisfaction level of Current Purchased Beef on "Food Safety" Attribute	.777	.897
Confidence Level on the "Food Safety" of LAB Preserved Chilled-Sealed Beef	.850	.906
Confidence Level on the "Prolonged Shelf Life" of LAB Preserved Chilled-Sealed Beef	.866	.906
Willingness Level to Buy LAB Preserved Chilled-Sealed Beef	.537	.899

4.4 Correlation between independent variables and trust

4.4.1 Association between socio-demographic factors and trust perception

Table 4.8 Association between socio-demographic factors and trust in LAB beef

Trust in food safety of LAB beef			Trust in the prolonged shelf-life of LAB beef		
Variables	γ	p	Variables	γ	p
Primary food shopper	0.194	0.003	Gender	0.150	0.025
No of Children	-0.109	0.053	Marriage	0.138	0.069
Marriage	0.107	0.166	Primary food shopper	0.116	0.083
Gender	0.105	0.117	No of Children	-0.111	0.053
Supermarket nearby?	0.078	0.223	Location of living	0.075	0.168
Location (city/town/village) of living	0.063	0.232	Supermarket nearby?	0.058	0.354
Income	-0.056	0.223	City of living	0.047	0.69
Education	-0.040	0.405	Income	-0.040	0.383
City of living	0.023	0.842	Age	-0.017	0.725
Career Type	-0.022	0.637	Career Type	-0.014	0.769
Age	0.002	0.97	Education	-0.006	0.9

Among all the socio-demographic factors, only the variable ‘primary food shopper’ has a moderate correlation with the trust in the food safety of LAB beef with $\gamma = 0.194$ being significant ($p = 0.003$). The positive correlation suggests that the primary food shopper has relatively high confidence, whereas a non-primary food shopper tends to have a lower level of confidence in the food safety of LAB beef. The γ values and significance levels ($p > 0.05$) of other socio-demographic factors indicate they all made very little difference in trust in the food safety of LAB beef. In terms of the trust in the prolonged shelf-life of LAB beef, only gender has a moderate correlation with it with $\gamma = 0.15$ ($p = 0.025$). This result suggests females place somewhat higher trust in the prolonged shelf-life of LAB, whereas males have less confidence. None of the remaining variables has a significance level below 0.05, which indicates there is no significant correlation between each of them and

confidence in the prolonged shelf-life of LAB beef. Through doing a further correlation analysis it was found that gender had a significant moderate correlation with the role of primary food shopper with $\gamma=0.187$ ($p = 0.037$). This result suggests that in a family, Chinese females tend to take the role of primary food shopper more than males.

The results shown in the table above are inconsistent with previous research that consumer's age, gender, education level, income as well as family structure more or less play roles in consumers' acceptance on new food product, however, when considering the difference on races in the literature reviewed, some were based on western society, and the different product attributes compared with the food products studied in previous research, this could help explain these inconsistencies.

4.4.2 Association between the eating/consumption/ purchase place habits and trust perceptions

In Table 4.9, in regards to trust in the food safety of LAB beef, the purchase place, frequency of eating and frequency of purchasing un-chilled un-cut beef made very little difference to consumer trust, with low correlations $\gamma = 0.096$, $p = 0.093$; $\gamma = 0.094$, $p = 0.069$ and $\gamma=0.088$, $p = 0.077$. This result indicates consumers who purchase at different places and who have a different frequency of eating and purchasing un-chilled un-cut beef tend to have a similar level of trust.

Table 4.9 Association between personal habits and trust perception

Trust in food safety of LAB beef			Trust in the prolonged shelf-life of LAB beef		
Variables	γ	p	Variables	γ	p
Frequency of Purchasing Chilled Cling Wrapped Beef	0.21	0.000	Frequency of Purchasing Chilled Cling Wrapped Beef	0.226	0.000
The frequency of Purchasing Chilled Un-Cut Beef	0.194	0.000	Frequency of Purchasing Chilled Vacuum-Sealed Beef	0.214	0.000
Frequency of Purchasing Chilled vacuum-sealed Beef	0.171	0.001	The frequency of Purchasing Chilled Un-Cut Beef	0.177	0.001
The frequency of Purchasing Chilled Cut-Ready Beef	0.147	0.006	The frequency of Purchasing Chilled Cut-Ready Beef	0.143	0.007
The frequency of Purchasing Un-Chilled Cut-ready Beef	0.133	0.011	Frequency of eating	0.111	0.019
Purchase place	0.096	0.063	The frequency of Purchasing Un-Chilled Cut-ready Beef	0.11	0.034
Frequency of eating	0.094	0.069	The frequency of Purchasing Un-Chilled Un-cut Beef	0.078	0.12
The frequency of Purchasing Un-Chilled Un-cut Beef	0.088	0.077	Purchase place	0.063	0.263

The positive γ and p values of the frequencies of purchasing other different types of beef indicate a relatively stronger positive correlation with the trust in the food safety of LAB beef. The more frequently consumers purchase beef, the safer they perceive the food safety of LAB beef. The frequencies of purchasing chilled cut-ready beef ($\gamma = 0.147$), purchasing un-chilled un-cut beef ($\gamma = 0.088$) and purchasing un-chilled cut-ready beef ($\gamma = 0.133$) suggest these have a moderate impact on the perception of the safety of LAB beef. The three other Gamma levels representing chilled cling wrapped beef, chilled uncut beef and chilled vacuum sealed beef suggest purchasing

chilled cling wrapped beef has the strongest impact on consumer trust in the food safety of LAB beef.

The results are similar for trust in the prolonged shelf-life of LAB beef. The values of γ (0.078 and 0.063) and p (0.12 and 0.263) of frequency of purchasing un-chilled un-cut beef and purchase place, respectively, indicate they both have weak positive correlations with the trust in the prolonged shelf-life. Like the correlations with trust in the food safety of LAB beef, the frequencies of purchasing chilled vacuum sealed beef ($\gamma = 0.214$, $p < 0.001$), chilled cling wrapped beef ($\gamma = 0.226$, $p < 0.001$) and chilled un-cut beef ($\gamma = 0.177$, $p < 0.001$) have a more significant positive correlation with the trust in the prolonged shelf-life of LAB beef than the other three variables. These results indicate consumers who are the frequent buyers of these three types of beef tend to have a higher confidence in the prolonged shelf-life of LAB beef.

4.4.3 Association between knowledge level and trust perception

Table 4.10 Association between knowledge levels and trust perception

Trust in food safety of LAB beef			Trust in the prolonged shelf-life of LAB beef		
Variables	γ	p	Variables	γ	p
Knowledge level of biological preservation	0.302	0.000	Knowledge level of the chemical preservatives	0.307	0.000
Knowledge level of physical preservations	0.297	0.000	Knowledge level of Physical preservations	0.296	0.000
Knowledge level of the chemical preservatives	0.281	0.000	Knowledge level of biological preservation	0.266	0.000
Health risk caused by chemical preservatives	0.247	0.000	Health risk caused by chemical preservatives	0.249	0.000

As shown in Table 4.10, with respect to trust in the food safety of LAB beef, the knowledge of the three preservation technologies and knowledge of the health risks of chemical preservatives all have significant positive correlations with trust. This

indicates that consumers who have more knowledge about preservation technologies and health risks are more likely to perceive the food safety of LAB beef to be high. Among the four variables, the strongest correlation with trust in the food safety of LAB is the knowledge level of biological preservation, with $\gamma = 0.302$ ($p < 0.001$). For trust in the prolonged shelf-life of LAB beef, all γ values suggest a positive correlation between these four independent variables and the trust in the prolonged shelf-life of LAB beef and indicate that the more knowledge consumers have on these four factors, the higher trust they have in the prolonged shelf-life of LAB. The knowledge of chemical preservation has the strongest correlation with trust in LAB beef, with $\gamma = 0.307$ ($p < 0.001$).

4.4.4 Association between satisfaction levels on the type of beef currently purchased and trust perception

Table 4.11 Association between satisfaction levels on the currently purchased beef and trust perception

Trust in the food safety of LAB beef			Trust in the prolonged shelf life of LAB beef		
Variables	γ	p	Variables	γ	p
Satisfaction on the quality	0.477	0.000	Satisfaction on the price	0.467	0.000
Satisfaction on the safety	0.449	0.000	Satisfaction on the quality	0.453	0.000
Satisfaction on the price	0.447	0.000	Satisfaction on the safety	0.449	0.000

The correlations between satisfaction level of the currently purchased beef and trust perception are presented in Table 4.11. The results suggest all three attributes have a significant positive correlation with trust, which means the higher the satisfaction consumers have with the type of beef currently purchased, the higher the safety and prolonged shelf-life they perceive from LAB beef. Consumer satisfaction on quality

has the highest correlation with the trust in the safety of LAB beef with $\gamma = 0.477$ ($p < 0.001$); the factor which has the strongest correlation with trust in prolonged shelf-life is satisfaction on the price with $\gamma = 0.467$ ($p < 0.001$).

4.4.5 Association between concern levels and trust perception

Table 4.11 shows the association between consumer concerns about general food safety and the trust in LAB beef. In the analysis of the safety of LAB beef, the γ values and P values for each variable indicate they all had significant negative correlations with trust perception. These results suggest that the more concerns consumers have over general food safety issues, the less confidence they have in the safety of LAB beef. Consumers may consider LAB as a conventional preservation additive which may slowly release toxins and remain on food based on their past experience; consumer concerns on residue has the highest negative correlation with the trust with $\gamma = -0.279$ ($p < 0.001$) followed by consumer concern on food additives with $\gamma = -0.214$ ($p < 0.001$). The other four variables having a significant correlation, in descending order, are: concerns on the feed given to livestock with $\gamma = -0.183$ ($p=0.001$), concerns on the expiry date with a $\gamma=-0.170$ ($p=0.001$), concerns on hygiene with a $\gamma = -0.166$ ($p = 0.002$), and concerns on poisoning with a $\gamma = -0.147$ ($p = 0.005$).

With respect to trust in the prolonged shelf-life of LAB beef, all the variables have significant negative correlations with trust, which again indicates concerns consumers have based on their recalling past food safety issues which could strongly reduce consumer confidence in the prolonged shelf-life of LAB beef.

Among the eight concerns listed, consumers concerns on residues and food additives dominate once again with $\gamma = -0.289$ ($p < 0.001$) and $\gamma = -0.23$ ($p < 0.001$). However, while the trend is the same as for the correlation with the safety of LAB beef, there are some slight differences in the order of variables of concern related to shelf life compared with safety (see Table 4.11).

Table 4.12 Association between consumer concerns and trust perception

Trust in food safety of LAB beef			Trust in the prolonged shelf-life of LAB beef		
Variables	γ	p	Variables	γ	p
Concerns on residue	-0.279	0.000	Concerns on residue	-0.289	0.000
Concerns on food additives	-0.214	0.000	Concerns on food additives	-0.23	0.000
Concerns on feed given to livestock	-0.183	0.001	Concerns on hygiene	-0.196	0.000
Concerns on an expiry date	-0.17	0.001	Concerns on feed given to livestock	-0.19	0.000
Concerns on hygiene	-0.166	0.002	Concerns on poisoning	-0.186	0.000
Concerns on poisoning	-0.147	0.005	Concerns on genetically modified	-0.177	0.001
Concerns on genetically modified	-0.145	0.007	Concerns on animal disease	-0.167	0.002
Concerns on animal disease	-0.134	0.013	Concerns on an expiry date	-0.166	0.002

4.4.6 Association between media exposure and trust perception

Table 4.13 Association between media exposure and trust perception

Trust in the food safety of LAB beef			Trust in the prolonged shelf life of LAB		
Variables	γ	p	Variables	γ	p
The frequency of using paper media	0.221	0.000	The frequency of using Radio	0.228	0.000
The frequency of using Radio	0.218	0.000	The frequency of using paper media	0.223	0.000
The frequency of using TV	0.164	0.001	The frequency of using TV	0.181	0.000
The frequency of using word of mouth	0.163	0.001	The frequency of using word of mouth	0.158	0.001
The frequency of using online	0.124	0.013	The frequency of using food packaging	0.126	0.008
The frequency of using food packaging	0.099	0.041	The frequency of using online	0.116	0.018

The results of γ values of each media format shown in Table 4.12 indicate they all have positive correlations with the two trust variables, which suggests that higher media exposure benefits both the perception of safety and prolonged shelf-life. Food packaging and online both had the lowest level of correlations with the two trust dimensions. As to the trust in the safety of LAB beef, frequency of using food packaging has a $\gamma = 0.099$ ($p = 0.041$), while using online media has a $\gamma = 0.124$ ($p = 0.013$). As to the trust in the prolonged shelf-life of LAB beef, frequency of using food packaging has a relatively higher correlation with a $\gamma = 0.126$ ($P=0.008$). Note that the correlation of frequency of using online is smaller than that in the food safety dimension with a $\gamma = 0.116$ ($p = 0.116$). The top two media sources which have the strongest correlations with the two trust dimensions are radio and paper media with a $\gamma = 0.218$ ($p < 0.001$) and 0.221 ($p < 0.001$), respectively, in the trust in the food safety of LAB beef, and $\gamma = 0.228$ ($p < 0.001$) and 0.223 ($p < 0.001$), respectively, in trust in prolonged shelf-life. Although television is facing a huge challenge of being replaced, it appears that it still plays a significant role in the establishment of the two trusts in safety and shelf life of LAB beef. Word of mouth is another efficient media source in providing information about safety and shelf life.

4.5 Section Summary

In this section, the association between the independent variables and the two trust dimensions were examined separately through measuring the value of Gamma coefficients. The level of correlation strengths are divided into three levels: a high γ value (absolute value) greater than 0.2, a medium γ value (absolute value) ranges from

0.1 to 0.199, and a low γ value (absolute value) less than 0.1 (see Table 4.13 below).

Generally speaking, consumer satisfaction level on current beef purchased has the strongest influences on the trust in LAB beef, while Consumer knowledge of different preservation technologies and part of their general food safety concerns play big roles in influencing consumer trust in LAB beef.

Table 4.14: Summary of different levels of association between independent variables and the dependent variable (trust in the food safety of LAB beef)

	Independent Variables	γ	p	Variable Group
High (Gamma a) ≥ 0.2	Satisfaction on the quality	0.477	0.000	Satisfaction group
	Satisfaction on the food safety	0.449	0.000	Satisfaction group
	Satisfaction on the price	0.447	0.000	Satisfaction group
	Knowledge of biological preservation	0.302	0.000	Knowledge group
	Knowledge of physical preservations	0.297	0.000	Knowledge group
	Knowledge of the chemical preservative	0.281	0.000	Knowledge group
	Concerns on residue	-0.279	0.000	Concerns group
	Health risk caused by chemical preservatives	0.247	0.000	Knowledge group
	The frequency of using press	0.221	0.000	Media exposure
	The frequency of using Radio	0.218	0.000	Media exposure
	Concerns on food additives	-0.214	0.000	Concerns group
	Frequency of Purchasing Chilled Cling Wrapped Beef	0.21	0.000	Purchase frequency
Medium (0.2 > Gamma ≥ 0.1	Primary food shopper	-0.194	0.003	Socio-demographic
	The frequency of Purchasing Chilled Un-Cut Beef	0.194	0.000	Purchase frequency
	Concerns on feed given to livestock	-0.183	0.001	Concerns group
	Frequency of Purchasing Chilled Vacuum-Sealed Beef	0.171	0.001	Purchase frequency
	Concerns on an expiry date	-0.17	0.001	Concerns group
	Concerns on hygiene	-0.166	0.002	Concerns group
	The frequency of using TV	0.164	0.001	Media exposure
	The frequency of using word of mouth	0.163	0.001	Media exposure
	The frequency of Purchasing Chilled Cut-Ready Beef	0.147	0.006	Purchase frequency
	Concerns on poisoning	-0.147	0.005	Concerns group
	Concerns on genetically modified	-0.145	0.007	Concerns group
	Concerns on animal disease	-0.134	0.013	Concerns group
	The frequency of Purchasing Un-Chilled Cut-ready Beef	0.133	0.011	Purchase frequency

	The frequency of using online	0.124	0.013	Media exposure
	No of Children	-0.109	0.053	Socio-demographic
	Marriage	0.107	0.166	Socio-demographic
	Gender	0.105	0.117	Socio-demographic
Low (Gamma a <0.1	The frequency of using food packaging	0.099	0.041	Media exposure
	Most often purchased place	0.096	0.093	Purchase venue
	Frequency of eating	0.094	0.049	Eating group
	The frequency of Purchasing Un-Chilled Un-cut Beef	0.088	0.077	Purchase frequency
	Supermarket nearby?	-0.078	0.223	Socio-demographic
	Location of living	0.063	0.232	Socio-demographic
	Income	-0.056	0.223	Socio-demographic
	Education	-0.04	0.405	Socio-demographic
	City of living	0.023	0.723	Socio-demographic
	Career Type	-0.022	0.412	Socio-demographic
	Age	0.002	0.97	Socio-demographic

Table 4.15: Summary of different levels of association between independent variables and trust in the prolonged shelf-life of LAB beef

	Independent Variables	γ^2	p	Group of Variables
High ($\Gamma \geq 0.2$)	Satisfaction on the price	0.467	0.000	Satisfaction group
	Satisfaction on the quality	0.453	0.000	Satisfaction group
	Satisfaction on the food safety	0.449	0.000	Satisfaction group
	Knowledge of the chemical preservative	0.307	0.000	Knowledge level group
	Knowledge of physical preservations	0.296	0.000	Knowledge level group
	Concerns on residue	-0.289	0.000	Concerns group
	Knowledge of biological preservation	0.266	0.000	Knowledge level group
	Knowledge of health risk caused by chemical preservatives	0.249	0.000	Knowledge level group
	Concerns on food additives	-0.23	0.000	Concerns group
	The frequency of using Radio	0.228	0.000	Media exposure group
	Frequency of Purchasing Chilled Cling Wrapped Beef	0.226	0.000	Purchase frequency
	The frequency of using press	0.223	0.000	Media exposure group
	Frequency of Purchasing Chilled Vacuum-Sealed Beef	0.214	0.000	Purchase frequency
	Medium ($0.2 > \Gamma \geq 0.1$)	Concerns on hygiene	-0.196	0.000
Concerns on feed given to livestock		-0.19	0.000	Concerns group
Concerns on poisoning		-0.186	0.000	Concerns group
The frequency of using TV		0.181	0.000	Media exposure group
The frequency of Purchasing Chilled Un-Cut Beef		0.177	0.001	Purchase frequency
Concerns on genetically modified		-0.177	0.001	Concerns group
Concerns on animal disease		-0.167	0.002	Concerns group
Concerns on an expiry date		-0.166	0.002	Concerns group
The frequency of using word of mouth		0.158	0.001	Media exposure group
Gender		0.15	0.025	Socio-demographic
The frequency of Purchasing Chilled Cut-Ready Beef		0.143	0.007	Purchase frequency
Marriage		0.138	0.069	Socio-demographic
The frequency of using food packaging		0.126	0.008	Media exposure group
Primary food shopper		-0.116	0.083	Socio-demographic
The frequency of using online		0.116	0.018	Media exposure group
No of Children		-0.111	0.053	Socio-demographic
Frequency of eating		0.111	0.019	Eating group
The frequency of Purchasing Un-Chilled Cut-ready Beef	0.11	0.034	Purchase frequency	
Low	The frequency of Purchasing Un-Chilled Un-cut Beef	0.078	0.12	Purchase frequency
	Location of living	0.075	0.168	Socio-demographic

(Gamma <0.1	Most often purchased place	0.063	0.263	Purchase venue
	Supermarket nearby?	-0.058	0.354	Socio-demographic
	City of living	0.047	0.082	Socio-demographic
	Income	-0.04	0.383	Socio-demographic
	Age	-0.017	0.725	Socio-demographic
	Career Type	-0.014	0.298	Socio-demographic
	Education	-0.006	0.9	Socio-demographic

4.6 Results of structural equation model analysis

4.6.1 Principal component analysis (PCA)

Principal component analysis (PCA) for socio-demographic factors

According to Hair *et al.* (2005), when the value of KMO (Kaiser-Meyer-Olkin) is greater than 0.6, and Bartlett index is less than 0.05, the data is suitable for principal component analysis. In the factor analysis below, KMO=0.667, $p < 0.001$, indicating PCA is applicable for socio-demographic factors. As shown in Table 4.16, education level (-0.795), household income (-0.794) and location of living (0.768) loaded substantially heavier than other factors and other factors all less than 0.5, therefore the first principal component can be represented by these three variables and named as Socio-economic status. In the second component, only age loaded heavily with 0.816, with other loading values less than 0.5, therefore, the representative variable of the second component named as Age.

Supermarket nearby and primary food shopper loaded heavily in component 3, the loading value of other factors were much lower than these two, therefore the third component can be represented by supermarket nearby and primary food shopper and named it as Shopping Factor. Marital status and number of dependent children loaded significantly heavier than other variables in the fourth component with -0.628 and 0.786 respectively .while none of the remaining variables had loading values

higher than 0.5; therefore, number of dependent children and marital status were the principal variables in the fourth component, named it as Family status. Lastly, in Component 5 gender was the only variable which had loading value bigger than 0.5 while the loading value of other variables was much lower than 0.5. Thus, component 5 was named as Gender. Career type and city of living will be eliminated in further discussion as they have not loaded heavily (>0.5) on any of the principal components (see Table 4.16 below)

Principal component analysis for other observed independent variable

	Rotated Component Matrix				
	Socio-econ omic status	Age	Shopping Factor	Family status	Gender
Gender	.053	.119	.019	-.032	.920
Age	-.023	.816	-.109	-.026	.231
Education Level	-.795	-.148	.087	-.051	-.011
Marital Status	.118	-.456	-.097	-.628	.182
Number of Dependent Children under 18	.099	-.144	-.124	.786	.044
Annual Household Income	-.794	.189	.019	.070	.052
Career Type	.416	.446	.285	-.068	-.276
City Of Living	.420	-.334	.348	.372	.085
Location of Living	.768	.048	.254	.115	.114
Any Supermarket or Retail Store Selling Chilled Beef Nearby	.126	.140	.763	-.017	-.150
Primary Food Shopper	-.073	-.344	.665	-.068	.268
Variance explained	20.45%	12.87 %	12.15%	10.76%	10.26%

The other observed variables were subjected to exploratory factor analysis in order to determine whether these data are suitable for principal component analysis. The results of KMO (0.911) and Bartlett's p value < 0.001 , both indicate that principal component analysis is applicable in the study.

Table 4.17: Factor analysis of other observed independent variables

Variable Names	Rotated Component Matrix						
	1	2	3	4	5	6	7
Concern Level on Food Safety Issues (Food Hygiene)	.786	.045	.041	.122	.060	.076	-.018
Concern Level on Food Safety Issues (Food Poisoning)	.780	.073	.036	.001	.081	.006	.161
Concern Level on Food Safety Issues (Food Additives)	.867	-.008	.109	.090	.043	.065	-.002
Concern Level on Food Safety Issues (Expiry Date)	.824	.035	.023	-.035	.095	-.030	.125
Concern Level on Food Safety Issues (Residue of Hormones, Steroids, etc.)	.870	-.034	.044	.103	.028	.097	-.058
Concern Level on Food Safety Issues (Genetically Modified Food)	.786	.058	.094	.036	.048	.018	-.065
Concern Level on Food Safety Issues (The Feed Given to Livestock)	.711	.110	.038	.068	.086	.110	-.085
Concern Level on Food Safety Issues (Animal Disease)	.836	.026	.004	-.007	.042	-.018	.082
Knowledge Level about Chemical Food Preservation	.123	.193	.185	.130	.726	-.170	.118
Knowledge Level about Health Risk Caused by Chemical Food Preservation	.130	.158	.219	.123	.764	-.061	.031
Knowledge Level about Physical Food Preservation	.122	.164	.188	.259	.750	-.048	-.001
Knowledge Level about Biological Food Preservation	.083	.168	.205	.171	.764	-.075	.055
Heard of LAB Before This Survey?	.156	-.144	.328	.218	.102	.247	-.461
The frequency of Using TV to Get Food Safety Knowledge	.014	.157	.761	.106	.194	-.045	.032
The frequency of Using Radio to Get Food Safety Knowledge	-.031	.338	.517	-.018	.208	-.187	.237
The frequency of Using Word of Mouth to Get Food Safety Knowledge	.039	.204	.733	.154	.154	-.024	.144
The frequency of Using Food Packaging to Get Food Safety Knowledge	.101	.165	.773	.153	.159	.024	-.036
The frequency of Using Online to Get Food Safety Knowledge	.171	.136	.762	.205	.089	.009	-.128
The frequency of Using Press Media to Get Food Safety Knowledge	.028	.341	.647	.033	.181	-.169	.160
The frequency of Eating Beef	.148	.507	.338	.274	.057	.075	-.042
Most Often Purchasing Beef Place	.076	.324	.179	.011	.090	-.050	.530
The frequency of Purchasing Chilled Vacuum-Sealed Beef	.035	.744	.198	.028	.171	-.140	-.056
The frequency of Purchasing Chilled Cling Wrapped Beef	.036	.824	.144	.014	.177	-.148	-.079

The frequency of Purchasing Chilled Cut-Ready Beef	.034	.851	.125	.018	.132	-.078	-.038
The frequency of Purchasing Chilled Un-Cut Beef	.047	.861	.155	.033	.097	-.092	.029
The frequency of Purchasing Un-Chilled Un-cut Beef	.049	.725	.143	.152	.081	.102	.212
The frequency of Purchasing Un-Chilled Cut-ready Beef	.035	.686	.135	.193	.055	.104	.253
Satisfaction level of Current Purchased Beef on "Price" Attribute	.107	.155	.132	.799	.174	-.201	.031
Satisfaction level of Current Purchased Beef on "Quality" Attribute	.108	.102	.157	.871	.149	-.154	.094
Satisfaction level of Current Purchased Beef on "Food Safety" Attribute	.070	.131	.184	.807	.225	-.120	.070
Trust Level on the "Food Safety" of LAB Preserved Chilled-Sealed Beef	.147	-.071	-.061	-.283	-.146	.847	-.007
Trust Level on the "Prolonged Shelf Life" of LAB Preserved Chilled-Sealed Beef	.171	-.070	-.076	-.266	-.146	.857	.004
Variance Explained	16.6%	15.4%	11%	8.4%	7.9%	5.6%	3.6%

The Table 4.17 shows the results from a Rotated Component Matrix, where the overall variables are divided into seven principal components. In Component 1, the eight concern levels for safety issues are more substantial than other variables; therefore Component 1 is named as Concern Complex. Component 2 is influenced heavily by the frequency of purchasing a different type of beef and rate of eating beef, accordingly Component 2 is named the Consuming Complex. In Component 3 all the variables covering the frequency of using media channels loaded heavily, therefore Component 3 is named the Media Complex. Satisfaction levels on the three attributes of beef currently purchased had by far the highest loadings in Component 4 and accordingly Component 4 is named the Satisfaction Complex. In Component 5 the knowledge level for different preservation techniques is dominant; therefore Component 5 is named as the Knowledge Complex. Component 6 relates to the levels of trust and is named the Trust Complex. Component 7 relates to the place of purchase, therefore Component 7 is named as Purchase place. A further variable, "Heard of

Lactic Acid Bacteria before this survey” did not fit into any of these principal components; therefore, this variable will be eliminated from the further discussion.

Table 4.18: Summary of Principal Component Factor Analysis

Principal Names	Heavy loading variables	Loading Value	Re-naming
Component 1	Concern Level on Food Safety Issues (Food Hygiene)	0.79	Concern Complex
	Concern Level on Food Safety Issues (Food Poisoning)	0.778	
	Concern Level on Food Safety Issues (Food Additives)	0.868	
	Concern Level on Food Safety Issues (Expiry Date)	0.821	
	Concern Level on Food Safety Issues (Residue of Hormones, Steroids, etc.)	0.873	
	Concern Level on Food Safety Issues (Genetically Modified Food)	0.786	
	Concern Level on Food Safety Issues (The Feed Given to Livestock)	0.713	
	Concern Level on Food Safety Issues (Animal Disease)	0.836	
Component 2	The frequency of Eating Beef	0.507	Consuming Complex
	The frequency of Purchasing Chilled Vacuum-Sealed Beef	0.744	
	The frequency of Purchasing Chilled Cling Wrapped Beef	0.824	
	The frequency of Purchasing Chilled Cut-Ready Beef	0.851	
	The frequency of Purchasing Chilled Un-Cut Beef	0.861	
	The frequency of Purchasing Un-Chilled Un-cut Beef	0.725	
	The frequency of Purchasing Un-Chilled Cut-ready Beef	0.686	
Component 3	The frequency of Using TV to Get Food Safety Knowledge	0.761	Media Complex
	The frequency of Using Radio to Get Food Safety Knowledge	0.517	
	The frequency of Using Word of Mouth to Get Food Safety Knowledge	0.733	
	The frequency of Using Food Packaging to Get Food Safety Knowledge	0.773	
	The frequency of Using Online to Get Food Safety Knowledge	0.762	

	Knowledge		
	The frequency of Using Press Media to Get Food Safety Knowledge	0.647	
Component 4	Satisfaction level of Current Purchased Beef on "Price" Attribute	0.799	Satisfaction Complex
	Satisfaction level of Current Purchased Beef on "Quality" Attribute	0.871	
	Satisfaction level of Current Purchased Beef on "Food Safety" Attribute	0.807	
Component 5	Knowledge Level about Chemical Food Preservation	0.726	Knowledge Complex
	Knowledge Level about Health Risk Caused by Chemical Food Preservation	0.764	
	Knowledge Level about Physical Food Preservation	0.75	
	Knowledge Level about Biological Food Preservation	0.764	
Component 6	Trust Level on the "Food Safety" of LAB Preserved Chilled-Sealed Beef	0.847	Trust Complex
	Trust Level on the "Prolonged Shelf Life" of LAB Preserved Chilled-Sealed Beef	0.857	
Component 7	Most Often Purchasing Beef Place	0.53	Purchase place

4.6.2 Results from the mediation effect test of trust between independent variables and dependent variables

Structural equation modeling was undertaken to examine the relationship between representative components and the dependent variables, examining the mediation effect. By drawing the causal path diagram among representative components, mediator and dependent variable in AMOS, the system will firstly test the model fitness by calculation of the values of CFI, RMSEA and CIMIN/DF. When the proposed model fits, the system can progress to the calculation of a path coefficient along with the arrow indicating direction; the level of significance of causal path is also reported. Two kinds of path coefficients will be calculated (direct and indirect). The figures of path coefficients show the extent to which a change of one standard deviation of independent variables impacts on the standard deviation of the mediator

and dependent variable. For example, when the path coefficient between independent variable (X) and mediator (Z) or dependent variable (Y) is M, this means when independent X increases by 1 standard deviation, mediator(Z) or dependent variable (Y) will increase by $M \times (\text{standard deviation of Z or Y})$. By using SPSS, the mean and standard deviation of each principal component is shown in Table 4.19.

Table 4.19 Summary of mean and standard deviation of principal components

	Mean	Standard deviation
Concern complex	4.0601	0.80106
Knowledge complex	2.8526	0.71536
Satisfaction Complex	3.4981	0.78849
Media Complex	3.7040	0.68286
Consuming Complex	2.4814	1.15759
Purchase place	4.5175	1.61157
Socio-economic	2.9131	1.21
Age	2.6965	1.15187
Shopping factor	1.9640	0.48783
Family status	1.5953	0.505
Gender	1.4144	0.49310
Trust Complex	3.1965	1.11751

4.6.2.1 Past collaboration

Results of concern complex model

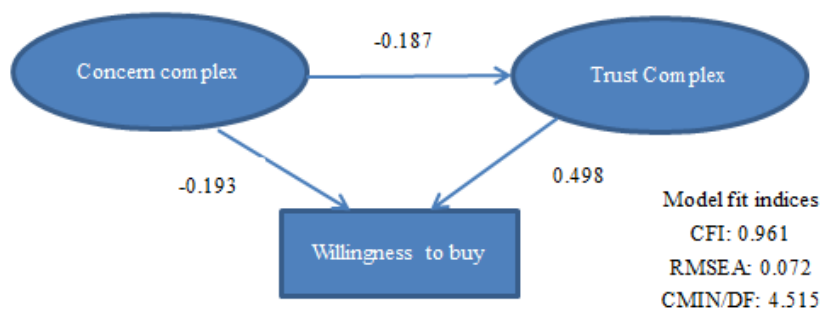


Figure 4.7 The path diagram of concern complex

Table 4.20: Summary of path coefficients of proposed concern complex model

Path coefficients	Standardized regression β (standardized direct effect)	p Value	Standardized indirect effect Y_{\square}	Standardized total effect $\lambda = (\beta + Y)$
Concern complex \rightarrow Trust	-0.187 (β_1)	***	0.000(Y_1)	-0.187 (λ_1)
Concern \rightarrow Willingness	-0.193 (β_2)	***	0.093(Y_2)	-0.1 (λ_2)
Trust \rightarrow Willingness	0.498 (β_3)	***	0.000(Y_3)	0.498 (λ_3)

*** = $p < 0.001$

Figure 4.7 confirms that the concern complex is suitable for structural equation modeling with CFI=0.961, RMSEA=0.08 and CMIN/DF=4.515. The first two paths shown in Table 4.19 indicate a significant negative impact of the concern complex on the establishment of trust complex and willingness to buy, with $\beta_1 = -0.187$ and $\beta_2 = -0.193$. However, the $Y_2 = 0.093$ suggests that although the concern complex had a negative direct impact on willingness to buy, when the trust complex worked as a mediator between the concern complex and willingness to buy, the concern complex could produce a positive indirect (mediated) impact. The total effect of the concern complex on willingness to buy therefore changed to -0.1 so that when the concern complex went up by 1 standard deviation, consumer purchase intention went down by -0.100 standard deviation. The value of $\beta_3 = 0.498$ and $p < 0.001$ indicate in the path of concern complex to trust complex and then to willingness to buy, that the trust complex had a significant positive influence on purchase intention. By combining the results of λ_2 and β_3 it can be shown that this model was heavily dependent on the mediation effect of trust.

Results of knowledge complex

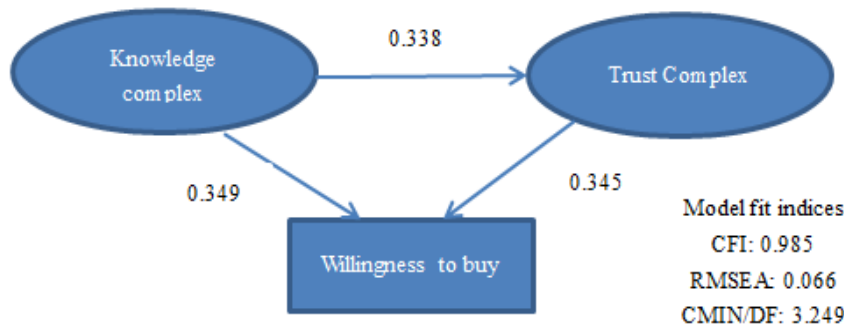


Figure 4.8 The path diagram of knowledge complex

Table 4.21: Summary of path coefficients of proposed knowledge complex model

Paths	Standardized regression β (standardized direct effect)	p Value	Standardized indirect effect Y	Standardized total effect $\lambda =$ ($\beta + Y$)
Knowledge complex \rightarrow Trust	0.338 (β_1)	***	0.000 (Y_1)	0.338 (λ_1)
Knowledge complex \rightarrow Willingness	0.349(β_2)	***	0.117 (Y_2)	0.466 (λ_2)
Trust complex \rightarrow Willingness	0.345 (β_3)	***	0.000 (Y_3)	0.345 (λ_3)

*** = $p < 0.001$

In this model, the three indices suggest this model is a good fit with CFI =0.985, RMSEA =0.066 and CMIN/DF =3.24. The direct effect coefficients $\beta_1=0.338$ and $\beta_2=0.349$ indicate the knowledge complex has a positive direct impact on the trust complex and willingness to buy. The trust complex has a positive influence on willingness to buy with $\beta_3 =0.345$ ($p < 0.001$). Also the value of $Y_2=0.117$ suggests that the knowledge complex also had an indirect impact on willingness to buy when the trust complex is mediated, which made the total effect of the knowledge complex to willingness to buy $\lambda_2=0.466$. This indicates that when the knowledge complex

increases by 1 standard deviation, the willingness to buy increases by 0.466 standard deviation. The value of $\beta_3 = 0.345$ ($p < 0.001$) suggests in this model, the trust complex also has a significant positive impact on willingness to buy. Results of β_2 , β_3 and λ_2 suggest apart from having a direct effect on willingness to buy, the knowledge complex also partially relied on the mediation effect of trust.

Results of satisfaction level

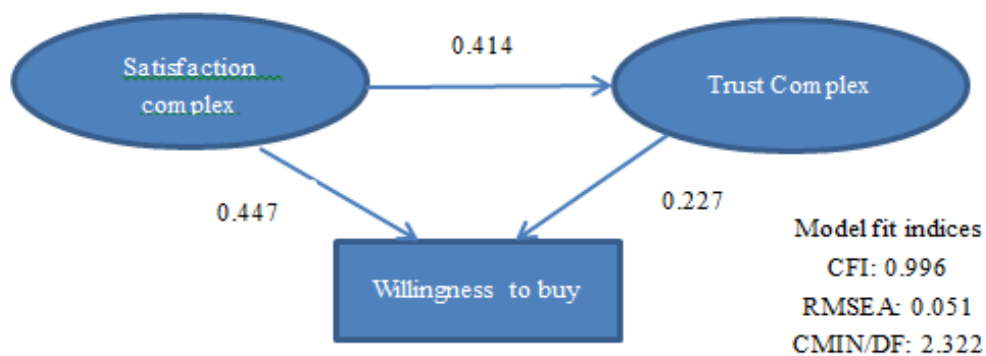


Figure 4.9 The path diagram of satisfaction complex

The results presented in Figure 4.9 indicate that this model fits well. The Satisfaction complex has a direct positive impact on the trust complex and willingness to buy with $\beta_1=0.414$ and $\beta_2=0.447$. The value of $\beta_3 = 0.277$ ($p < 0.001$) suggests when trust increases by 1 standard deviation, willingness to buy increases by 0.277 standard deviation. By taking the trust complex into consideration as a mediator, the satisfaction complex produced an additional indirect effect on willingness to buy with $Y_2 = 0.115$, which makes the total impact of satisfaction complex on willingness to buy $\lambda_2=0.562$, meaning that as the satisfaction complex increases by 1 standard deviation, the willingness to buy went up by 0.562 standard deviation. Similar to the

model with the knowledge complex, the satisfaction complex model was also partially dependent on the mediation effect of trust.

Table 4.22: Summary of path coefficients of proposed satisfaction complex model

Paths	Standardized regression β (standardized direct effect)	p Value	Standardized indirect effect Y	Standardized total effect $\lambda = (\beta + Y)$
Satisfaction complex \rightarrow Trust	0.414 (β_1)	***	0.000 (Y_1)	0.414 (λ_1)
Satisfaction complex \rightarrow Willingness	0.447 (β_2)	***	0.115 (Y_2)	0.562 (λ_2)
Trust complex \rightarrow Willingness	0.277 (β_3)	***	0.000 (Y_3)	0.277 (λ_3)

*** = $p < 0.001$

4.6.2.2 Results of media exposure

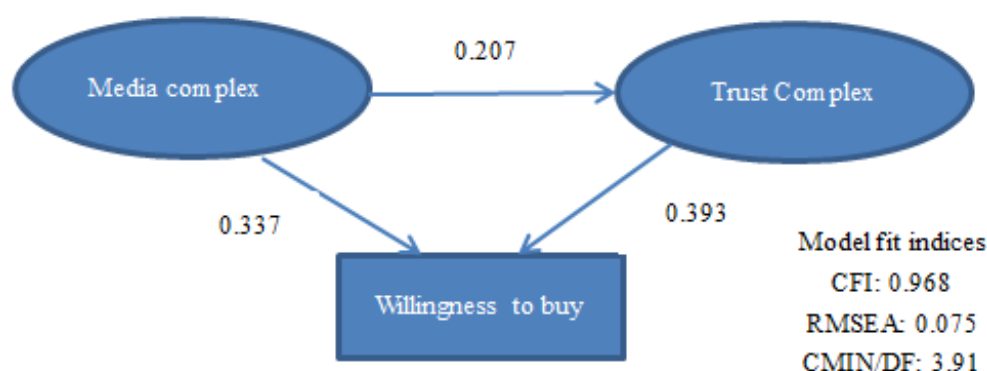


Figure 4.10 The path diagram of media complex

The results of Figure 4.10 confirm that the media complex fits the data well. As shown in Table 4.23, the value of β_1 , 0.207 and β_2 , 0.337 show that the media complex directly influences the trust complex and willingness to buy. Also the value of β_3 0.393, ($p < 0.001$) indicate the trust complex has a significant positive influence on willingness to buy. The value of Y_2 , 0.081, suggests that when the trust complex mediated between the media exposure complex and willingness to buy, the media

exposure complex had an additional indirect positive effect on willingness to buy. The total effect summed to 0.419, indicating that when the media complex increases by 1 standard deviation, the willingness to buy increases by 0.419 standard deviation. By combining the results of β_2 , λ_2 and β_3 , the media exposure complex has two paths to influence willingness to buy, one path was the direct impact and another path through the mediation effect of trust; therefore this proposed model also partially relied on the mediation effect of trust.

Table 4.23: Summary of path coefficients of proposed media exposure model

Paths	Standardized regression β (standardized direct effect)	p Value	Standardized indirect effect λ	Standardized total effect $\lambda = (\beta + \lambda)$
Media complex \rightarrow Trust complex	0.207 (β_1)	***	0.000 (λ_1)	0.207 (λ_1)
Media complex \rightarrow Willingness	0.337 (β_2)	***	0.081 (λ_2)	0.419 (λ_2)
Trust complex \rightarrow Willingness	0.393 (β_3)	***	0.000 (λ_3)	0.393 (λ_3)

*** = $p < 0.001$

4.6.2.3 Results of Personal bonds

Results of consuming complex

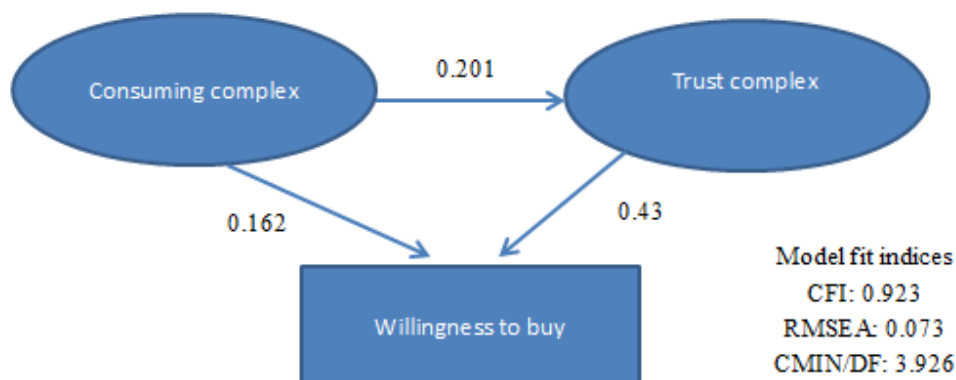


Figure 4.11 The path diagram of consuming complex

Figure 4.11 displays the path of proposed consuming complex. The three fit indices imply a satisfactory result with CFI =0.923, CMIN/DF =3.926 and RMSEA =0.075. The Table 4.24 shows that the consuming complex positively influenced the trust of Chinese consumers in LAB beef. The value of $\beta_1 =0.201$ ($p < 0.001$) and $\beta_2 =0.162$ ($p < 0.001$) suggest that when the consuming complex increased by 1 standard deviation, the trust complex and willingness to buy increases by 0.201 standard deviation and 0.162 standard deviation respectively. The value of $\beta_3 =0.43$, $p < 0.001$ suggests that the trust complex has a strong influence on willingness to buy. The value of $Y_2 =0.086$ suggests that due to the mediated effect of the trust complex, the media exposure complex has an additional positive impact making the total effect $\lambda_2 =0.248$, meaning that when the consuming complex increases by 1 standard deviation, willingness to buy increases by 0.248 standard deviation. The results of β_2 and β_3 suggest that the consuming complex influenced willingness to buy through direct and mediated paths; therefore this model partially relied on the mediation of trust.

Table 4.24: Summary of path coefficients (consuming complex)

Paths	Standardized regression β (standardized direct effect)	p Value	Standardized indirect effect $Y \square$	Standardized total effect $\lambda =$ ($\beta + Y$)
Consuming complex \rightarrow Trust complex	0.201 (β_1)	***	0.000 (Y_1)	0.201(λ_1)
Consuming complex \rightarrow Willingness	0.162 (β_2)	***	0.086 (Y_2)	0.248(λ_2)
Trust complex \rightarrow Willingness	0.430 (β_3)	***	0.000 (Y_3)	0.430(λ_3)

*** = $p < 0.001$

Results of purchase place model

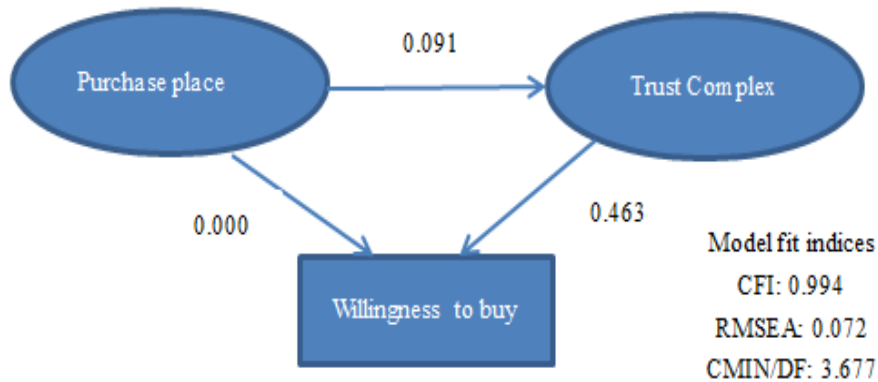


Figure 4.12 The path diagram of purchase place

Table 4.25 Summary of path coefficients (Purchase place)

Path coefficients	Standardized regression β (standardized direct effect)	p value	Standardized indirect effect Y_{\square}	Standardized total effect $\lambda =$ ($\beta + Y$)
Purchase place \rightarrow Trust	0.091(β_1)	0.44	0.091(Y_1)	0.091(λ_1)
Purchase place \rightarrow Willingness	0.000 (β_2)	/	0.042(Y_2)	0.042(λ_2)
Trust \rightarrow Willingness	0.463(β_3)	***	0.463(Y_3)	0.463(λ_3)

*** = $p < 0.001$

Figure 4.12 portrays the path diagram of purchase place model. The values of the CFI, RMSEA and CMIN/DF indicate this model is validated. The $\beta_1 = 0.091$ ($p = 0.44$) suggests the influence from the purchase place to the establishment of trust in LAB beef is small and not significant. The path between the purchase place and willingness to buy is $\beta_2 = 0$ which indicates the most often purchased place does not have any direct impact on consumer purchase intention. However, the indirect effect coefficient $Y_2 = 0.042$ indicates that when taking the trust factor into the path as a mediator, the purchase place did have some impact on the purchase intention.

Therefore, this model fully relies on the mediation effect of trust with $\beta_3 = 0.463$ ($p < 0.001$) between trust and willingness to buy.

Results of socio-demographic complex model

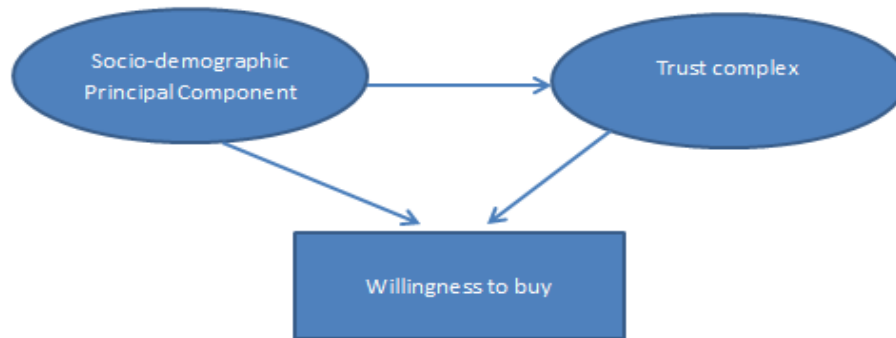


Figure 4.13 The path diagram of socio-demographic principal component

Figure 4.13 is an integrated structural equation model for all the principal socio-demographic components. However, each socio-demographic component was measured separately, as shown in Table 4.26. Firstly, the model fit indices of each socio-demographic principal component imply a satisfactory result for all of the demographic complexes. Most of the path coefficients are small and non-significant except Shopping Factor which has a significant direct positive impact on willingness to buy with $\beta_2 = 0.265$ ($p=0.007$) and Gender which has a significant positive impact on trust complex with $\beta_1 = 0.095$ ($p=0.037$). The value of β_2 of Shopping Factor indicates this can effect willingness to buy significantly without a mediation effect.

The values of Y_2 for each demographic principal component indicate that due to the mediation effect of trust, all the demographic complexes have a positive indirect (mediated) effect on the willingness to buy and interestingly, in terms of Age, the positive indirect impact they have upon willingness to buy was bigger than the value of its original direct positive impact on willingness to buy. The results of the β_3 in

each socio-demographic complex suggest in the socio-demographic models that the entire trust complex has a significant effect on the willingness to buy. By combining the results of β_2 and β_3 in each socio-demographic complex it appears that only the Shopping factor is partially dependent on a mediation effect as it has a significant direct and indirect impact on willingness to buy. However, the remaining socio-demographic complexes do not have significant direct impact on willingness to buy; they fully rely on the mediation effect of trust to influence consumer purchase intention.

Table 4.26: Summary of path coefficients of Socio-demographic components

Paths	Standardized regression β (standard direct effect)	p Value	Standardized indirect effect Y	Standardized total effect $\lambda=(\beta + Y)$	Model fit indices
Socio-economic status \rightarrow Trust	-0.069(β_1)	0.194	0.000(Y_1)	-0.069(λ_1)	CFI=0.981 RMSEA=0.028 CMIN/DF=0.998
Socio-economic status \rightarrow Willingness	-0.061(β_2)	0.185	0.032(Y_2)	-0.029(λ_2)	
Trust \rightarrow Willingness (1)	0.467(β_3)	***	0.000(Y_3)	0.467(λ_3)	
Age \rightarrow Trust	-0.001(β_1)	0.985	0.000(Y_1)	-0.001(λ_1)	CFI=0.989 RMSEA=0.002 CMIN/DF=0.236
Age \rightarrow Willingness	0.028(β_2)	0.458	0.056(Y_2)	0.084(λ_2)	
Trust \rightarrow Willingness (2)	0.772(β_3)	***	0.000(Y_3)	0.772(λ_3)	
Shopping Factor \rightarrow Trust (3)	0.179(β_1)	0.054	0.000(Y_1)	0.179(λ_1)	CFI=0.995 RMSEA=0.057 CMIN/DF=2.647
Shopping Factor \rightarrow Willingness	0.265(β_2)	0.007	0.075(Y_2)	0.338(λ_2)	
Trust \rightarrow Willingness (3)	0.415(β_3)	***	0.000(Y_3)	0.415(λ_3)	
Family status \rightarrow Trust	0.176(β_1)	0.109	0.000(Y_1)	0.176(λ_1)	CFI=0.974 RMSEA=0.037 CMIN/DF=0.333
Family status \rightarrow Willingness	-0.056(β_2)	0.486	0.08(Y_2)	0.024(λ_2)	
Trust \rightarrow Willingness (4)	0.453(β_3)	***	0.000(Y_3)	0.453(λ_3)	
Gender \rightarrow Trust	0.095(β_1)	0.037	0.000(Y_1)	0.095(λ_1)	CFI=0.998 RMSEA=0.028 CMIN/DF=1.406
Gender \rightarrow Willingness	0.073(β_2)	0.064	0.043(Y_2)	0.116(λ_2)	
Trust \rightarrow Willingness (5)	0.763(β_3)	***	0.000(Y_3)	0.763(λ_3)	
Socio-economic: education, income, location. Family status: number of children, marital status			Shopping factor: supermarket, primary food shopper ***= p < 0.001		

4.7 Section summary

This section examined the mediation effect of trust for different independent variables. The results suggested firstly that trust is an important factor which positively stimulates consumer willingness to buy. Secondly, the SEM analysis shows, through the mediation effect of trust that the independent variables (purchase place and part socio-demographic factors) which do not have any direct impact on willingness to buy can induce a positive impact on willingness to pay. For some variables (concern complex) which negatively impact on consumer willingness to buy, the negative impact can be neutralized by the mediation effect of trust to positively affect willingness to buy. Thirdly, the mediation effect of trust can also help to enhance the positive impacts of some variables (consuming complex, satisfaction complex, knowledge complex and media complex) to willingness to buy.

Chapter Five

Discussion and Interpretation

5.1 Introduction

This study identified some key factors which influence Chinese consumers' trust in LAB beef. These factors include:

- Gender
- If the consumers are primary food shoppers
- Frequency of purchasing beef
- Knowledge about preservation technology
- Concerns about food safety
- Media sources

This study also identified that trust is a key factor in stimulating purchase intention.

This chapter contextualizes the findings of this study in relation to previous studies about consumers' trust in food safety, new food technology, and research about the relationship between trust and purchase intention. This chapter also summarizes the results and compares the findings with previous research.

5.2 Summary of results

In the descriptive data analysis section, the results showed that in the sample analysis, consumer confidence in the safety of food is not very high with 55.8% of total respondents having from no confidence to medium confidence, versus 44.2% of respondents being somewhat confident to very confident in food safety. Food additives; residues of hormones, steroids, and antibiotics in food; and genetically modified food are the top three issues for consumers. It was found that 54.28% of total respondents were highly concerned about food additives; 54.09% of total

respondents indicated they were concerned about residues; and 47.67% of total respondents indicated concerns about genetically modified food.

The questionnaire measured respondents' knowledge about three preservation technologies and the perceived health risk caused by chemical preservation. Results indicated the respondents' knowledge base is varied. Few had high knowledge about food preservation; few had no knowledge, while the majority of respondents had some knowledge of food preservation. In the survey, 69.46% of respondents had heard of Lactic Acid Bacteria (LAB). Through measuring consumers' frequency of use of different media channels, the results showed that online was the most popular means for sourcing information related to food safety, with 36.83% of respondents indicating they used online sources daily. The number of respondents who use traditional media like TV, radio, and press media was relatively low, with more than half of respondents saying they never use radio as a source of information.

Consumers' beef consumption habits are fragmented. Only a small group of people eat and purchase beef daily, whereas the majority of respondents eat and purchase beef once a month or only once every few months. Among all the shopping venues, farmers markets still seem to be the most important food-shopping venue; 58.73% of the respondents indicated they shop for beef at a farmers market. The proportion of respondents who purchase beef at the supermarket was rather low at 15.37%. Consumer satisfaction with beef purchased was positive for three dimensions (beef quality, beef price, and beef safety). Consumers who are not satisfied or said don't know with respect to these three dimensions made up only a small proportion of

respondents. This suggests that beef is considered a valuable quality protein source. When consumers were asked to rank their trust in the food safety and prolonged shelf-life of LAB beef, 78.02% of responses ranged from somewhat confident to very confident (3 points to 5 points) indicating they have confidence in the food safety of LAB beef. In addition, 75.68% of responses indicated they are somewhat confident to very confident (3 points to 5 points) in the prolonged shelf-life of LAB beef.

By measuring the γ (Gamma) value, the correlation between each of the independent variables and consumers' trust in LAB beef was determined. Independent variables were divided into three groups by referring to their γ value: a relatively high γ value ($|\gamma| \geq 0.2$), a medium γ value ($0.1 \leq |\gamma| < 0.2$) and a low γ value ($|\gamma| < 0.1$). Table 4.13 in section 4.4 illustrates the three levels of γ values. The results indicated that variables which have a relatively high association ($|\gamma| \geq 0.2$) with trust in the food safety of LAB include; consumer satisfaction level with beef purchases, knowledge about preservation technologies and perception of the health risk caused by chemical preservatives, consumer concerns with food additive and residue safety issues, frequency of using radio and press media, and the frequency of purchasing chilled cling wrapped beef.

Table 4.14 in portrays the results for measuring the correlation between each of the independent variables and trust in the prolonged shelf-life of LAB. The factors that have a relatively high association ($|\gamma| \geq 0.2$) with trust in the prolonged shelf-life are consistent with the situation in Table 5.1, although there are some minor differences

in the ranking order of the factors. Consumers' satisfaction levels in the three attributes of purchased beef again had the highest correlation with the trust in the prolonged shelf-life of LAB beef. Consumers' knowledge of the three preservation technologies and the concerns on residue and health risk caused by chemical preservatives took the second place

Applying structural equation modeling, the impacts from the independent components on willingness to buy were examined. The results suggest that most of the socio-demographic components and purchase place have weak impacts on the willingness to buy, whereas the consuming, knowledge, satisfaction, and media complexes can stimulate consumer purchase decisions (see Table 5.1).

The strongest direct influence from the independent complexes on the willingness to buy is from the satisfaction complex with a path coefficient 0.447, this result indicates that consumers' recall of their satisfaction level of similar products is very important and will directly influence consumers' purchase decision on the other products in the same food category. Also examined was the impact of the trust complex on willingness to buy. The results show trust has a significant positive impact on the motivation of consumers to buy; in most cases this impact is bigger than any of the impacts from the independent components on willingness to buy, except for the satisfaction complex.

The third effect studied was the mediation effect of trust between independent variables and dependent variable. Table 5.1 shows consuming complex, knowledge complex, satisfaction complex and media complex have direct and indirect paths that

positively influence the willingness to buy LAB beef. The concerns complex initially negatively affected willingness to buy; however through the mediation effect of trust, it produced a positive indirect impact and the final total impact tends to be positive. Before introducing trust as a mediator, purchase place had no direct impact on willingness to buy; however, the value of a standardized indirect effect suggests the mediation effect of trust bridged these two factors. Table 4.15 suggests that the mediation effect of trust helps to produce a positive indirect impact from independent variables to dependent willingness to buy for every socio-demographic component.

Table 5.1 Summary of structural equation model

Paths	Standardized regression (standardized direct effect) β	p Value	Standardized indirect effect γ	Standardized total effect $\lambda=(\beta + \gamma)$	Model fit indices
Consuming→ Trust	0.201(β_1)	***	0(γ_1)	0.201(λ_1)	CFI=0.923 RMSEA=0.073 CMIN/DF=3.92
Consuming→ Willingness	0.162(β_2)	***	0.086(γ_2)	0.248(λ_2)	
Trust→ Willingness	0.430(β_3)	***	0(γ_3)	0.43	
Purchase place→ Trust	0.091(β_1)	0.44	0(γ_1)	0.091(λ_1)	CFI=0.994 RMSEA=0.072 CMIN/DF=3.667
Purchased place→ Willingness	0(β_2)	/	0.042(γ_2)	0.042(λ_2)	
Trust→ Willingness	0.463(β_3)	***	0.463(γ_3)	0.463(λ_3)	
Concern complex→ Trust	-0.187(β_1)	***	0(γ_1)	-0.187(λ_1)	CFI=0.961 RMSEA=0.072 CMIN/DF=4.515
Concern complex→ Willingness	-0.193(β_2)	***	0.093(γ_2)	-0.1(λ_2)	
Trust→ Willingness	0.498(β_3)	***	0(γ_3)	0.498(λ_3)	
Knowledge complex→ Trust	0.338(β_1)	***	0(γ_1)	0.338(λ_1)	CFI=0.985 RMSEA=0.066 CMIN/DF=3.249
Knowledge complex→ Willingness	0.349(β_2)	***	0.117(γ_2)	0.466(λ_2)	
Trust→ Willingness	0.345(β_3)	***	0(γ_3)	0.345(λ_3)	
Satisfaction complex→ Trust	0.414(β_1)	***	0(γ_1)	0.414(λ_1)	CFI=0.996 RMSEA=0.051 CMIN/DF=2.322
Satisfaction Complex→ Willingness	0.447(β_2)	***	0.115(γ_2)	0.562(λ_2)	
Trust→ Willingness	0.277(β_3)	***	0(γ_3)	0.277(λ_3)	
media complex→ Trust	0.207(β_1)	***	0(γ_1)	0.207(λ_1)	CFI=0.968 RMSEA=0.075 CMIN/DF=3.91
media→ Willingness	0.337(β_2)	***	0.081(γ_2)	0.419(λ_2)	
Trust→ Willingness	0.393(β_3)	***	0(γ_3)	0.393(λ_3)	
***=<0.001					

5.3 Hypothesis discussion

5.3.1 Hypotheses related to socio-demographic factors

Hypothesis 1: “Males trust in LAB beef more than females”, was not supported by the correlation analysis and the result from the proposed structural equation model of Gender. In this equation $\gamma = 0.105$ ($p = 0.117$) between gender and trust in the food safety of LAB indicates that gender difference has a weak correlation with the level of trust in food safety of LAB beef. This result differs from Hossian, et al (2002) who interviewed US consumers about acceptance of genetically modified food and concluded that males are more willing than females to accept new food biotechnology. This result also differs from the conclusion of Davidson & Freudenberg (1996) that women tend to perceive more technological and environment risks than men.

The correlation, $\gamma = 0.150$ ($p = 0.025$), between gender and trust in the prolonged shelf-life of LAB beef showed that in this study gender difference had a significant correlation with the trust in the prolonged shelf-life of LAB beef, with women having higher positive attitudes than men toward the shelf-life benefits of LAB beef. This result differs from the hypothesis and findings of Cardello (2003) that females tend to perceive less benefit than males in new food technologies. A possible reason is as discussed in 4.3.1 that Chinese women are tend to take the dominant role in purchasing family food, their earlier involvement in food preparation activities exposes them to various food information channels more than males, which in turn make females are more concerned about food risks and being more eager to source alternative safer food as a way of reducing risks.

Hypothesis 2: “Younger people tend to trust in LAB beef more than older people”, was not supported. The result of the cross tabulation analysis between age and the two trust dimensions indicates age difference does not influence trust in LAB beef. The result of the Age structural equation model also suggested there was no direct correlation between age and trust with a direct impact coefficient $\beta_1 = -0.001$ ($p = 0.985$). This finding is contrary to that of Miles et al (2004) who concluded that compared to younger people, older people tend to have more concerns with technology-related food safety. However, this finding is consistent with the finding of Frenzen et al (2001) and Gunes & Tekin (2006) that different age groups do not show differences in attitudes towards new technology.

Hypothesis 3: “Education level is positively related to consumers’ trust in LAB beef”, was not supported. The two γ values, -0.04 ($p = 0.97$) and -0.006 ($p = 0.9$), suggest the consumers with a lower education level have a similar levels of trust in LAB beef compared to more highly educated consumers. The result from the proposed Socio-economic structural equation model also suggests that socio-economic status (education level, household income and location of living) does not have a significant direct impact on the trust complex with $\beta_1 = -0.069$ ($p = 0.194$). This is contrary to the finding of Henson et al (2007) that highly educated people tend to have more concerns about new technology than others. This result also differs from the finding of Dosman and Adamowicz (2003) that people with higher education perceive a greater food safety risk as they tend to obtain more food hazard information. This result indicates that, in the sample, consumers’ confidence

level in LAB beef has little relation to their education; the advantages of accessing information about new technology along with the degree improvement are becoming less strong. Nowadays, the various media channels provide consumers with open and fair information, and which narrows the knowledge gap about emerging technologies between higher and lower educated people.

Hypothesis 4: "High income consumers trust in LAB beef more than low income groups", was not supported. The γ (-0.056) and significance level ($p = 0.223$) suggest income difference is not correlated with trust in the food safety of LAB beef. The Gamma value between income and trust in the prolonged shelf-life ($\gamma = -0.04$, $p = 0.383$) also suggests that there is not much difference in the trust level among different income groups. This finding is inconsistent with the finding of Henson et al. (2007) that people with higher incomes are more concerned about new technology than lower income groups. This finding is consistent with the finding with respect to education, as income has a high positive correlation with education. This insignificant correlation is consistent with the result of the direct impact of socio-economic status on the trust complex in the proposed Socio-economic structural equation model where $\beta_1 = 0.069$ ($p = 0.194$), however, the results of socio-economic analysis can only partially explain the correlation between income and trust, as there is education level and location of living included in the socio-economic models. A possible explanation for these observations is that in China, the cost of obtaining information is much lower than before; there are various affordable information channels available providing information to many sectors.

Another potential explanation is accompanying the economic development of China, most Chinese have achieved and a living standard meeting their basic living needs and beyond, and the relative low income groups have similar capacity to demand and select higher quality food as higher income earners.

Hypothesis 5: “The number of dependent children positively relate to consumers’ trust in Lab beef”, was not supported. The γ (-0.109) and significance level ($p = 0.053$) suggest family structure is not a strong factor influencing consumers’ trust in the food safety of LAB beef. In terms of trust in the prolonged shelf life of LAB beef, the γ (-0.111 and $p = 0.053$) also suggests there is no significant correlation between the number of children and trust level in LAB beef.

In the Family Status structural equation model, $\beta_1 = 0.176$ ($p = 0.109$) indicates that Family Status does not have strong direct impact on the trust; however, this may be also influenced by marital status. These data indicate that the number of dependent children in a family is not a significant factor causing a difference in the trust in LAB beef. This finding differs from the result found by Dosman et al. (2001) and Miles et al. (2004) who people with children are less confident than those with children in terms of food safety. This situation, perhaps, can be explained by the fact that in China, dependent children living with parents are not a priority when considering food safety and the health of all the family members takes same loading.

Hypothesis 6: “People’s trust in LAB beef varies according to the type of career”, was not supported. In the analysis of the correlation, the two values of γ (-0.022 with $p = 0.412$ and -0.014 with $p = 0.298$) both indicate there is no significant correlation

between career type and the trust in LAB beef (career type is not included in any demographic complex).

Hypothesis 7: "People who are married tend to trust in LAB beef more than the unmarried," was not supported. The γ between marriage status and trust in LAB beef is 0.107 ($p = 0.166$), while the gamma between marital status and trust in the prolonged shelf of life of LAB beef is γ 0.138 ($p = 0.069$) both suggest insignificant correlations. Similar to the number of dependent children, in the proposed Family Status structural equation model, $\beta_1 = 0.176$ ($p = 0.109$) also indicates Family Status is not a significant influence on trust in LAB beef.

Hypothesis 8: "People's trust level in LAB beef is differentiated by the city of living, and the people living in cities tend to have higher trust in LAB beef", was not supported. In the correlation analysis the results of two $\gamma = 0.023$ ($p=0.723$) and $\gamma = 0.47$ ($p = 0.082$) indicate no significant correlation between the difference in the city of living and the trust in LAB beef. Due to the low loading, city of living is not included in any of the socio-demographic principal components.

Hypothesis 9: "People living in different locations (city, town and village) have different levels trust in LAB beef, and people who live at city level have the highest trust in LAB beef", was not supported by correlation analysis with $\gamma = 0.063$ ($p = 0,232$) (trust in food safety of LAB beef) and $\gamma = 0.075$ ($p = 0.168$) (trust in the prolonged shelf-life of LAB beef), neither by the proposed Socio-economic demographic structural equation model.

Hypothesis 10: “In peoples’ food environment, the availability of a supermarket induces higher trust in LAB beef”, this hypothesis was not supported. The γ between the food environment and trust in food safety of LAB $\gamma = 0.126$ ($p = 0.223$) and $\gamma = 0.058$ ($p = 0.354$) between the food environment and trust in prolonged shelf-life of LAB both suggest consumers’ trust level in LAB beef does not vary substantially with the availability of a supermarket. Also the result from the proposed Shopping factor (supermarket nearby, primary food shopper) structural equation indicates Shopping factor does not have a significant direct impact on the trust complex with $\beta_1 = -0.069$ at a significance level of $p = 0.194$.

Hypothesis 11: “Primary food shoppers tend to have higher trust in LAB beef, was partially supported. The correlation between the primary food shopper and trust in LAB beef $\gamma = 0.194$ ($p = 0.003$), indicates there is a significant positive correlation between the primary food shopper and trust in the safety of LAB beef; the primary food shoppers have more trust in LAB beef than non-primary food shoppers. However, there is no significant correlation between the primary food shopper and trust in the prolonged shelf life of LAB beef with $\gamma = -0.116$ ($p = 0.083$). The result of Shopping factor where $\beta_1 = 0.179$ ($p=0.054$) indicates a rather modest effect between being the primary food shopper and trust in LAB.

5.3.2 Hypothesis related to personal habits

Hypothesis 12: “The frequency of beef eating is positively relates to the trust in LAB beef”, was not supported by the cross tabulation analysis. The $\gamma = 0.094$ ($p = 0.069$) between frequency of eating and trust in food safety of LAB beef and the $\gamma = 0.111$

($p = 0.019$) between the frequency of eating and trust in the prolonged shelf-life of LAB beef, both indicate there is moderate positive correlation between the eating habit and trust in LAB beef.

Hypothesis 13: “The frequency of consumers purchasing different types of beef is positively related to their trust in LAB beef”, was supported. The γ and associated significance levels between six types of beef and the two trust dimensions suggest consumers’ frequency differences in purchasing those types of beef had a notable correlation on the trust in the LAB beef. However, the γ between purchase place and trust indicates where consumers usually shop does not have much impact on their trust in LAB beef.

These correlations are consistent with the direct impact of the coefficient of consuming complex (eating habit and purchasing frequency) and proposed purchased place structural equation model. The direct impact from the consuming complex to the trust complex was $\beta_1 = 0.201$ ($p < 0.001$), however, the direct impact from purchase place to trust was zero. The eating habit result supports the finding of Luckow, Sheehan, Delahunty & Fitzgerald (2005) that consumers’ acceptance of food is related to eating habits and habitual consumption increases consumers’ acceptance of food. The combined results of eating and types of beef purchased supports the proposition of Królak, Jeżewska-Zychowicz & Sajdakowska (2017) that consumers’ past experience with similar products provides a reference influencing consumer choice.

5.3.3 Hypotheses related to past collaboration

Hypothesis 14: “Consumers’ knowledge level on preservation technology is positively related to trust in LAB beef, was supported by the results of cross tabulation and the proposed knowledge complex structural equation model. The γ and significance level of consumers’ knowledge about each preservation technology indicates consumers’ knowledge level significantly influences consumers’ trust in LAB beef. The more knowledge consumers have about the three preservation technologies and the potential health risk, the higher consumers’ trust is. There is further support from the proposed knowledge complex structural equation model, where consumers’ knowledge complex had a significant direct impact on the trust complex with a coefficient $\beta_1 = 0.338$ ($p < 0.001$). These two results are similar to the finding of Teisl, Fein and Levy (2009) who concluded that there is a positive causal relationship between greater self-rated knowledge and positive attitudes about that technology in US. However, this finding contrasts that of Bauer, Allum & Miller (2007) that positive attitudes toward technology and science are not guaranteed by transferring knowledge to the public.

Hypothesis 15: “consumers’ general food safety perception is negatively related to trust in LAB beef was supported by both of the results of cross tabulation analysis and the proposed concerns complex structural equation model. All the individual food safety concerns had a significant negative correlation with trust in LAB beef. Consumers concerned about food safety tend to have less trust in LAB beef. This is further supported by the result of the proposed concern complex structural modeling with a significant direct negative impact coefficient $\beta_1 = -0.187$ ($p < 0.001$). The

correlation for residues and food additives took the first two places in the two trust dimensions indicating that for consumers who recalled similar food incidents influenced their trust in the new relevant food technology more than other food safety issues. This finding is consistent with the proposition of De Jonge et al. (2004) that consumers who recall food safety incidents tend to have less confidence in food safety in general.

Hypothesis 16: “Consumer’s satisfaction level with their current purchased beef product is positively related to trust in LAB beef”, was supported by the cross tabulation analysis and proposed satisfaction complex structural equation model. The γ and significance level of satisfaction on each beef attribute indicate there is a strong positive correlation between consumers’ satisfaction with beef and trust in LAB beef. This is further supported by the result of the proposed satisfaction complex structural equation model with $\beta_1 = 0.414$ ($p < 0.001$). These results suggest consumers with high satisfaction in beef tend to have high trust in LAB beef. This finding partially supports the proposition of Verbeke (2001) that consumers’ confidence in food safety is a reflection of the perceived food safety of the product.

5.3.4 Hypothesis related to communication

Hypothesis 17: “The frequency of media exposure is positively related to the trust in LAB beef”, was supported. *Media exposure has a positive impact on consumers’ trust in LAB beef”*, was supported by the correlation analysis. The γ and significance level between six media sources and the two trust dimensions indicate each media source has a significant positive correlation with trust in LAB beef and the

consumers who use media sources frequently have higher confidence about LAB beef. The results from the proposed media complex also suggest the media complex has a significant direct impact on trust in LAB beef with $\beta_1 = 0.207$ ($p < 0.001$).

Interestingly, the γ values for online media and the two trust dimensions are contrary to what was expected as it was assumed that online media would be the strongest influential variable due to the growing use of online information in China. In this study, the results from the association analysis suggest that consumers who frequently use traditional media sources like the press, TV, and radio are more confident in LAB beef than consumers who make frequent use of online sources. This finding is to some extent consistent with the finding of Wang (2014) that consumers using traditional media (newspaper, magazine, TV, and radio) perceive less risk for dairy products while consumers who use online sources frequently perceive more risk with dairy products. This indicates that Chinese consumers are probably not placing a high level of trust in the food safety information from online media. Another possible explanation may be that online media is delivering more negative food information than positive information, so consumers who use online information more frequently tend to have a lower level of trust in LAB beef. The third potential explanation is that Chinese consumers have higher trust in the information delivered through traditional media.

5.3.5 Hypothesis related to trust

Hypothesis 18: "Trust is a key driver for stimulating purchase intention", was supported by the results of the entire proposed set of structural equation models. In

each proposed structural model, the direct impact coefficient β_3 was positive with a significance level. This finding is consistent with the proposition of Wang (2015) that trust has an impact on food purchase intention and the proposition that in a social commerce context, trust has a significant effect on consumers' decisions (Chen & Shen 2015; Kim & Park, 2013; Shin, 2013; Sukrat, Papasratorn & Chongsuphajasiddhi, 2015). This finding is also consistent with the proposition of Yee & Yeung (2008) that consumer trust has a positive effect on consumers' intention for future purchases.

Hypothesis 19: "All the consumers' attributes can only work on purchase intention through the mediation effect of trust", was partially supported. The results of some of the socio-demographic components, the concern complex, and the purchase place indicate these three constructs do not have a direct positive impact on consumers' purchase intention, however, through the mediation effect of trust these three constructs have a positive indirect impact (the value of Y_2) on purchase intention. The β_2 values from other structural equation models (concern complex, knowledge complex, satisfaction complex, media complex) either negatively or positively have a significant direct impact on consumers' willingness suggest that trust is not an essential mediator to drive the purchase intention.

Table 5.2 The summary of hypothesis

Hypothesis	Supported	Partially supported	Not supported
H1: Males trust in LAB beef more than females			√
H2: Younger people tend to trust in LAB beef more than older people			√
H3: Education level is positively related to consumers' trust in LAB beef			√
H4: High income consumers' trust in LAB beef is more than low income groups			√
H5: Families with children under 18 trust in LAB beef more than others			√
H6: People's trust in LAB beef varies according to the type of career.			√
H7: People who are married tend to trust in LAB beef more than the unmarried.			√
H8: People's trust level in LAB beef is differentiated by the city of living, and the people living in developed cities tend to have higher trust in LAB beef.			√
H9: People living in different locations (city, town and village) have different levels of trust in LAB beef, and people who live in city level have the highest trust in LAB beef.			√
H10: In peoples' food environment, the availability of a supermarket induces higher trust in LAB beef.			√
H11: Primary food shoppers have a higher level of trust in LAB beef.		√	
H12: The frequency of consumers eating beef is positively related to their trust in LAB beef.			√
H13: The frequency of consumers purchase different types of beef is positively related to their trust in LAB beef.	√		
H14: Consumers' knowledge about the preservation technology is positively related to trust in LAB beef.	√		
H15: consumers' general food safety perception is negatively related to trust in LAB beef.	√		
H16: Consumers' satisfaction level with their current purchased beef product is positively related to trust in LAB beef.	√		
H17: The frequency of media exposure is positively related to the trust in LAB beef.	√		
H18: Trust is a key driver of stimulating purchase intention	√		
H19: All of the consumers' attributes can only work on purchase intention through the mediation effect of trust		√	

Chapter Six

Implications and Conclusion

6.1 Theoretical implications

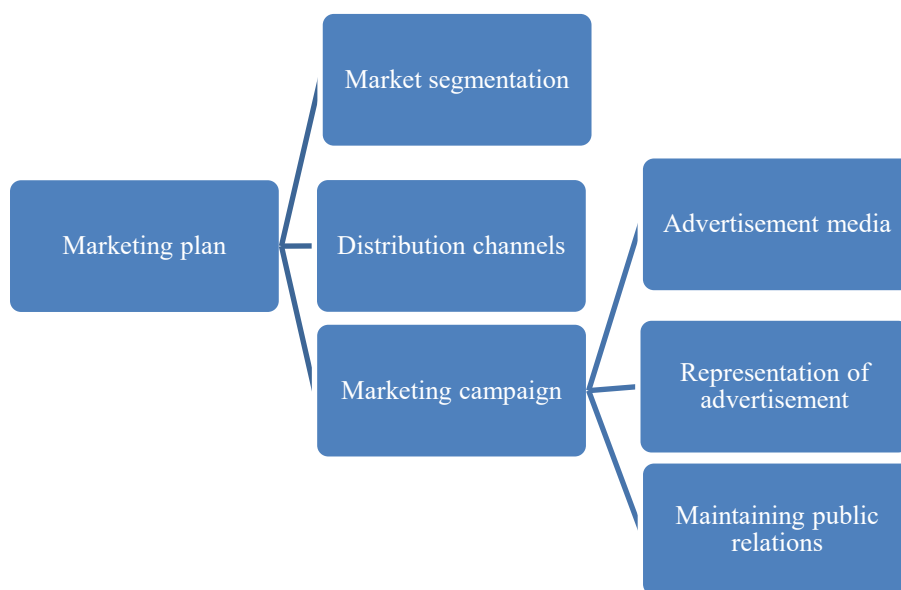
This study has offered some insights into the Chinese consumer trust in a new food preservation technology. This study developed a framework to identify the key factors influencing Chinese consumer trust in LAB (Lactic Acid Bacteria) beef. This newly developed conceptual framework could be applied to other similar research like consumer perception of other new food preservation technologies or different products using LAB preservation.

This study, which specifically considered Chinese consumer trust in LAB beef, is different from previous research about Chinese consumer attitudes toward the new food technology. It found that some of the previous findings for consumer attitudes to new foods may not be applicable to LAB beef. For example, socio-demographic factors are not the key basis for judging and comparing consumer confidence in LAB beef. However, consumer confidence levels in LAB beef is highly correlated with satisfaction level with current beef products, their knowledge of preservation technologies, frequency of using news media (radio and paper press) and frequency of purchasing chilled beef. In the SEM analysis, it was found that these factors can also directly stimulate consumer purchase intention without establishing trust. This provides some empirical results to be compared and contrasted in future research.

6.2 Marketing implications

Apart from developing a conceptual framework for identifying key factors contributing to Chinese consumer trust in LAB beef and confirmation of the mediation effect of trust in purchase intention, another important outcome of this research was providing data analysis useful for developing marketing strategies for LAB beef providers. In this section, the suggested marketing strategies will cover three aspects including; market segmentation, distribution channel and marketing campaign. Figure 6.1 illustrates the details of the marketing plan.

Figure 6.1 Suggested marketing plan for LAB beef providers



6.2.1 Market segmentation

The γ results for socio-demographic factors other than gender and the consumer role in family food shopping, indicate there is a weak correlation between these factors and trust in LAB beef. The results suggested that perceptions with respect to the longer-shelf-life and safety of LAB beef are quite consistent among the Chinese

consumers that were studied, despite the varying backgrounds of the respondents.

The continuing occurrence of food safety issues in China means that food safety concerns are not limited to certain narrowly based groups of people, but are more of a widely held general social perception. Nowadays, in China with increasing incomes and living standards, most Chinese consumers tend to be no longer satisfied with just meeting basic needs; they are demanding a higher quality of life, including clearer air, better food, better health and more sophisticated entertainment. The gap in food choices due to socio-demographic differences is narrowing. Therefore, LAB beef providers do not need to target specific groups to market their products. The market for LAB beef is potentially the entire food market.

This result is consistent with the concept that beef is a general basic protein food for all consumers. This differs from other commercial products which are specifically targeted at certain groups (e.g. the breakfast provided by Kentucky Fried Chicken target white collars workers and students and Procter & Gamble's daily cleaning and laundry products targeting medium to high income groups).

6.2.2 Distribution Channel

58.73% of respondents purchase beef at farmer's markets (wet market), 15.37% at the supermarket and 12.84% at a retail meat store, which together make 86.9% of the total respondents. This result suggests farmers' markets, supermarkets and retail meat stores are good distribution channels covering the most customer flow. Based on the correlational analysis with the place of purchase (food safety: $\gamma=0.096$, $p=0.069$; prolonged shelf-life: $\gamma=0.063$, $p=0.263$) and the SEM analysis

($\beta_1=0.091$, $p < 0.001$; $\beta_2=0.000$, $p=N/A$), it is evident that differences in purchase place do not have a significant correlation or impact with respect to their trust in LAB beef, nor their willingness to buy.

6.2.3 Marketing campaign

Although there have been some published articles about LAB preservation and LAB beef, and, as it has yet to be launched as a new food, consumer knowledge is low or nonexistent. The reason that best explains why the primary food shopper and females tend to have more trust in LAB beef than males is because the access to food information through shopping. This suggests the importance of providing enough information about LAB beef to the public. The extent to which the information is delivered determines the level of impact. In this section, based on data analysis in chapter 4, strategies about selecting advertisement methods, the content of advertisements and maintaining public relations are suggested.

Advertisement media

Online is the most common media source with 55.7% of respondents using it daily or weekly. Although respondents' frequency in using traditional media is relatively lower, the traditional media (paper press, radio and TV) have a slightly stronger correlation with trust. This result suggests to LAB beef providers that communication with consumers cannot be limited to a single advertising medium. The advantages of online and traditional media combined will produce the best effect. Putting advertisement online is a good way to increase the frequency of exposure of LAB beef to consumers. However, Chinese consumers place higher trust

in the information delivered through traditional media, therefore, advertising LAB beef using traditional media should also be given the same importance as online information.

The representation of advertisement

The advertising medium will provide information but the effectiveness in terms of how much the consumer takes note of the information may vary. It is important to consider how well consumer will decode and understand the information about LAB beef in any given advertisement.

Consumer knowledge of LAB beef is rather low. Secondly, the path coefficients from trust to willingness to buy have consistently been shown to have a strong impact in SEM modeling. Trust is an important factor in stimulating consumer willingness to buy. In the survey, the definition and advantages of LAB beef were provided, however the level of consumer trust in this product does not tend to be high, with average confidence scores of 3.16 and 3.24 for food safety and prolonged shelf-life, respectively. Thirdly, in terms of willingness to buy only 14.59% of respondents were very likely to buy LAB beef with the majority (59.14%) falling into the somewhat likely to buy category and 26.2% (22.75% + 3.7%) being somewhat unlikely or don't know their purchase intentions. This result suggests that most of the respondents do not have a strong willingness to buy. These three situations suggest three incremental goals for the content of advertising: they are (1) introducing LAB beef to public, (2) enhancing the public's trust in LAB beef and (3) stimulating consumer willingness to buy.

In this survey the dominant age group was 26-55, comprising 78% of the total number of respondents. This suggests that these consumers have life experience that they can use to compare and contrast different products. In this survey 69% of respondents had heard of LAB before doing this survey, indicating that LAB are recognized in the market. Therefore, in terms of introducing LAB beef, LAB beef providers could emphasize the correlation between LAB beef and LAB in other products to provide consumers with a quick reference point.

The independent variables of consumer satisfaction with the beef they currently purchase, knowledge of three preservation technologies, knowledge of the health risk of chemical preservatives and the frequency of purchasing chilled beef all have a significant positive correlation with trust in LAB beef. Furthermore, it can be seen from the SEM analysis that the satisfaction and knowledge complex have the relatively higher impacts on the level of trust with path coefficients of $\beta_1=0.414$ and $\beta_2=0.338$ respectively. These results suggest for beef providers that if satisfaction with current beef products and knowledge are favorable, consumer trust in LAB beef is more likely to be increased.

Close to half of the respondents were somewhat satisfied with the beef they purchase, only around 10% of respondents, stated they are very satisfied. The majority of consumers do not have strong knowledge of preservation technologies and the health risk associated with chemical preservation. Only a small number of respondents claim they have strong knowledge of preservation (7.2% of respondents in terms of

chemical food preservation, 3.31% in biological, 3.89% in physical preservation and 4.67% with the health risks of chemical preservation).

This suggests that although consumers demand high quality food, their knowledge of what constitutes better quality food is lacking. LAB beef providers need to be aware that there is a need to deliver basic information about food preservation to educate consumers of the advantages of physical and biological preservation then link these advantages to LAB beef.

In this survey, most of the respondents are not frequent buyers of chilled beef. Only around 10% of consumers purchase chilled beef either daily or weekly. LAB beef providers need to be aware that due to the low purchasing frequency, the frequency of exposure of some communication will be low. Take the information printed on food packaging as an example, during the purchasing process consumers may firstly notice the food information on food packaging, thus a higher purchase frequency increases the frequency of information that consumers are exposed to. Note that consumer frequency of purchasing chilled beef is currently low, while purchasing chilled beef takes an important role in trust. This suggests that for LAB beef providers, at the initial marketing stage, selling LAB beef together with relevant products which have a high purchase frequency may be a useful strategy.

The confidence of respondents in food safety in general is low with 55.84% respondents claiming to have a neutral or low confidence in food safety, reflecting the enduring lack of confidence that the Chinese have in food safety. Food additives were of most concern (54.28%) with only 1.95% of respondents having no concern

with food additives. This is closely followed up by residues of hormones, steroids, and antibiotics in food with 54.09% showing a high level of concern. Consumer concerns have a negative correlation with trust in LAB beef, which indicates that consumers who have concerns over the various food safety issues tend to have a lower level trust in LAB beef. Food additives and residues, which attracted the highest level of concern, correspondingly have the highest negative correlation with consumer trust in LAB beef. The result of the SEM analysis of the concern complex suggests that apart from lowering consumer trust, such concerns also directly weaken consumer willingness to buy, with a standardized direct impact coefficient $\beta_2 = -0.193$ ($p < 0.001$).

The results above suggest that for LAB beef providers there is a need to address the negative impact from consumer concerns about the general food safety environment. In marketing promotions, LAB beef providers need to put extra effort into emphasizing the fact that residues and food additives are not a concern with LAB beef.

In terms of stimulating willingness to buy, apart from the impact from trust, the consuming complex, knowledge complex and satisfaction complex also have a direct positive impact, with path coefficients $\beta_3 = 0.162, 0.349$ and 0.447 (all with significance levels < 0.001). These three results indicate the importance of delivering information about food preservation, encouraging the purchase of chilled beef and highlighting the quality and safety of LAB. All of these factors work in relation to enhancing consumer trust and directly stimulating consumer purchase intention.

In this study around 70% of respondents lack a tertiary education. Also according to the Chinese sixth census of population in 2010 the percentage of people at each maximum educational level were 4.04%, with no education, 26.78% with a primary school education, 38.79% with junior high education and 14.03% with senior high education leaving only 8.9% with a tertiary and above education (National Bureau of Statistics of the People's Republic of China, 2010). This shows that in China approximately 90% of the population lacks a tertiary qualification (compared with 70% in this study). This will enhance the difficulties in consumer understanding of food preservation and food safety and needs to be considered when promoting LAB beef.

Maintaining public relations

Online media potentially delivers more negative food safety information than positive in comparison to other sources of news and information. Online sources are also the most commonly used channels for Chinese consumers to get food information. These two situations suggest that there is a high possibility for many Chinese consumers to be exposed to a variety of different food safety issues, which in turn may increase their food safety concerns and reduce their confidence in the general food safety environment. As there is a significant negative correlation between food safety concerns and trust in LAB beef and willingness to buy, LAB beef providers need to be aware of the potential negative impact from other food safety issues. For example, consider the milk contamination incident in China in 2008, involving the use of an inappropriate and dangerous food additive in baby

formula. Chinese consumers lost their confidence in the Chinese milk industry. Therefore, to avoid or minimize the potential impact from other food safety issues, LAB beef providers need to actively respond to those relevant negative food safety issues.

6.2 Limitations and future research

Although this study aimed at testing many independent variables, there are still some other potential variables that may be important and could be included in future study. These include the timeline for the introduction of LAB beef to the market on a large scale and the value in marketing LAB beef with an accreditation certificate. It will be interesting to know if the certificates improve consumer trust or if certificates can directly stimulate consumer purchase intentions prior to achieving a level of trust.

Although this study provided some empirical results for beef, these results may be not applicable to other food products such as chicken, pork or seafood as these meats are perceived differently by Chinese consumers.

In this study, sampling bias associated with convenience groups were tried to be minimized by varying respondents' gender, age, career type, education level, family structure, living location and income level. However, only a small number of Chinese consumers living in Shanghai City and Chengdu City were included in the sample. With different sampling methods, sample locations or sample sizes, consumer profiles may change, potentially influencing the results. In this study, the possible endogenous connection between independent variables was not considered.

For example, there might be some connection between career type and knowledge of

preservation technologies, or consumer satisfaction levels with beef might be correlated with income and education, or the frequency of using media might be associated with age and gender.

Based on the limitations of this study, there is room for further exploration of this topic in future studies. Future studies could consider more independent variables which may have an impact on consumer trust in LAB beef. Similar studies would be useful for other categories of meat or other food sectors and then comparisons and contrasting these results would be an interesting study. Comparative studies could be done in different locations. More detailed studies can explore the connections between independent variables to draw more detailed paths relating to establishing trust and purchase intention.

6.3 Conclusion

This research helped to develop a conceptual framework to examine the factors which may influence consumer trust in LAB beef. This research has identified some important factors which have significant positive correlation with Chinese consumer trust in LAB beef. These include consumer satisfaction with the beef currently purchased, knowledge of preservation technologies, media exposure, personal preference in terms of the type of beef and general food safety concern. Generally speaking, of these factors, consumers' satisfaction level on the current purchased beef has the highest positive correlation relation with both of their trust in the food safety and prolonged shelf life of LAB beef, followed by consumers' knowledge on

preservation technology. Reversely, the factors which mostly negatively impact on consumers' trust in LAB beef are consumers' concerns on current food safety issues.

This research also found that in terms of LAB beef, some previous conclusions regarding consumer food preference relating to socio-demographic factors are not applicable. This research examined how much impact the independent variables influence trust in LAB beef and examined consumers have the purchase intention after building trust in LAB beef. The results from this study provide a better understanding of the mediation effect of trust on linking independent variables and willingness to buy. These results suggest that LAB beef providers raise the public's willingness to buy; the key determinant is establishing consumer trust.

References

- Agugutin, Mary Ann., Riley, Malcolm., Stokmann, Regine. & Bennett, Louise (2016). Role of food processing in food and nutrition security. *Trends in food science and Technology* 56.
- Aitken, C., Power, R., & Dwyer, R. (2008). A very low response rate in an online survey of medical practitioners. *Australia and New Zealand Journal of Public Health*, 32(3), 288-289.
- 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.
- Altekruse, S.F. (1999). *Campylobacter jejuni*-an emerging food borne pathogen. *Emerg Infect Dis*, 5(1), 28-35.
- Alzamorea, Stella Maris., Fito, P., López-Malo, Aurelio., Tapia, Maria S., & Parada-Arias, E. (2000). Minimally processed fruit using vacuum impregnation, natural antimicrobial addition and/or high hydrostatic pressure techniques. Retrieved from:
https://www.researchgate.net/publication/305043574_Minimally_processed_fruit_using_vacuum_impregnation_natural_antimicrobial_addition_andor_high_hydrostatic_pressure_techniques_Minimally_Processed_Fruits_and_Vegetables
- Ananou, S., Maqueda, M., Martinewz-Bueno, M., & Valdivia, E.M. (2007). Bio preservation, an ecological approach to improve the safety and shelf-life of foods. In Méndez-Vilas, A (Eds), *Communication Current Research and Educational Topics and Trends in Applied Microbiology* (pp 475-487). Retrieved from:
<https://pdfs.semanticscholar.org/5d46/e4baffe92c4ff33189e5bcd3ef62209bf235.pdf>
- Anderson, A. L., Verrill, L. A., & Sahyoun, N. R. (2011). Food safety perceptions and practices of older adults. *Public Health Reports*. 126 (2), 220-227.
- Anderson, Eugene W., & Mary W. Sullivan. (1993). The Antecedents and Consequences of Customer Satisfaction for Firms. *Marketing Science*, 12 (2), 125-143.
- Ares G., & Gámbaro A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite*, 49, 148-158
- Arrow, Kenneth J. (1972). 'Gifts and Exchange.' *Philosophy and Public Affairs* 1: 343-362.
- Aste, Niccolo., Pero, Claudio., & Leonforte, Fabrizio. (2017). Active refrigeration technologies for food preservation in humanitarian context-A review. *Sustainable Energy Technologies and Assessment*, 22(August), 150-160.
- Babbie, E. (2010). *The Practice of Social Research* (12th ed.). California: Wadsworth.
- Babbie, E. R. (2010). *The Practice of Social Research*. 12th ed. Belmont, CA: Wadsworth Cengage.

- Bachmann, D., & Elfrink, J. (1996). Tracking the progress of e-mail versus snail-mail. *Marketing Research*, 8 (2), 31–35
- Bai, Jian., Sun, Haoxue., & Shangguan, Pengjun. (2004). The new research about the preservation technology of chilled meat. *Meat Research*, 2, 36-39.
- Baker, G. A. (2003). Food safety and Fear: Factors Affecting consumer response to food safety. *International Farm and Agribusiness Management Review*, 6(1).
- Ban, Lingling. (2017). The application preservative effects of Lactobacillus and onions on chilled pork. *Science & Technology Information*, 12, 68-69.
- Barrett, J. R. 2007. Hyperactive Ingredients? *Environmental Health Perspectives*. 115 (12): A578
- Barrett, P. (2007). Structural equation modeling: Adjudging model fit. *Personality and Individual Differences*, 42(5), 815-824
- Barte, A. P., & Lichtenberg, F. R. (1987). The Comparative Advantage of Educated Workers in Implementing New Technology. *The Review of Economics and Statistics* 69:1-11.
- Bauer, M. W., Allum, N., & Miller, S. (2007). What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda. *Public Understanding of Science*, 16, 79-95.
- Bener, Ayse Basar. (2000). Risk perception, trust and credibility: a case in internet banking (PhD). London School of Economics and Political Science, London.
- Beydoun, M. A. & Wang, Y. F. (2016). How do socio-economic status, perceived economic barriers and nutritional benefits affect quality of dietary intake among US adults. *European Journal of Clinical Nutrition*, 62, 303-313. doi: 10.1038/sj.ejcn.1602700
- Bhattacharjee, A. (2012). Social Science Research: Principles, Methods, and Practices. *Textbooks Collection*. 3, 73-83.
- Bruce, D. M. (2002). A social contract for biotechnology: Shared visions for risky technologies? *Journal of Agricultural and Environmental Ethics*, 15(3), 279-289.
- Bruhn, C.M., 2017. Consumer Perception of Food Preservation Techniques, in: Juneja, V.K., Dwivedi, H.P., Sofos, J.N. (Eds.), *Microbial Control and Food Preservation*. Springer New York, New York, NY, pp. 373–380. https://doi.org/10.1007/978-1-4939-7556-3_17
- Brul, S., & Coote, P. (1999). Preservative agents in foods. Mode of action and microbial resistance mechanism. *International Journal of Food Microbiology*, 50(1-2), 1-17.
- Cai, Yongfeng. (2016). Consideration of China Lactobacillus Industry Development Strategy. *Professional Celebrity*, 6, 9-10
- Campbell, John Y. (2003). Consumption-based asset pricing. *Handbook of the Economics of Finance*. 1, 803-887.
- Cardello, AV. (2003). Consumer concerns and expectations about novel food processing technologies: effects on product liking. *Appetite*, 40(3), 217-233.
- Chen, J., & Shen, X. L. (2015). Consumers' decisions in social commerce context: An empirical investigation. *Decision Support System*, 79, 55-64.

- Chen, X. G. (2001). The development trend of preservation technology. *Jiangsu Cooking Ingredients & Supplementary Food*, 68, 7-9.
- Chinahighlights.com (2019). Chengdu Maps. Retrieved from: <https://www.chinahighlights.com/chengdu/map.htm>
- Chinahighlights.com. (2019). Shanghai Maps. Retrieved from: <https://www.chinahighlights.com/shanghai/map.htm>
- Chong qing morning post. 2019. Businessman Wang apologized and be fined for adding Formalin into duck blood. Retrieved from: <http://cq.qq.com/a/20190411/000461.htm>
- Churchill, G. A., & Carol S. (1982), "An Investigation into the Determinants of Customer Satisfaction". *Marketing research*, 19, 491-504.
- Cohen, J, Cohen, P; West, S. G & Aiken, L. S., 2003. Applied multiple regression/correlation analysis for the behavior science (3rd ed.). Mahwah, NJ: Erlbaum.
- Coleman, James. (1990). Foundation of Social Theory. Cambridge, MA: Harvard University Press.
- Couper, M. P. (2000). Web-based surveys: A review of issues and approaches. *Public Opinion Quarterly* , 64 (4), 464-494.
- Davidson, D. J., & Freudenberg, W. R., (1996). Gender and environmental risk concerns. *Environment and Behavior*, 28, 302-339
- Davidson, D. J., & Freudenburg, W. R. (1996). Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior*, 28(3), 302-339.
- De Jonge, J., Van T, 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.
- 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
- Dehydrator Blog. (2019). History of Food Preservation-Complete Explanation. Retrieved from: <https://dehydratorblog.com/food-preservation-history/>
- Deliza, R., da Costa, M.C., Rosenthal, A., Hedderley, D. & Frewer, L. (2003) Acceptance of novel food technologies - comparison between Brazilian and British consumers. *FoodInfo Online Features*, 17 June 2003 - available from www.foodsciencecentral.com/fsc/ixid12294.
- Deliza, R., da Costa, M.C., Rosenthal, A., Hedderley, D. and Frewer, L. (2003) Acceptance of novel food technologies - comparison between Brazilian and British consumers. *Food Info Online Features*, 17 June 2003 - available from www.foodsciencecentral.com/fsc/ixid12294.
- Deliza, R., Macfie, H., & Hedderly, D. (2005). Consumer perception of passion-fruit juice using Free-Choice Profiling. *Sensory Studies*, 20(1), 17-27.
- Deliza, R., Macfie, H., & Hedderly, D. (2005). The application situation and future improvement trend of food preservatives in China. *Science and Technology Innvation Herald*, 29, 85-88.

- Delves-Broughton, J., Blackburn, P., Evans, R.J., & Hugenholtz, J. (1996). The application of bacteriocin, nisin. *Antonie van Leeuwenhoek*, 69(2),193-202.
- Deng, Lin., & Liu, Yanling. (2016). Study on the application of Lactobacillus Fermentation Broth in Beef Preservation. *Food and Fermentation Science & Technology*, 53(2), 24-28.
- Diao, Yishao., Jia, Meng., & Zhu, Luyao. (2012). Application status of food preservatives and their security analysis. *Hebei Huagong*, 35(10), 63-66.
- Dosman, D. M., Adamowicz, W. L., & Hrudef, S. E. (2001). Socioeconomic Determinants of Health- and Food Safety-Related Risk Perceptions. *Risk Analysis*, 21(2), 307-318. doi:10.1111/0272-4332.212113
- Evans, M. M., Foxall, G. & Jamal, A. (2009). Consumer behavior (2nd Ed.). Chichester, England; Hoboken, NJ: John Wiley & Sons.
- Farris, Paul W.; Neil T. Bendle; Phillip E. Pfeifer; David J. Reibstein (2010). *Marketing Metrics: The Definitive Guide to Measuring Marketing Performance*. Upper Saddle River, New Jersey: Pearson Education, Inc. ISBN 0-13-705829-2.
- Field, Simon Quellen (2008). *Why There's Antifreeze in Your Toothpaste: The Chemistry of Household Ingredients*. Chicago: Chicago Review Press
- Font-I-Furnols, S., & Guerrero, L. (2014). Consumer preferences, behavior and perception about meat and meat products: an overview. *Meat Science*, 98(3), 361-71.
- Fornell, C. G., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19(4), 440–452.
- Fox, S., Rainie, L.m Larsen, E.m Horrigan, J., Lenhart, A., Spooner, T., & Carter, C. (2001). Wired Seniors. The Pew Internet and American Life Project. Retrieved from: http://www.pewinternet.org/pdfs/PIP_Wired-Seniors_Report.pdf.
- Frenzen, P. D., DeBess, E. E., Hechemy, K. E., Kassenborg, H., Kennedy, M., McCombs, K., McNees, A. & Food net Working Group. (2001). Consumer Acceptance of Irradiated Meat and Poultry in the United States. *Journal of Food Protection*. 64(12), 2020-2026.
- Frewer, L. (2000). Risk perception and risk communication about food safety issues. *Nutrition Bulletin*, 25(1), 31-33. doi: 10.1046/j.1467-3010.2000.00015.x
- 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%20>
- Gallagher, J. (2015). Processed meats do cause cancer-WHO. Retrieved from: <https://www.bbc.com/news/health-34615621>
- Gambetta, Diego (2000) ‘Can We Trust Trust?’, in Gambetta, Diego (ed.) *Trust: Making and Breaking Cooperative Relations*, electronic edition, Department of Sociology, University of Oxford, chapter 13, pp. 213-237. Retrieved from: <https://www.csee.umbc.edu/~msmith27/readings/public/gambetta-2000a.pdf>

- Ganesan, S. (1994). Determinants of Long-Term Orientation in Buyer-Seller Relationships. *Journal of Marketing*, 58(2), 1-19.
- Garbarino, E., & Johnson, M. S. (1999). The different roles of satisfaction trust, and commitment in customer relationships. *Journal of Marketing*, 63(2), 70-87.
- Genfen, D. (2002). The effect of trust and risk perception on citizen's intention to adopt and use E-Government services in Jordan. *Association for Information System*, 3, 27-51.
- Geyskens, Inge., Steenkamp, Jan-Benedict. & Kumar N. Nirmalya. (1999). A meta-Analysis of Satisfaction in Marketing Channel Relationships. *Journal of Marketing Research* 36(2), 223-238
- Grunert, K., Sondergaard, H., Scholderer, J. (2004), How can we know what we like when we don't understand it? Consumer attitude formation towards complex technical issues. 74 Aarhus V, Denmark: MAPP – Centre for Research on Customer Relations in the Food Sector, Aarhus School of Business.
- Grunert, Klaus G. (2005). Food quality and safety; consumer perception and demand. *European Review of Agricultural Economics*, 32(3), 369-391.
- Guinalíu, M., Flavián, C. (2006). Consumer trust, perceived security and privacy policy; Three basic elements of loyalty to a website. *Industrial Management & Data System*, 106(5), 601-620.
- Gundlach, Gregory T. & Murphy, Patrick E. (1993). Ethical and Legal Foundations of Relational Marketing Exchanges. *Journal of Marketing*. 57 (4), 35-46.
- Gunes, G., & Tekin, M. D. (2006). Consumer awareness and acceptance of irradiated foods: Results of a survey conducted on Turkish consumers. *Food Science and Technology*, 39(4), 444-448.
- Hair, J., Anderson, R. E., Tatham, R. L., & Black, W. C. (2005). Multivariate data analysis. Upper Saddle River, NJ: Prentice-Hall.
- Hajli, M. Nick. (2014). A study of the impact of social media on consumers. *International Journal of Market Research*, 56(3), 387-404.
- 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.
- Helfert, G., Gemunden, H. G. (1998). Relationship Marketing Team Design: A powerful Predictor for Relationship Effectiveness, in ISBM Report #6-1998. Institute for the Study of Business Markets. Pennsylvania State University, University Park, PA, USA.
- Henning, Gebert., Malte, Geib., Lutz, Kolbe & Walter, Brenner. (2003). Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts. *Journal of Knowledge Management*. 7 (5), 107-123.
- Henseler, J., Ringle, C. M., Sarstedt, M. (2014). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modeling. *Journal of the Academy of Marketing Science*, 43 (1), 115-135.
- Henson, S., Annou, M., Cranfield, J., Ryks, J. and Herath, D. (2007), Understanding consumer attitudes towards food technologies in Canada. *International Food*

- Economy Research Group working paper no. 13. Department of Food, Agricultural and Resource Economics, University of Guelph, Ontario, Canada
- Holt, S. (1999). Determination of Customer-Perceived Value of Business-to-Business Relationship Managers: A Conceptual Model”, Damien McLoughlin, Conor Horan Proceedings of The 15th Annual IMP Conference, Dublin
- Hooper, Daire., Coughlan, Joseph. & Mullen, Michael R. (2008). Structural Equation Modeling: Guidelines for Determining Model Fit. *Electronic Journal on Business Research Methods* 6(1), 53-60
- Hossian, F., Onyango, B., Adelaja, A., Schilling, B., & Hallman, W. Consumer Acceptance of Biotechnology: Willingness to Buy Genetically Modified Food Products. *Journal of International Food & Agribusiness Marketing*, 15(1-2), 53-76.
- Hox, J. J., & Bechger, T. M. (n.d). An introduction to Structural Equation Modeling. *Journal of Family Science Review*, 11, 354-373.
https://www.researchgate.net/publication/4803118_Uses_and_Attitudes_of_Young_People_Toward_Technology_and_Mobile_Telephony
- Huang, Jikun., Qu, Huanguang., Bai, Junfei., & Pray, Carl. (2006). Awareness, acceptance and purchase intention of Chinese consumers to genetically modified food-Urban areas. *China Soft Science* 2, 66-72.
- Institute of Medicine (US) and National Research Council (US) Committee to Ensure Safe Food from Production to Consumption. (1998). Ensuring Safe Food: From Production to Consumption. Washington (DC): National Academies Press (US); 1998. Retrieved from: <https://www.ncbi.nlm.nih.gov/books/NBK209115/> doi: 10.17226/6163
- Jack, R W., Tagg, J R., & Ray, B. (1995). Bacteriocins of gram-positive bacteria. *Microbiol Rev*, 59(2), 171-200.
- Jolliffe, I. T. (2002). Principal component analysis (2nd ed.). New York, NY: Springer.
- Kahan, D.M., Slovic, P., Braman, D., Gastil, J. and Cohen, G.L. (2007), Affect, Values, and Nanotechnology Risk Perceptions: An Experimental Investigation. Cultural Cognition Working Paper No. 22.
- Kenny, D. A. (2018). Mediation. Retrieved from: <http://davidakenny.net/cm/mediate.htm>
- Khaldi, N. (1975). “Education and Allocative Efficiency in U.S. Agriculture.” *American Journal of Agricultural Economics* 57:650-657
- Kim, S., & Park, H. (2013). Effects of Various Characteristics of Social Commerce (S-Commerce) on Consumers’ Trust and Trust Performance. *International Journal of Information Management*, 33, 318-332.
- Klontz, K.C. (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.
- Królak, M., Jeżewska-Zychowicz, M., Sajdakowska, M., & Gębski, J. (2017). Does Perception of Dietary Fiber Mediate the Impact of Nutrition Knowledge on Eating Fiber-Rich Bread. *Nutrients*, 16(9), 11.

- Kumar, Dinesh., Chadda, Silky., Sharma, Jyoti., & Surain, Parveen. (2013). Syntheses, Spectral Characterization, and Antimicrobial Studies on the Coordination Compounds of Metals Ions with Schiff Base Contamination Both Aliphatic and Aromatic Hydrazide Moieties. *Bioinorganic Chemistry and Applications, volume 2013*, 981764.
- Kursunoglu, N., & Onder, M. (2019). Application of Structural Equation Modeling to Evaluate Coal and Gas Outbursts. *Tunnelling and Underground Space Technology, 88*, 63-72.
- Larzelere, R. E., & Huston, T. L. (1980). The dyadic Trust Scale: Toward understanding interpersonal trust in close relationships. *Marriage and the Family, 42*. 595-604
- Lavilla, M., & Gayan, E. (2018). Consumer acceptance and marketing of foods processed through emerging technologies. In F.J. Barba, A. S. Sant' Ana, V.Orlien, & M. Koubaa (Eds.), *Innovative technologies for food preservation: Inactivation of spoilage and pathogenic micro-organisms* (pp. 233-253). Academies Press/Elsevier. London, UK.
- Levy, A. S., Chionire, C. J., & Fein, S. B. (2008). Practice-specific risk perception and self-reported food safety practices. *Risk Anal, 28*, 749-761.
- Li, L., & Zhang, M. (2016). Preservative effects of two lactobacillus on bean curd. *China J Microecol, 28*(12), 1370-1378
- Lisabeth, LD., Sánchez, BN., & Escobar, J. (2010). The food environment in an urban Mexican American community. *Health Place, 16*(3), 598–605
- Liu, A., & Niyongira, R. (2017). Chinese consumers food purchasing behaviors and awareness of food safety. *Food Control, 79*, 185-191.
- Liu, Ping., & Song, Xia. (2010). Consideration of China Lactobacillus Industry Development Strategy. *Professional Celebrity, 6*, 9-10.
- Llieva, J., Baron, S., & Healey, N. M. (2002). Online surveys in marketing research: Pros and cons. *International Journal of Market Research* , 44 (3), 361–367.
- Luckow, T., Sheehan, V., Delahunty, C., & Fitzgerald, G. (2005). Determining the odor and flavor characteristics of probiotic, health-promoting ingredients and the 466 I. Siro' et al. / *Appetite 51* (2008)
- Lusk, Jayson., Roosen, Jutta., & Bieberstein, Andrea. (2014). Consumer Acceptance of new food technologies: causes and roots of controversies. *Journal of Annual Review of Resource Economics 6*(1), 381-405.
- Lyndhurst, B. (2009). An evidence review of public attitude to emerging food technologies. A report carried out on behalf of the Social Science Research Unit (FSA), Food Standards Agency. Brook Lyndhurst Ltd (2009).
- Lyndhurst, B. (2009).An evidence review of public attitudes to emerging food technologies, food standards agency. Retrieved from:<https://www.food.gov.uk/sites/default/files/multimedia/pdfs/>
- Mackinnon, D. P. (2008). *Introduction to Statistical Mediation Analysis*. New York: Erlbaum.
- Mariani, C., Briandet, R., Chamba, J. F., Notz, E., Carnet-Pantiez, A., Eyoug, R. N., & Oulahal, N.(2007). Biofilm ecology of wooden shelves used in ripening the French raw milk smear cheese Reblochon de Savoie. *Journal of Dairy Science,*

- 90(4), 1653-1661. doi: 10.3168/jds.2006-190
- McCluskey, J., Kalaitzandonakes, N., & Swinnen, J. (2015). Media coverage, public perception, and customer behavior; insights from new food technologies. *Annual Review of Resource Economics*, 7(1), 19.1-19.20.
- McLeod, S. (2013). What is Validity in Psychology. Simply Psychology. Retrieved from:
<https://www.simplypsychology.org/simplypsychology.org-Jean-Piaget.pdf>
- Messick, S. (n.d). Validity of Psychological Assessment: Validation of Inferences from Persons' Responses and Performances as Scientific Inquiry into Score Meaning.33
- Meyda, C. H., & Sesen, H. (2015). Structural equation modeling Amos applications. Detay Publishing, pp. 5-37.
- Miles, S., Brennan, M., Kuznesof, S., Ness. M., Ritson, C. and Frewer, L.J. (2004), Public worry about specific food safety issues. *British Food Journal*, 106 (1), 9 - 22.
- Missagia, Simone Velloso., Oliveira, Solange Riveli., & Rezende, Daniel Carvalho, (2013). Beauty and the beast: gender difference in food related behavior. *Revista Brasileira de Marketing - REMark, São Paulo*, 12(1), 149-165.
- Nelson, R, and Phelps, E. P. (1966). "Investments in Humans, Technological Diffusion, and Economic Growth." *American Economic Review* 56:69-75.
- Nie, N., Hillygus, S.& Erbring, L. (2002). Internet use, interpersonal relations and sociability: Findings from a detailed time diary study. In B. Wellman (Ed.), *The Internet in Everyday Life* (pp. 215–243). London: Blackwell Publishers
- Noterman, J., Criel, B., Kegels, G and Isu, K. (1995). A payment scheme for scheme for hospital care in the Masisi district in Zair: a critical evaluation. *Social and Medicine*, 40(7), 919-930.
- Oliver, Richard L., & Wayne, DeSarbo. (1988). Response Determinants in Satisfaction Judgements. *Consumer Research*, 14 (March), 495-507.
- Osaili, Tarequ., Obeidat, Bayan., Abu Jamous, Dima O., & Bawadi, Hiba. (2011). Food safety knowledge and practices among college female students in north of Jordan. *Food Control*, 22 (2), 269-276.
- Paul, P. C. (2013). Research Methods in Psychology. Retrieved from:
<https://opentext.wsu.edu/carriecuttler/chapter/reliability-and-validity-of-measurement/>
- Pennings, J.M.E., & Garcia,P. (2001). Measuring Producers' Risk Preferences: A Global Risk-Attitude Construct. *American Journal of Agricultural Economics*, 83(4), 993-1009. doi: 10.1111/0002-9092.00225
- Popa, M. E., & Popa, A. (2012). Consumer behavior: Determinants and trends in novel food choice. In A. Mcelhatton, & P. Jd. A. Sobral (Eds), *Novel technologies in food science* (pp. 137-156). New York: Springer.
- Popham, W. J. (2008). All About Assessment/A Misunderstood Grail. *Educational Leadership*, 66 (1), 83-83
- Price, Paul C. (2013). Research Methods of Psychology.
<https://opentextbc.ca/researchmethods/chapter/reliability-and-validity-of-measu>

rement/

- Priest, S.H. (2000), US public opinion divided over biotechnology? *Nature Biotechnology*, 18, pp. 939 – 942.
- Qiao, G. H, Guo, T, & Klein, K.K. (2012). Melamine and other food safety and health scares in China: Comparing households with and without young children. *Food Control*, 126, 378-386
- Rachbini, W. (2018). The impact of consumer trust, perceived risk, perceived benefit on purchase intention and purchase decision. *International Journal of Advanced Research*, 6(1), 1036-1044.
- Redmond, Elizabeth C., & Griffith, Christopher. (2003). A comparison and evaluation of research methods used in consumer food safety studies. *International IJC*, 27(1), 17-33.
- Rempel, J. K., Holmes, J. G., & Zanna, M. P. (1985). Trust in close relationships. *Personality and Social Psychology*, 49(1), 95-112. Retrieved from: <http://jcmc.indiana.edu/vol6/issue1/yun.html>.
- Rempel, J. K., Holmes, J. G., & Zanna, M. P., 1985. Trust in close relationships. *Journal of Personality and Social Psychology*, 49(1), 95-112. Retrieved from: http://scholarcommons.usf.edu/oa_textbooks/3
- Riddell, W. C., Song, X. D. (2012). The role of education in technology use and adoption evidence from the Canadian workplace and employee survey. IZA Discussion Paper No. 6377.
- Robbins, Blaine G. (2016). What is Trust? A Multidisciplinary Review, Critique, and Synthesis. *Sociology Compass*, 10 (10), 972-986.
- Rosati, S., & Saba, A. (2004). The perception of risks associated with food-related hazards and the perceived reliability of sources of information. *International Journal of Food. Science & Technology*, 39(5), 491-500. doi: 10.1111/j.1365-2621.2004.00808.x
- Rousson, V. (2007). The Gamma coefficient revisited. *Journal of Statistics & Probability Letters*, 77, 1696-1704.
- Ruiz, M. D., & Hüllermeier, E. (2012). A formal and empirical analysis of the fuzzy gamma rank correlation coefficient. *Information Science*, 206, 1-17.
- Ruiz, M. Dolores., & Hüllermeier, Eyke. (2012). A formal and empirical analysis of the fuzzy gamma rank correlation coefficient. *Information Science*, 206, 1-17.
- Santos, Cristiane Pizzutti Dos., & Fernandes, Daniel Von Der. (2008). Antecedents and Consequences of Consumer Trust in the Context of Service Recovery. *Brazilian Administration Review*, 5(3), 225-244.
- Schultz, T. (1964). "Transforming Traditional Agriculture." New Haven: Yale University Press.
- Schultz, T. (1975). "The Value of the Ability to Deal with Disequilibria." *Journal of Economic Literature*, 827-846.
- Senecal, S. & Nantel, J. (2004) The influence of online product recommendations on consumer online choices . *Retailing*, 80 (2), 159-169
- Sharma, S., Niedrich, R. W., & Dobbins, G. (1999). A Framework for Monitoring Customer Satisfaction: An Empirical Illustration. *Industrial Marketing Management*, 28(3), 231-243.

- Shin, D.-H. (2013). "User Experience in Social Commerce: In Friends We Trust," *Behavior & Information Technology*, 32(1), 52-67.
- Simon, S. (2015). World Health Organization Says Processed Meat Causes Cancer. Retrieved from:
- Singh, J., & Sirdeshmukh, D. (2000). Agency and trust mechanism in consumer satisfaction and loyalty judgment. *Academy of Marketing Science*, 28(1), 150-167.
- Singh, V. P., (2018). Recent approaches in food bio-preservation - a review. *Open Veterinary Journal*, 8(1): 104-111
- Soomro, Aijaz Hussain., Masud, Tariq., & Kiran, Anwaar. (2002). Role of Lactic Acid Bacteria (LAB) in Food Preservation and Human Health-A Review. *Pakistan Journal of Nutrition*, 1(1), 20-24.
- Stephoe, A., Pollard, T.M., & Wardle, J. (1995). Development of a measure of the motives underlying selection of food: the food choice questionnaire. *Appetite*, 25(3), 267-284.
- Streiner, D. L. (2005). Finding Our Way: An Introduction to Path Analysis. *The Canadian Journal of Psychiatry*, 50(2), 115-122.
- Sukrat, S., Papasratorn, B., & Chonggsuphsjasiddhi, V. (2015). Impact of customer trust on purchase intention in organic rice through Facebook: a pilot study. Conference: The 10th International Conference on e-Business (iNCEB2015). At Bangkok, Thailand.
- Supattana, Sukrat., Borworn, Papasratorn., & Vithida, Chongsuphajasiddi. (2015). Impact of customer trust on purchase intention in organic rice through Facebook: a pilot study. Conference: The 10th International Conference on e-Business (iNCEB2015), At Bangkok, Thailand.
- Teisl, M. F., Fein, S. B., & Levy, A. S. (2009). Information effects on consumer attitudes toward three food technologies: organic production, biotechnology and irradiation. *Food Quality and Preference*, 20, 586-596.
- Tonkin, E., Webb, T., Coveney, J., Meyer, S. B., & Wilson, A. M. (2016). Consumer trust in the Australian food system-the everyday erosive impact of food labeling. *Appetite*, 103, 118-127.
- Tonsor, G. T., Schroeder, T. C., & Pennings, J. M. E. (2009). Factors Impacting Food Safety Risk Perceptions. *Journal of Agricultural Economics*, 60(3), 625-644.
- Trochim, W. M. K. (2006). Introduction to Validity. *Social Research Methods*. Retrieved from: www.Socialresearchmethods.net/kb/introval.php.
- Tse, David K., & Peter, C. Wilton. (1988). Models of Consumer Satisfaction Formation: An Extension. *Marketing Research*, 25 (May),204-212.
- Urban, D.L., Miller, C., Stephenson, N.L., & Halpin, P.N. (2000). Forest pattern in Sierran landscapes: the physical template. *Landscape Ecol.*, 15, 603-620.
- Valor, J., & Sieber, S. (2003). Uses and attitudes of young people toward technology and mobile telephony. *ESE Working Paper No. D/505*
- Valor, Josep., & Sieber, Sandra. (2003). Uses and attitudes of young people toward technology and mobile telephone. IESE Business School. IESE Research Paper. Retrieved from: https://www.researchgate.net/publication/4803118_Uses_and_Attitudes_of_Yo

- ung_People_Toward_Technology_and_Mobile_Telephony
- Verbeke, W. (2001), "The emerging role of traceability and information in demand-oriented livestock production", *Outlook on Agriculture*, 30, 249-255.
- Verbeke, W., Pérez-Cueto, F. J. A., de Barcellos, M. D., Krystallis, A., & Grunert, K. G. (2010). European citizen and consumer attitudes and preferences regarding beef and pork. *Meat Science*, 84(2), 284-292
- Verbeke, Wim., Frewer, Lynn J., Scholderer, Joachim, & De Brabander, Hubert F. (2007). Why consumers behave as they do with respect to food safety and risk information. *Analytica Chimica Acta*, 586(1), 2-7.
- Wang, F. (2014). Analysis of factors that impact on the consumer risk perception of Dairy product safety in China. Master thesis. Massey University of New Zealand. Palmerston North. Retrieved from: <https://mro.massey.ac.nz/handle/10179/6787>
- Wang, S. W. (2015). Chinese students' trust in the safety of food purchased through online channels. Doctor thesis. Massey University of New Zealand. Palmerston North.
- Webb, N.M., Shavelson, R.J., Haertel, E.H. (2006). Reliability Coefficients and Generalizability Theory, in: Handbook of Statistics. *Elsevier*, 81–124. [https://doi.org/10.1016/S0169-7161\(06\)26004-8](https://doi.org/10.1016/S0169-7161(06)26004-8)
- Welch, F. (1970). "Education in Production." *Journal of Political Economy* 78, 35-59.
- Welch, F. (1973). "Education, Information, and Efficiency." *NBER Working Paper #1*.
- Wijoseno, J. & Ariyanti, M. (2015). Perceived factors influencing consumer trust and its impact on online purchase intention in Indonesia. *International Journal of Science and Research*, 6 (8), 961-968.
- Wilcock, Anne., Pun, Maria., Khanona, Joseph. & Aung May. (2004). Consumer attitudes, knowledge and behavior: A review of food safety issues. *Trends in Food Science and Technology* 15(2), 56-66.
- Williamson, Ó. (1993). Calculativeness, Trust, and Economic Organization. *Law and Economics* 36, 453–86. <https://doi.org/10.1086/467284>
- Wozniak, G. D. (1984). "The Adoption of Interrelated Innovations: A Human Capital Approach" *Review of Economics and Statistics* 66: 70-79
- Wright, K. B. (2017). Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services. *Journal of Computer-Mediated Communication*, 10(3). Retrieved from: <https://academic.oup.com/jcmc/article/10/3/JCMC1034/4614509>
- Wu, L. (2013). The study of effect of lactic acid bacteria fermentation liquor on the preservation of eggs. *China Food Additives*, 2, 229-232
- Wu, Ling. (2013). The research about Lactic Acid Bacteria and their metabolites to the preservation of egg. *China Food Additives*, 2, 194-197.
- Yang, Y. Y., & Green, S. B. (2011). Coefficient Alpha: A Reliability Coefficient for 21st Century? *Journal of Psycho educational Assessment*, 29(4),1-16. Retrieved from:

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.912.8771&rep=rep1&type=pdf>

- Yee, W. M. S., & Yeung, R. M. W. (2008). An Empirical Examination of the Role of Trust in Consumer and Supplier Relationship of Little Direct Contact: A Structural Equation Modeling Approach. *Journal of International Food & Agribusiness Marketing*, 22(1), 143-163.
- Yousef, A.E. and Carolyn Carlstrom, C. (2003) *Food microbiology: a laboratory manual*. Wiley, pp.226 [ISBN 978- 0-471-39105-0]
- Yuan, Pu., Yang, Li., Fu, Pengyu., & Li, Bin. (2017). The application situation and future improvement trend of food preservatives in China. *Science and Technology Innovation Herald*, 29, 85-88
- Yun, G. W., & Trumbo, C. W. (2000). Comparative response to a survey executed by post, email, and web form. *Journal of Computer-Mediated Communication*, 6 (1).
- Zakaria, Z., Majid, M. N. A., Ahmad, Z., & Jusoh, Z. (2018) Influence of Halal certification on customers' purchase intention. *Fundamental and Applied Science*, 9 (5), 772-788.
- Zakaria, Zainuddin., Salim, Muhammed Rahman., Ahmad, Zuriyati., Ahmad, Ferozah Haini Mohamed., & Kamaludin, Mohd Arifl. (2005). Trust as a mediator in determining customer purchase intention of Halal frozen food. *International Academic Research Journal*. 2, 283-289.
- Zepeda, L., Douthitt, R., & You, S.-Y. (2003). Consumer Risk Perceptions Toward Agricultural Biotechnology, Self-Protection, and Food Demand: The Case of Milk in the United States. *Risk Analysis*, 23(5), 973-984. doi: 10.1111/1539-6924.00374
- Zhang, Yan., Zhou, Changyi., Su, Wenjin., & Su, Guocheng. (2012). Applied research of Lactic Acid Bacteria and their metabolites in food preservation. *Academic Periodical of Farm Product Processing*, 4 (277), 21-27.
- Zhao, T., Du, Q., Li, Fi., Wang, Y., Zhu, F., & Zhao, H.K. (2016). Studies on the preservation of chilled chicken by LAB fermented solution. *Food Industry*, 37 (1), 6-10
- Zhou, Hua., Wang, Guoxia., Huang, Wenqing., & Huang, Yanhua. (2010). The exploratory research about the preservation of Lactic Acid Bacteria to *Penumatophorus japonicas*. *Guangdong Agriculture Science*, 10, 30-34.

Appendix

Questionnaire (English version)

Lactic Acid Bacteria (LAB) Preserved Vacuum-Sealed Chilled Beef

My name is Jinya Chen, from Chengdu City. I am currently studying for a Master degree at Massey University in New Zealand. This questionnaire is an important part of my Master's thesis at Massey University, in New Zealand. I want to learn about consumer purchase behavior of raw beef and examine consumer's willingness to pay for LAB(Lactic Acid Bacteria) preserved vacuum-sealed chilled beef which preserves the beef in a more natural and healthier way. I would really appreciate your help by completing this questionnaire. This questionnaire should take you around 10 to 15 minutes to do.

This survey is voluntary; respondents are free to refuse to answer any given item. All responses will be held confidentially and will be used for research purpose only. If you have any question about this survey, please feel free to contact Jinya Chen at 313405762@qq.com or (+86)173-4012-6989. This project has been assessed as low risk and been recorded in Massey University system which is reported in the Annual Report of the Massey University Human Ethics Committee.



Section1: Perception on food safety

**Q1: In general, how confident are you in the safety of the food you consume?
(Please circle the one which applies to you)**

Not confident at all 1 2 3 4 5 Very confident

Q2: How much confidence do you have in the safety of each of the following kinds of meat? (Please tick one box on the each line).

	Very much	Somewhat	A little	Not at all	Don't know
Poultry	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
Seafood	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
Pig	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
Beef	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
Sheep Meat	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

Q3: listed below are a number of issues concerning meat. How concerned are you about each of the following issues? (Please tick one of each line).

	Very much	Somewhat	A little	Not at all	Don't know
A: Food hygiene	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
B: Food poisoning (food contamination due to bacteria and viruses)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
C: Food additives	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
D:Expiry date (Food overdue)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
E:Residue of hormones, steroids and antibiotics in food	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
F: Genetically modified food	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
G: The feed given to livestock	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

H: Animal disease
(e.g. mad cow)

 5 4 3 2 1

Section2: Knowledge about preservation technology

Q4: How much do you feel you know about chemical food preservation? (tick one)

Very much 5

A good deal 4

Some 3

Not much 2

Not at all 1

Q5 Can you name an example of chemical food preservation?

Yes(Please specify _____) 2

No 1

Q6: How much do you feel you know about the potential health risk of using chemical preservation?

Very much 5

A good deal 4

Some 3

Not much 2

Not at all 1

Yes(Please specify _____) 2

No 1

Q7: Can you name an example of a potential health risk of using chemical food preservation?

Q8: How much do you feel you know about what physical food preservation is?

Very much 5

A good deal 4

Some 3

Not much 2

Not at all 1

Q9: Can you name an example of physical food preservation?

Yes(Please specify _____) 2

No 1

Q10: How much do you know about what biological food preservation is?

Very much 5

A good deal 4

Some 3

Not much 2

Not at all 1

Q11: Can you name an example of biological food preservation?

Yes(Please specify _____) 2

No 1

Q12: Have you ever heard of Lactic Acid Bacteria? (If your answer is NO, please skip Q13)

Q16. How often do you or your family members eat beef? (Please tick one only).

- | | |
|---|--|
| <input type="checkbox"/> Daily ₇ | <input type="checkbox"/> More than once a week ₆ |
| <input type="checkbox"/> Weekly ₅ | <input type="checkbox"/> More than once a month ₄ |
| <input type="checkbox"/> Monthly ₃ | <input type="checkbox"/> Once every few months ₂ |
| <input type="checkbox"/> Never ₁ | |

Q17. Where do you most often buy beef ? (Please tick one box only)

- | | |
|---|--|
| <input type="checkbox"/> Retail meat store ₁ | <input type="checkbox"/> Wholesale meat store ₂ |
| <input type="checkbox"/> Convenience store ₃ | <input type="checkbox"/> Organic store ₄ |
| <input type="checkbox"/> Farmer's market (wet market) ₅ | <input type="checkbox"/> Supermarket ₆ |
| <input type="checkbox"/> Other (please specify: _____) ₇ | |

Q18: Which kind of beef you buy most often? (Please tick one only)

- Chilled-beef ₃
- Unchilled-beef ₂
- Frozen-beef ₁

Q19: How often do you buy each of the following types of beef? (Please tick one choice on each line; please see the photos below for example of the different types of beef))

	More than once a week 6	Once a week 5	More than once a month 4	Once a month 3	Once a month 2	Never 1
A: Chilled vacuum-sealed beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B: Chilled cling wrapped beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C: Chilled cut-ready unwrapped beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D: Chilled un-cut beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E: Unchilled un-cut beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E: Unchilled cut-ready beef	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



A



B



C



D



E



F

Q20. Please rank the following factors, in an ascending order of importance, when you purchase beef (1-8, with 1=most important and 8=least important).

- Price ₁
- Origin of production (country) ₂

- Brand/Company ₃
- Food Safety ₄
- Appearance of package ₅
- Information shown on the label ₆
- Production practices ₇
- Freshness ₈

Q21: Please rank “Nutrition” factor in each type of meat (with 1=most and 4=least)

	Nutrition
Pork	<input type="checkbox"/>
Beef	<input type="checkbox"/>
Poultry	<input type="checkbox"/>
Seafood	<input type="checkbox"/>

Q22: Please rank “Flavor” factor in each type of meat (with 1=best and 4=worst)

	Flavor
Pork	<input type="checkbox"/>
Beef	<input type="checkbox"/>
Poultry	<input type="checkbox"/>
Seafood	<input type="checkbox"/>

Q23: Please rank “Food Safety” factor in each type of meat (with 1=best and 4=worst)

	Food Safety
Pork	<input type="text"/>
Beef	<input type="text"/>
Poultry	<input type="text"/>
Seafood	<input type="text"/>

Q24: Please rank “Price” factor in each type of meat (with 1=Highest and 4=Lowest)

	Price
Pork	<input type="text"/>
Beef	<input type="text"/>
Poultry	<input type="text"/>
Seafood	<input type="text"/>

Q25: Please rate how satisfied you currently are with each of the following attributes of beef on a 5 point scale.

	Very satisfied 5	Somewhat satisfied 4	A little satisfied 3	Neutral 2	Unsatisfied 1
A: Price of beef	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
B: Quality of beef	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C: Food safety of beef	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Section4 Vacuumed chilled LAB Preserved Beef

What is LAB:

Lactic acid bacteria (LAB) are the bacteria that are produced through the fermentation of certain foods. There are many different types and are commonly found in nature. Most of them have important functions for the well-being and health of the human body. These bacteria naturally live in the gastrointestinal tracts of humans and other mammals.

What is LAB preserved vacuumed chilled beef:

When a certain concentration of lactic acid bacteria is evenly spread onto chilled beef then vacuum-sealed, it is called LAB preserved vacuumed chilled beef. The organic acids and other substances produced by LAB inhibit the production and growth of various bacteria that can spoil beef, thus delaying spoilage and prolonging the shelf-life of beef.



Q26. Comparing to the beef you usually buy, how much confidence do you have on the food safety of LAB preserved vacuumed chilled beef? (Please circle the one that applies to you, 1=not confident at all and 5=very confident).

Not confident at all 1 2 3 4 5 Very Confident

Q27. Compared to the beef you usually buy how much confidence do you have on prolonged shelf-life of LAB preserved vacuumed chilled beef? Please circle the number that best applies to you, from 1=not confident at all to 5=very confident).

Not confident at all 1 2 3 4 5 Very Confident

Q28. After knowing the advantages of LAB preserved vacuumed chilled beef, compared to the beef you are currently buying how likely you are to purchase LAB preserved vacuumed chilled beef if they are both accessible to you?

- Very likely ₄
- Somewhat likely ₃
- Somewhat unlikely (skip Q23) ₂
- Not sure (skip Q23) ₁

Section 5: Willingness To Pay (WTP)

Q29. Within the last two months how much you have paid, on average, per kilo for non-bio preserved beef?

- Less than or about ¥ 30.00/500g ₅
- ¥ 30.00/500g-- ¥ 32.50/500g ₄
- ¥ 32.50/kg-- ¥ 35.00/500g ₃
- ¥ 35.00/kg-- ¥ 37.50/500g ₂
- Above ¥ 37.5/500g ₁

Q30: Compared to beef which does not offer you advantages of food safety and longer shelf life, how much more you would be willing to pay for LAB preserved vacuum-sealed chilled beef, which has more advantages in terms of food safety and longer shelf life?

- More than 20% ₇
- Between 15% and 20% ₆
- Between 10% and 14% ₅
- Between 5% and 9% ₄
- Between 1% and 4% ₃
- 0% ₂
- Not at all ₁

Section4: About yourself (All your personal information will be treated as confidential)

Q31. Are you:

Male ₁

Female ₂

Q32. What is your current age?

18 to 25 ₁

26 to 35 ₂

36 to 45 ₃

46 to 55 ₄

56 to 65 ₅

66 or above ₆

Q33. What is the highest level of education you have completed?

Some high school or lower ₁

High school graduate ₂

Some college/technical/vocational training ₃

Associate degree ₄

Bachelor's degree ₅

Master's degree ₆

Ph.D. degree ₇

Others (please specify: _____) ₈

Q34. What is your current marital status?

- Married ₁
- Never married ₂

- Living with partner ₃
- Divorced ₄
- Separated ₅
- Widowed ₆

Q35. How many children under 18 years old live with you?

- None ₁
- One ₂

- Two ₃
- Three ₄
- Above three ₅

Q36. What is your household's approximate annual gross income before taxes in 2017?

<input type="checkbox"/> Less than ¥ 29,999 ₁	<input type="checkbox"/> ¥ 30,000 - ¥ 49,999 ₂
<input type="checkbox"/> ¥ 50,000 - ¥ 69,999 ₃	<input type="checkbox"/> ¥ 70,000 - ¥ 89,999 ₄
<input type="checkbox"/> ¥ 90,000 - ¥ 99,999 ₅	<input type="checkbox"/> ¥ 100,000 - ¥ 149,999 ₆
<input type="checkbox"/> ¥ 150,000 - ¥ 199,999 ₇	<input type="checkbox"/> Greater than ¥ 200,000 ₈

Q37. What is your occupation?

- Government Employee ₁
- Private Sector Employee ₂
- Academic Institution ₃
- Student ₄
- Retired ₅
- Unemployed ₆
- Self-employed ₇
- Others (please specify: _____) ₈

Q38: In which city do you currently live?

- Shanghai City ₂
- Chengdu City ₁

Q39: What kind of place do you currently live in ? (please tick one box only)

- City ₃
- Town ₂
- Village ₁

Q40: Is there any supermarket or stores near where you are currently living selling chilled beef?

- Yes ₃
- No ₂
- Don't Know ₁

Q41. Are you the primary shopper for food in your family?

- Yes ₂
- No ₁

Thank you for taking time to help us on our survey about your beef purchase experience. Your participation will help us to develop our knowledge and experience about food safety.

Questionnaire (Chinese Version)

乳酸菌保鲜的真空冷藏生鲜牛肉

我的名字叫陈金娅来自成都。目前在新西兰梅西大学攻读农业贸易硕士学位。这份问卷将作为我硕士毕业论文的一部分。我的主要研究课题为了解消费者在新型乳酸菌保鲜的真空冷藏牛肉的消费行为。对于您的参与和帮助本人非常感激。回答这份问卷大概需要 10 到 15 分钟。

本次问卷调查完全是自愿行为，您在任何时候都有权利拒绝回答。所有的回答将保密且只作为学术研究。如果您有任何的疑问请及时与我联系。联系方式：313405762@qq.com 或者 (+86) 173-4012-6989。本项目已通过梅西大学伦理委员会审查。



第一章：关于食品安全的意识

Q1: 总得来说，您对您目前所购买的食品的安全信心指数为：(1=一点信心也没有，5=非常有信心)。(请圈出匹配您的信心指数)

一点信心也没有 1 2 3 4 5 非常有信心

Q2: 在下列肉类中，您对每种肉类的食品安全信心指数为：(请在方框内打勾)

	非常有信心	有一定信心	有一点信心	完全没信心	不知道
家禽	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
海鲜	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
猪肉	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
牛肉	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
羊肉	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

Q3: 目前社会中食品行业存在着一系列的隐患让消费者担忧，在以下相关食品隐患中，您对每一个问题的担心程度为：(请在方框内打勾)

	非常担心	有一些担心	一点点担心	一点也不担心	不知道
A: 食品卫生	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
B: 食物中毒(由细菌或者病毒引起的食品污染)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
C: 食品添加剂	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
D: 食品保质期(过期食品)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
E: 食品中农药及抗生素的残留	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
F: 转基因食品	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
G: 给家禽喂养的饲料	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
H: 动物疾病(疯牛病, 禽流感)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

第二章：关于保鲜技术的认知和知识

Q4: 您认为您对化学食品保鲜剂的认识程度为:

非常了解 5 还不错 4 有一些 3 一点点 2 一点也没有 1

Q5 您可以说出任意一种因为使用化学保鲜剂可能引起的健康威胁吗?

可以 (请说明一种健康威胁: _____) 2

不可以 1

Q6: 您认为您对化学食品保鲜剂可能引起的健康威胁了解程度为:

非常了解 5 还不错 4 有一些 3 一点点 2 一点也没有 1

Q7:您能说出一一种因为使用化学保鲜剂可能引起的健康威胁吗:

可以 (请说明一种方式: _____) 2

不可以 1

Q8: 您认为您对物理食品保鲜方式的认识程度为:

非常了解 5 还不错 4 有一些 3 一点点 2 一点也没有 1

Q9 您可以说出任意一种物理保鲜的方式吗?

可以 (请说明一种方式: _____) 2

不可以 1

Q10: 您认为您对生物食品保鲜方式的认识程度为

非常了解 5 还不错 4 有一些 3 一点点 2 一点也没有 1

Q11: 您可以说出任意一种生物保鲜的方式吗?

可以 (请说明一种方式: _____) 2

不可以 1

Q12: 请问在此次调查问卷之前, 您有听说过乳酸菌吗?

有听说过 2

没有听说过 1

Q13: 根据您目前的认知范围, 乳酸菌目前是被使用在下列哪些领域? (可多选)

乳制品 5

消化类药品 4

除了乳制品之外的发酵类食品 3

保鲜 2

其他 (请说明 _____) 1

Q14: 我们会通过各种渠道获得我们所需要的信息, 食品安全信息也不例外。在下列各种信息渠道中, 针对于食品安全信息您使用的频率是怎样的呢? (请在方框内打勾)

	每天使用至少一次 5	每周使用至少一次 4	每月至少使用一次 3	一个月少于一次使用 2	从来不使用 1
电视	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
收音机	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
口头听说	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
食品包装	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
网络	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
纸质印刷媒体	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

第三节: 关于牛肉的购买

Q15: 请问您和您的家人多久购买一次牛肉 (请在方框内打勾)

一周超过一次购买 6

一个月超过一次购买 4

几个月购买一次 2

一周购买一次 5

一个月购买一次 3

从来不购买

Q16. 请问您和您的家人多久食用一次牛肉呢？（请在方框内打勾）。

- | | |
|------------------------------------|--------------------------------------|
| <input type="checkbox"/> 每日食用 7 | <input type="checkbox"/> 一周食用超过一次 6 |
| <input type="checkbox"/> 一周食用一次 5 | <input type="checkbox"/> 一个月食用超过一次 4 |
| <input type="checkbox"/> 一个月食用一次 3 | <input type="checkbox"/> 几个月食用一次 2 |
| <input type="checkbox"/> 从来不食用 1 | |

Q17. 请问您们最常在以下什么地方购买牛肉？

- | | |
|--|-----------------------------------|
| <input type="checkbox"/> <input type="checkbox"/> 肉制品零售店 1 | <input type="checkbox"/> 肉制品批发店 2 |
| <input type="checkbox"/> <input type="checkbox"/> 便利店 3 | <input type="checkbox"/> 有机肉蔬店 4 |
| <input type="checkbox"/> <input type="checkbox"/> 农贸市场 5 | <input type="checkbox"/> 超市 6 |
| <input type="checkbox"/> 其他 (请说明: _____)7 | |

Q18: 请问以下哪种牛肉您购买的最多（请只选一项）

- 冷藏牛肉 3
 非冷藏牛肉 2
 冷冻牛肉 1

Q19: 请问在以下牛肉种类中，您购买的频率大致为：（请参考图片）

	一周多于 一次 6	一周一次 5	一月多于 一次 4	一月一 次 3	几个月一 次 2	从来 不 1
A:冷藏真空包装牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B:冷藏保鲜膜包装牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C:冷藏散装牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D:冷藏点切牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E:非冷藏点切牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F:非冷藏散装牛肉	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



A



B



C



D



E F

Q20. 在以下 9 个可能影响您购买行为的因素中，请从 1 到 9（从最重要到不重要）进行排序）

- 价格
- 牛肉原产地（国家）
- 品牌
- 食品安全
- 食品的外在包装
- 包装上所显示的食品信息
- 生产流程
- 新鲜度
- 其他（请说明：_____）

Q21: 在以下营养因素中，请您对各种肉类在每一种因素中进行排名：（1=最好，4=最不好）

	营养
猪肉	<input type="checkbox"/>
牛肉	<input type="checkbox"/>
家禽	<input type="checkbox"/>
海鲜	<input type="checkbox"/>

Q22: 在以下口味因素中, 请您对各种肉类在每一种因素中进行排名: (1=最好, 4=最不好)

	口味
猪肉	<input type="checkbox"/>
牛肉	<input type="checkbox"/>
家禽	<input type="checkbox"/>
海鲜	<input type="checkbox"/>

Q23: 在以下食品安全因素中, 请您对各种肉类在每一种因素中进行排名: (1=最好, 4=最不好)

	食品安全
猪肉	<input type="checkbox"/>
牛肉	<input type="checkbox"/>
家禽	<input type="checkbox"/>
海鲜	<input type="checkbox"/>

Q24: 在以下价格因素中, 请您对各种肉类在每一种因素中进行排名: (1=最好, 4=最不好)

	价格
猪肉	<input type="checkbox"/>
牛肉	<input type="checkbox"/>
家禽	<input type="checkbox"/>
海鲜	<input type="checkbox"/>

Q25:在以下三个因素中（牛肉价格，牛肉质量，牛肉安全性），您对您目前购买的鲜牛肉在每一个因素的满意度为：

	非常满意 5	比较满意 4	一点点满意 3	不满意 2	不知道 1
A: 牛肉价格	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B: 牛肉质量	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C: 牛肉安全性	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

第四节：乳酸菌保鲜的真空冷藏牛肉

什么是乳酸菌：

乳酸菌是一种通过特定食物发酵产生的菌类。有很多中乳酸菌可在自然界中找到。他们大多数在人类健康中起到重要作用。这些有益的乳酸菌在人类和其他哺乳类动物的肠道和胃部都可以找到。

什么是乳酸菌保鲜的真空冷藏牛肉：



当把一定浓度的乳酸菌试液均匀地涂抹在冷藏牛肉上再进行真空包装，这种牛肉就叫做乳酸菌真空保鲜冷藏牛肉。由乳酸菌代谢产生的有机物和其他物质可以抑制各种致腐细菌的产生和生长，因为延缓牛肉的腐败以及延长牛肉的货架时间。

Q26. 对比您目前购买的生鲜牛肉，您对乳酸菌真空保鲜的生鲜牛肉在食品安全方面的信心指数为：1=一点信心也没有，5=非常有信心。（请圈出匹配您的信心指数）

一点信心也没有 1 2 3 4 5 非常有信心

Q27. 对比您目前购买的生鲜牛肉，您对乳酸菌真空保鲜的生鲜牛肉在延长货架时间方面的信心指数为：1=一点信心也没有，5=非常有信心。（请圈出匹配您的信心指数）

一点信心也没有 1 2 3 4 5 非常有信心

Q28. 在了解学习乳酸菌真空保鲜生鲜牛肉的优势之后，您愿意购买此种牛肉吗？

- 非常愿意 4
- 比较愿意 3
- 不太愿意（请跳过第 23 题） 2
- 非常不愿意（请跳过第 23 题） 1

第五节：意向购买价格

Q29. 在过去两个月中，您购买的生鲜牛肉大致平均价格为：

- 少于 ¥ 30.00/500g 5
- 介于 ¥ 30/500g-- ¥ 32.5/500g 4
- 介于 ¥ 32.5/500g-- ¥ 35/500g 3
- 介于 ¥ 35.00/500g-- ¥ 37.5/500g 2
- 高于 ¥ 37.5/500g 1

Q30: 对比于在食品安全性以及货架时间上没有明显优势的普通生鲜牛肉, 对于乳酸菌真空保鲜的生鲜牛肉您认为这种牛肉比普通牛肉贵多少您可以接受呢?

<input type="checkbox"/> 大于 20% 7
<input type="checkbox"/> 介于 15%--20% 6
<input type="checkbox"/> 介于 10%--14% 5
<input type="checkbox"/> 介于 5%--9% 4
<input type="checkbox"/> 介于 1%--4% 3
<input type="checkbox"/> 0% 2
<input type="checkbox"/> 不想买 1

第六章：关于您自己：

Q31. 请问您的性别是：

男性 1

女性 2

Q32. 请问您目前的年龄是：

18 to 25 1

26 to 35 2

36 to 45 3

46 to 55 4

56 to 65 5

66 or above 6

Q33. 请问您最高的学历是：

- 初中及以下 1
- 高中 2
- 中专/大专 3
- 本科学位 4
- 硕士学位 5
- 博士学位 6
- 其他（请说明：_____） 7

Q34. 请问您目前的婚姻状况为？

- 已婚 1
- 未婚 2
- 同居 3
- 离异 4
- 分居 5
- 配偶去世（单身） 6

Q35. 请问目前跟您一起生活年龄低于 18 岁的孩子有几个呢？

- 没有 1
- 一个 2
- 两个 3
- 三个 4
- 多于三个 5

Q36. 请问您以及您的家人年度家庭收入大致为?

<input type="checkbox"/> Less than ¥ 29,999	1
<input type="checkbox"/> ¥ 30,000 - ¥ 49,999	2
<input type="checkbox"/> ¥ 50,000 - ¥ 69,999	3
<input type="checkbox"/> ¥ 70,000 - ¥ 89,999	4
<input type="checkbox"/> ¥ 90,000 - ¥ 99,999	5
<input type="checkbox"/> ¥ 100,000 - ¥ 149,999	6
<input type="checkbox"/> ¥ 150,000 - ¥ 199,999	7
<input type="checkbox"/> Greater than ¥ 200,000	8

Q37. 请问您的职业是?

政府工作人员 1

私企工作人员 2

学术机构工作人员 3

学生 4

退休 5

待业 6

自雇 7

其他 (请说明: _____) 8

Q38:请问目前您居住在哪个城市?

上海市 2

成都市 1

Q39:请问您目前居住在：(请只选一项)

城市 3

城镇 2

乡村 1

Q40: 请问在您目前的居住地点附近有没有超市或者其他商店种类销售冷藏生鲜牛肉?

有 3

没有 2

不知道 1

Q41. 请问您是家里食物方面的主要购买人吗?

是的 2

不是 1

非常感谢您抽出宝贵的时间参与我们此次调查。您的帮助将协助我们进一步研究食品安全方面的问题。