Building Trust Through Innovative Trust Building Process: the case of organic food market in Thailand

Miss Supranee Tangnatthanakrit

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Technopreneurship and Innovation Management
Inter-Department of Technopreneurship and Innovation Management
GRADUATE SCHOOL
Chulalongkorn University
Academic Year 2019

การสร้างความเชื่อมั่นผ่านนวัตกรรมกระบวนการสร้างความเชื่อมั่น: กรณีศึกษาตลาดอาหารอินทรีย์ในประเทศไทย

น.ส.สุปราณี ตั้งณัฐธนกฤต

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรดุษฎีบัณฑิต
สาขาวิชาธุรกิจเทคโนโลยีและการจัดการนวัตกรรม สหสาขาวิชาธุรกิจเทคโนโลยีและการจัดการนวัตกรรม
บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2562

Thesis Title	
By	Miss Supranee Tangnatthanakrit
Field of Study	Technopreneurship and Innovation Management
Thesis Advisor	Associate Professor Krittinee Nuttavuthisit, Ph.D.
Thesis Co Advisor	Assistant Professor Praima Israsena na ayudhya, Ph.D.

Accepted by the GRADUATE SCHOOL, Chulalongkorn University in Partial Fulfillment of the Requirement for the Doctor of Philosophy

..... Dean of the GRADUATE SCHOOL
(Associate Professor THUMNOON NHUJAK, Ph.D.)

DISSERTATION COMMITTEE

..... Chairman
(Professor TIRAYUT VILAIVAN, Ph.D.)
..... Thesis Advisor
(Associate Professor Krittinee Nuttavuthisit, Ph.D.)
..... Thesis Co-Advisor
(Assistant Professor Praima Israsena na ayudhya, Ph.D.)
..... Examiner
(Ms. Kunwadee Sripanidkulchai, Ph.D.)
..... Examiner
(Assistant Professor KAVIN ASAVANANT, Ph.D.)
..... External Examiner
(Ms. Rungrat Wiangsripanawan, Ph.D.)

สุปราณี ตั้งณัฐธนกฤต : การสร้างความเชื่อมั่นผ่านนวัตกรรมกระบวนการสร้างความเชื่อมั่น: กรณีศึกษาตลาดอาหารอินทรีย์ในประเทศไทย . (Building Trust Through Innovative Trust Building Process: the case of organic food market in Thailand) อ.ที่ปรึกษาหลัก : รศ. ดร.กฤตินี ณัฏฐวุฒิสิทธิ์, อ.ที่ปรึกษาร่วม : ผศ. ดร.ไปรมา อิศรเสนา ณ อยุธยา

ในปัจจุบันผู้บริโภคกำลังเผชิญกับความท้าทายในด้านการขาดความไว้วางใจอาหารอินทรีย์อันเนื่องมาจากปัจจัยด้านความน่าเชื่อถือของข้อมูล ความโปร่งใสของห่วงโซ่อุปทาน คุณภาพของผลิตภัณฑ์ การขนส่ง ผลกระทบต่อสิ่งแวดล้อม การทุจริตปลอมปน และความปลอดภัยของอาหาร อีกทั้งผู้บริโภคเองยังขาดความไว้วางใจในตรารับรองคุณภาพอาหารอินทรีย์จากหน่วยงานที่เกี่ยวข้อง ส่งผลให้ผู้บริโภคได้หันไปหาแหล่งข้อมูลอื่นๆ อาทิ เช่น ชื่อเสียงของผู้ค้าปลีก ความน่าเชื่อถือของผู้ผลิต ซึ่งสอดคล้องกับจากงานวิจัยที่ผ่านมาว่า การมีปฏิสัมพันธ์ที่ดีนั้นจะเกิดจากพื้นฐานของความเชื่อมั่นและความไว้วางใจ ในส่วนขององค์ความรู้ด้านความเชื่อมั่นยังคงขาดงานวิจัยในเชิงลึกโดยเฉพาะอย่างยิ่งภายใต้อุตสาหกรรมอาหาร การวิจัยฉบับนี้จึงมี *วัตถุประสงค์* เพื่อสำรวจปัจจัยที่ส่งผลต่อความเชื่อมั่น ศึกษาผลกระทบที่มีต่อองค์ประกอบความน่าเชื่อถือ และสำรวจพฤติกรรมที่เกี่ยวข้องกับความเชื่อมั่นและความไว้วางใจผ่านนวัตกรรมกระบวนการสร้างความเชื่อมั่นภายใต้บริบทงานวิจัยของตลาดอาหารอินทรีย์ในประเทศไทยที่มีความเปราะบางในด้านความน่าเชื่อถือ โดยการออกแบบนวัตกรรมแพลตฟอร์มการสร้างความเชื่อมั่นเป็นเครื่องมือที่ใช้ในการวิจัย

ในส่วนของวิธีดำเนินงานวิจัยนี้ประกอบด้วย 6 ขั้นตอน โดย*ขั้นตอนแรก* การสำรวจกรอบแนวคิดและปัจจัยที่ส่งผลต่อความเชื่อมั่นข้อมูลจากการทบทวนวรรณกรรมและการสัมภาษณ์ผู้เชี่ยวชาญ 5 ท่าน พบว่า ปัจจัยที่ส่งผลต่อความเชื่อมั่นในอาหารอินทรีย์ ได้แก่ การควบคุมความสามารถ คุณลักษณะ การสื่อสาร และความเป็นชุมชน และการผลการสำรวจจากผู้ตอบแบบสอบถาม 319 ท่าน พบว่าคุณลักษณะและความเป็นชุมชนส่งผลกระทบต่อความเชื่อมั่นและความไว้วางใจ จากนั้นนำผลมาวิเคราะห์ใน*ขั้นตอนที่สอง* ด้านความต้องการคุณสมบัติและการออกแบบแพลตฟอร์ม โดยการประชุมเชิงปฏิบัติการสร้างสรรค์ร่วมซึ่งประกอบไปด้วยผู้เชี่ยวชาญ เกษตรกร ภาคธุรกิจและผู้บริโภค 21 ท่าน พบว่า ความโปร่งใสของข้อมูลและกระบวนการสื่อสารถือเป็นข้อกำหนดที่สำคัญในการรสร้างความเชื่อมั่นและความไว้วางใจ *ขั้นตอนที่สาม คือการนำผลที่ได้ทั้งหมด*มาออกแบบและพัฒนาแพลตฟอร์มโดยใช้เทคโนโลยีบล็อกเชน *ขั้นตอนที่สี่* การศึกษาการยอมรับแพลตฟอร์มของผู้ใช้ โดยการสำรวจจากแบบสอบถาม 128 ท่าน พบว่าการยอมรับของผู้ใช้ ความพึงพอใจ ความสนใจและคุณค่าของแพลตฟอร์มอยู่ในระดับสูง ใน*ขั้นตอนที่ห้า จาก*การสำรวจด้วยแบบสอบถาม พบว่า ความสามารถในการสื่อสารเป็นเพียงปัจจัยเดียวที่ส่งผลกระทบต่อความเชื่อมั่นของผู้บริโภค และความตั้งใจที่จะซื้อ ความตั้งใจที่จะร่วมสร้างสรรค์ถือว่าเป็นตัวอย่างของพฤติกรรมที่เกี่ยวข้องกับความเชื่อมั่นและไว้วางใจ *ขั้นตอนสุดท้าย* แผนการนำไปใช้ประโยชน์เชิงพาณิชย์จะเป็นการจัดตั้งธุรกิจใหม่ในฐานะผู้ให้บริการการแก้ปัญหาด้านเทคโนโลยี นอกจากนี้งานวิจัยยังก่อให้เกิดการต่อยอดองค์ความรู้ในทฤษฎีความน่าเชื่อถือและความไว้วางใจทางสังคมศาสตร์โดยบูรณาการกระบวนการสร้างความไว้วางใจ เพื่อตรวจสอบการพัฒนาความเชื่อมั่นของผู้บริโภค และยังสามารถเป็นแนวทางในการสร้างนโยบายเพื่อสร้างความเชื่อมั่นและส่งเสริมการขยายตลาดอาหารอินทรีย์อย่างยั่งยืน

สาขาวิชา	ธุรกิจเทคโนโลยีและการจัดการนวัตกรรม	ลายมือชื่อนิสิต .....
ปีการศึกษา	2562	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....
		ลายมือชื่อ อ.ที่ปรึกษาร่วม

5887808320 : MAJOR TECHNOPRENEURSHIP AND INNOVATION MANAGEMENT
KEYWORD: Trust, Consumer trust, 5Cs, Transparency, Co-creation, Innovative trust-building process, Innovative trust-building platform, Blockchain technology, Organic food, Thailand

Supranee Tangnatthanakrit : Building Trust Through Innovative Trust Building Process: the case of organic food market in Thailand. Advisor: Assoc. Prof. Krittinee Nuttavuthisit, Ph.D. Co-advisor: Asst. Prof. Praima Israsena na ayudhya, Ph.D.

The organic food industry is currently faced with challenges of consumer mistrust due to the current food supply chain issues concerning the reliability of information, supply chain transparency, product quality, logistic issues, environmental impact, fraud, and food safety. Although receiving certification from the authorized institutions is one way of building consumer trust, it remains a cumbersome process. In addition, consumers are increasingly looking to develop trust through other sources, such as searching for information that relates to the reputation of the retailers or the credibility of the producers. While trust has been generally defined in previous trust-related studies as the positive outcomes of interaction, it remains fairly under-theorized in food studies. This research aims to explore the determinants of trust and understand their impact on trust components and trust-related behaviors through an innovative trust building process. To this end, an innovative trust-building platform is designed as the research tool for achieving the research objectives. The research scope is the organic food market in Thailand where trust is fragile, and the system or market is fragmented.

Comprising six phases, this study begins by exploring the conceptual framework and determinants of trust. Data were collected from a systematic literature review, expert interviews, and a survey. The 5Cs – control, competence, characteristics, communication, and community – were identified as the determinants of trust in the organic food context. A survey of 319 respondents revealed that certain characteristics and community factors impacted the trusting beliefs and trusting intentions. The second phase of this study is the requirement analysis which entails the features and design of the platform. A trust-building co-creative workshop was organized with 21 participants comprised of experts, farmers, businesses, and consumers. The key requirements identified by the participants included information transparency and the communication process. The third phase of this study is the design and development of the platform by implementing blockchain technology. Fourth, a study of user acceptance was conducted by a questionnaire survey of 128 respondents. The results revealed high levels of user acceptance, satisfaction, interest, and platform value. The fifth phase assesses the subsequent development of consumer trust. From the 128 participants in the questionnaire survey, communication was the only determinant that was found to impact consumer trust. Both intention to purchase and intention to co-create were identified as the trust-related behavioral outcomes. Lastly, a commercialization plan recommends a new enterprise positioned as a technical solutions provider. This research contributes to the trust theory in social sciences by integrating the trust-building process and examining the development of consumer trust through the process. The findings are of value in formulating effective trust-building policies and promoting expansion of the sustainable organic food market.

Field of Study:	Technopreneurship and Innovation Management	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....
		Co-advisor's Signature .....

ACKNOWLEDGEMENTS

This dissertation is the result of four years of research work. I would like to express my sincere gratitude to my main advisors, Associate Professor Krittinee Nuttavuthisit, Ajarn Amm, and Assistant Professor Praima Israsena na Ayudhya, Ajarn Poo. With great tolerance, they have guided me during the research process, providing me with useful comments, encouragement, and friendship. Aj Amm always addresses the critical questions as 'food for thought'.

Without the following people, I would not have been able to complete this research, nor would I have made it through my doctorate degree!

I thank Dr Rungrat Wiangsripanawan, who provided great advice and support on Blockchain technology. The innovative trust-building platform would not exist without her kindness and support. Most importantly, I thank the committees including Professor Tirayut Vilaivan, Dr Kunwadee Sripanidkulchai, and Assistant Professor Kavin Asavanant, who provided the valuable suggestions to make this research more complete.

I would also like to thank Mr Arrut Navaraj, the Sampran model team, and the Sasin team who always assisted me and provided great support while I was conducting my fieldwork and data collection. Special thanks go to the platform development team – Khun Nat, Nong Best, and Nong Ma – who were so influential in making the innovative trust-building platform finally happen!

I would like to express my gratitude to all of the participants in the workshop, focus group, interviews, and survey. I thank you all for devoting your time and providing so much valuable information for this dissertation. Without your great cooperation, it would have been impossible for me to collect all the data needed for this thesis.

My biggest thanks must go to my beloved family – Papa; Mama; Jae Aey; Jae Su; my two nieces, Nong Pin and Nong Pam; and my brothers-in-law, P Kriang and P Pui – for all the support you have shown me throughout my PhD journey. Without your support, I would have stopped my studies a long time ago. For my boyfriend, a special thank you for all your support and understanding from the first year of my study. You have been amazing!

Lastly, I thank myself for being patient and persevering during these five years. This achievement proves that "Where there is a will, there is a way."

Supranee Tangnatthanakrit

TABLE OF CONTENTS

Page

..... iii
ABSTRACT (THAI) iii
.....iv
ABSTRACT (ENGLISH).....iv
ACKNOWLEDGEMENTS.....v
TABLE OF CONTENTS.....vi
List of Tables xiii
List of Figures.....xv
Chapter 1 Introduction.....1
1.1 Background.....1
1.2 Research objectives 5
1.3 Research scope 6
1.4 Definition of words in this study 7
1.4.1 Organic agriculture.....7
1.4.2 Organic food.....7
1.4.3 Active consumers 7
1.4.4 Trust in food consumption 7
1.4.5 Transparency 8
1.4.6 Blockchain technology.....8
1.5 Research contributions 8
1.5.1 Academic contributions.....8
1.5.2 Practical contributions.....9
1.6 Research activities.....10
Chapter 2 Literature Review.....11
2.1 Fundamental of trust.....11

2.1.1 Components of trust 12
2.1.2 Types of trust 14
2.1.3 Sources of trust 15
2.1.3.1 Control or rule of law 15
2.1.3.2 Competence and reputation 15
2.1.3.3 Characteristics or personality traits 16
2.1.3.4 Communication 16
2.1.3.5 Community or social interactions 17
2.2 Trust in the organic food market 18
2.2.1 Components of trust in organic foods 18
2.2.2 Types of trust in organic foods 19
2.2.3 Sources of trust in organic foods 20
2.2.3.1 Control or rule of law 20
2.2.3.2 Competence and reputation 22
2.2.3.3 Characteristics or personality traits 22
2.2.3.4 Communication 23
2.2.3.5 Community or social interactions 23
2.3 Food traceability and transparency 25
2.4 Trust-based Technology: Blockchain 27
2.4.1 Blockchain technology 28
2.4.2 Blockchain principles and characteristics 29
2.4.3 Examples of Blockchain applications 31
2.4.3.1 Finance 32
2.4.3.2 Supply chain 32
2.4.3.3 Healthcare 33
2.5 Technology acceptance model (TAM) 34
2.5.1 Perceived usefulness 34
2.5.2 Perceived ease of use 35
2.6 Conceptual framework 36

Chapter 3 Methodology 38
3.1 Research methodology 38
3.2 Research process 41
3.2.1 Phase 1: Exploration of the conceptual framework and determinants of trust 41
3.2.2 Phase 2: Exploration of platform requirements through a trust building co-creative workshop 43
3.2.3 Phase 3: Development of an innovative trust-building platform and evaluation of its technical performance.....46
3.2.4 Phase 4: Consumer acceptance testing of the innovative trust-building platform 47
3.2.5 Phase 5: Trust-related behavioral outcomes.....48
3.2.6 Phase 6: Development of a commercialization strategy.....50
Chapter 4 Requirement Analysis and Platform Development.....51
4.1 Phase 1: Exploration of the conceptual framework and determinants of trust..51
4.1.1 Consumer characteristics.....53
4.1.2 Consumer perceptions towards sources of trust 55
4.1.3 Impact of sources of trust on consumer trust levels 56
4.2 Phase 2: Exploration of platform requirements through a trust-building co-creative workshop.....58
4.2.1 Stakeholder map 58
4.2.1.1 Needs or requirements between each relationship 59
4.2.1.2 Pain points of each stakeholder 59
4.2.1.3 Gain points of each stakeholder.....60
61
4.2.2 Journey maps.....61
4.2.3 Key values and requirements 65
4.2.4 Consumer segmentation 67
4.3 Phase 3: Development of an innovative trust-building platform and evaluation of its technical performance 70
4.3.1 Blockchain system.....71

4.3.2 Application design....74
4.3.3 User experience and user interaction design (UX/UI) 76
4.3.4 Technical performance testing 81
Chapter 5 Consumer Acceptance and Consumer Trust Development....82
5.1 Phase 4: Consumer acceptance testing of the innovative trust-building platform 82
5.1.1 Concept acceptance results....82
5.1.1.1 Focus group 82
5.1.1.2 Consumer acceptance survey....84
5.1.2 Technology acceptance model (TAM)....89
5.2 Phase 5: Trust-related behavioral outcomes....93
Chapter 6 Commercialization 97
6.1 Summary of product (business): Innovative trust-building platform 97
6.1.1 Technology details 98
6.1.1.1 Key Features 98
6.1.1.2 Potential benefits 98
6.1.1.3 Advantages 99
6.1.1.4 Commercialization benefits....99
6.1.2 Technology assessment 100
6.1.2.1 Technology readiness 100
6.1.2.2 Skills required to use the technology....100
6.1.2.3 Possibility for extension 100
6.1.2.4 Resource management....101
6.1.2.5 Market acceptance 101
6.2 Value chain analysis....101
6.3 Situation analysis....104
6.3.1 PESTEL....104
6.3.1.1 Political aspect....104
6.3.1.2 Economics aspect 105

6.3.1.3 Social aspect 105
6.3.1.4 Technological aspect 106
6.3.1.5 Environmental aspect 106
6.3.1.6 Legal aspect 107
6.3.2 Porter's Five Forces Model 107
6.3.2.1 Barriers to entry or threat of new entrants 108
6.3.2.2 Bargaining power of buyers 108
6.3.2.3 Bargaining power of suppliers 108
6.3.2.4 Rivalry among existing competitors 109
6.3.3 Market assessment 109
6.3.3.1 Size of the organic food market 109
6.3.3.2 Blockchain in the agricultural market 110
6.3.4 SWOT analysis 112
6.4 Technology exploitation 113
6.4.1 New enterprise 113
6.4.2 Non-exclusive licensing 114
6.5 Financial calculation 116
6.5.1 Investment estimation 116
6.5.2 Revenue estimation 116
6.5.3 Cost estimation 117
Chapter 7 Discussion and Conclusion 120
7.1 Phase 1: Exploration of the conceptual framework and determinants of trust 120
7.1.1 Expert interviews 120
7.1.2 Consumer trust survey 121
7.1.2.1 Determinants of trust 121
7.1.2.2 Impact of the determinants of trust on consumer trust 121
7.2 Phase 2: Exploration of the requirements for the innovative trust-building ... 122
platform through a trust building co-creative workshop 122
7.2.1 Trust building co-creative workshop 122

7.3 Phase 3: Development of the innovative trust-building platform and evaluation of its technical performance 124
7.4 Phase 4: Consumer acceptance testing of the innovative trust-building platform 125
7.4.1 Focus group discussion 125
7.4.2 In-depth interviews 126
7.4.3 Consumer acceptance 126
7.5 Phase 5: Trust-related behavioral outcomes 127
7.6 Phase 6: Commercialization strategy 128
7.6 Theoretical contributions 128
7.7 Practical contributions 130
7.8 Limitations and future research recommendations 132
7.8.1 Limitations 132
7.8.2 Future research recommendations 132
REFERENCES 134
Appendices 141
Appendix 1 Details research methodology 142
Appendix 2 Sources of Trust Survey 147
Appendix 3 Trust building co-creative workshop participants' profile 154
Appendix 4 Double diamond design process for trust building co-creative workshop (adapted from Design Council, 2015) 155
Appendix 5 Co-creation techniques and their relationship with 5Cs aspect of trust 156
Appendix 6 Trust building co-creative workshop Protocol 158
Appendix 7 Thai Organic Platform (TOP) 169
Appendix 8 Focus group participants' profile 170
Appendix 9 Trust Development Model Survey 171
VITA 179

List of Tables

Table 1 Research activities....10

Table 2 Research methodology details....40

Table 3 Background characteristics of respondents....53

Table 4 Buying frequency and knowledge of the organic principles....54

Table 5 Overall mean value of respondents' perception toward each factor of 5Cs ..55

Table 6 Overall mean value of respondents' perception toward trust components 56

Table 7 Multiple regression analysis, regressing the impact of each source of trust towards trusting belief....56

Table 8 Multiple regression analysis, regressing the impact of each source of trust towards trusting intention 57

Table 9 Journey 1: Current active consumers started the healthy lifestyle....63

Table 10 Journey 2: Current active consumers searched for authentic organic food .64

Table 11 Key requirements....67

Table 12 Consumer segmentation based on experience sought....69

Table 13 The interested information by consumers....84

Table 14 Interview session feedback 85

Table 15 Demographic profiles of the respondents 87

Table 16 Consumption pattern of the respondents....88

Table 17 Consumption behavior of the respondents....89

Table 18 Perceived usefulness factors 89

Table 19 Perceived ease of use 90

Table 20 Perceived usefulness 90

Table 21 Intention to use....91

Table 22 The correlation between perceived usefulness antecedents and perceived usefulness....91

Table 23 The correlation between perceived ease of use and perceived usefulness...91

Table 24 The correlation between perceived ease of use and perceived usefulness and intention to use....92

Table 25 Type of trust in organic food market....93

Table 26 Reason for trusting the innovative trust-building platform.....94

Table 27 Barriers for purchase.....94

Table 28 The correlation between trust antecedents and trusting intention.....95

Table 29 The correlation between trust antecedents and trusting beliefs (5Cs).....95

Table 30 The correlation between trust beliefs (5Cs) and trusting intention.....96

Table 31 The correlation between trust beliefs (5Cs) and trusting intention and intention to purchase.....96

Table 32 The correlation between trust beliefs (5Cs) and trusting intention and intention to co-create.....96

Table 33 SWOT analysis.....112

Table 34 The investment estimation.....116

Table 35 Revenue and cost estimation Year 1-5.....119

Table 36 Financial feasibility.....119

List of Figures

Figure 1 An interdisciplinary model of high-level trust concepts (H. D. McKnight & Chervany, 2001).....12

Figure 2 Communications networks (a) Centralized (b) Decentralized (c) Distributed networks (Baran, 1962).....29

Figure 3 Technology Acceptance Model (Davis, 1989).....35

Figure 4 Extension of Technology Acceptance Model, TAM 2 (Venkatesh & Davis, 2000).....36

Figure 5 Conceptual framework for the innovative trust-building process.....37

Figure 6 Research methodology diagram.....41

Figure 7 Conceptual approach for exploring the consumer co-creation process.....49

Figure 8 The stakeholder map initiation.....61

Figure 9 Key values from idea generations.....67

Figure 10 Interactive experience and confidence.....68

Figure 11 The example of data recording in blockchain.....72

Figure 12 Flow of data recording from farmer application to blockchain database...72

Figure 13 The overview of TOP architecture.....73

Figure 14 The overview of Blockchain database.....74

Figure 15 The user and data flow overview.....75

Figure 16 Information flow diagram.....76

Figure 17 Keywords for designing the innovative trust building platform's experience.....77

Figure 18 Overall user experience and user interaction of the innovative trust building platform.....79

Figure 19 Touchpoints for the innovative trust-building platform (1) TOP's E-commerce page (2) packaging (3) QR standee.....80

Figure 20 QR code design.....81

Figure 21 Technology acceptance model for the innovative trust-building platform (Adapted from Venkatesh and Davis, 2000).....92

Figure 22 The consumer trust development and their correlations to trusting behaviors.....96

Figure 23 Value chain analysis of innovative trust-building platform 102

Figure 24 Food product traceability to drive the growth of the market for blockchain in agriculture and food supply chains (MarketsAndMarkets, 2018) 110

Figure 25 Blockchain in agriculture market, by region (USD million) (MarketsAndMarkets, 2018).....111

Figure 26 Innovative trust-building process flow.....130

Figure 27 The key trust building components of innovative trust-building platform 131

Figure 28 AgTech Landscape 2019 (Day, 2019).....133

Chapter 1
Introduction

1.1 Background

When 1,379 CEOs from 79 countries were surveyed, the ability to build and sustain trust among key stakeholders was seen to be critical to company success especially in the digital age (PricewaterhouseCoopers, 2017). Business journals include numerous examples of increased concern over corporate reputation, the capability of collaboration, and the role of trust in business (Blomqvist & Seppänen, 2003). In the world of increased transparency, even a minor breakdown of trust can result in major failures (Blomqvist & Seppänen, 2003). As such, trust has become an important factor in market development, for example, inter-firm cooperation (Macaulay, 1963; Young & Wilkinson, 1989) and partnerships (Parkhe, 1998; Zaheer, McEvily, & Perrone, 1998), and supplier relationship (Sako, 1997). Even though trust is regarded as fragile, it is contributed to a sustainable competitive advantage (Morgan & Hunt, 1994). Trust leads to a successful relationship between business and business as well as business and consumer (Barney & Hansen, 1994; Grönroos, 1996; Morgan & Hunt, 1994). Trust has the mechanism to facilitate the interpersonal acceptance and openness of expression (Zand, 1972). On the other hand, mistrust leads to the interpersonal rejection resulting in the defensive behaviors (Zand, 1972). Specifically, trust is considered an important prerequisite to the success of certain markets such as those of credence products.

As the trend in consumption patterns has shifted toward healthy lifestyles and sustainable consumption (Seyfang, 2006; Verain et al., 2012), the most common factors driving the growth of the organic food market are concerns over food safety, the environment, animal welfare, and taste (Seyfang, 2006; C.-C. Wang, Lo, & Fang, 2008). The attention which related to disease prevention is reflected in the growing demand for organic products over the last few years (ResearchAndMarkets, 2020; TechSciResearch, 2017). With this trend predicted to continue, the global organic food market is projected to grow at a compound annual growth rate (CAGR) of 11% to surpass €200 billion by 2024 (ResearchAndMarkets, 2020).

Organic food products represent consumer goods with a high degree of “credence attributes” (Schneider, Stolze, Kriege-Steffen, Lohscheidt, & Boland, 2009).

Darby and Karni (1973) introduced the notion of credence goods as products with characteristics or quality attributes that cannot be verified by consumers, even after purchase or consumption (Darby & Karni, 1973). In general, consumers cannot differentiate the organic food products from conventional products by their appearance or taste both before and after consumption (Schneider et al., 2009). Production methods are considered as the added value of organic food products and they are nearly impossible to assess outside the production site (Kottila & Rönni, 2008). Consumers must rely on trust when they decide whether or not to buy organic food products (Kriege-Steffen, Boland, Lohscheidt, Schneider, & Stolze, 2010). In addition, certification by authorized institutions is used as a means of differentiating organic food products from conventional food products, with certified products displaying an organic label to assist consumers in making their purchase decision (Thøgersen, 2010). For organic food products, the certification system and the integrity of the producers are crucial factors in generating consumers trust and influencing their purchase decisions (Tung, Shih, Wei, & Chen, 2012). Consumers have to believe that farmers or producers have strictly followed the relevant processes and that the organic label is trustworthy (Kriege-Steffen et al., 2010; Schneider et al., 2009). The attitude and behavior relationship is affected by the degree of consumer confidence in the transparency of the process and in the belief that food labeled as organic was truly produced according to organic agricultural practices (Tung et al., 2012).

Building consumer trust is a key prerequisite for establishing a market for credence goods, especially with premium priced goods (Nuttavuthisit & Thøgersen, 2015). The demand-side instruments, i.e. control, certification, and labeling, are crucial activities for supporting market development while the credibility of the certifying body is both important and necessary for enhancing confidence and achieving consumer trust (Thøgersen, 2010). The credibility of a country's national certifying authority, both in terms of commitment and ability, is rarely achieved in many developing countries where weak regulations still exist. Highly corrupted certification schemes further endanger the system's credibility. This environment of weak regulation and corruption leads to consumer mistrust in specific products, such as organic food products, thereby reducing the possibility of market expansion.

The reliability of information, supply chain transparency, product quality, logistics issues, environmental impacts, fraud, and food safety are the major issues in food supply chains (Ge, Christopher, Spek, Smeenk, & Top, 2017; Trienekens, Wognum, Beulens, & Van der Vorst, 2012). All of these issues are centered around consumer trust. The mistrust that consumers have toward food was examined by Halk in 1993 (Kriege-Steffen et al., 2010). The results emphasized that consumers did not trust or mistrust the food itself, their trust or mistrust were rather related to the actors who are responsible for the production, processing, marketing, and control of the food (Kriege-Steffen et al., 2010). The increasing risk of fraud (e.g., the selling of unqualified products under high-quality or well-known labels or claims) and the adulteration of the products are all common issues that affect consumer trust (Ge et al., 2017). In Thailand, the problem of mistrust is clearly demonstrated. The wide range of certifying authorities and labels with regard to safe foods and organic foods in the organic food market can create consumer confusion and undermine consumer confidence (Thøgersen, 2010). Consumers cannot clearly differentiate between the various non-organic labels and the organic labels (Roitner-Schobesberger, Darnhofer, Somsook, & Vogl, 2008). To a certain extent, this issue arises because most consumers lack the basic understanding of what "organic" means (C.-C. Wang et al., 2008). Recent research suggested that consumers are aware of organic agriculture but they have limited knowledge about it, with approximately 40% of them confused by the difference between the food safety logo and the certified organic logo (Kongsom & Kongsom, 2016). In terms of organic product certification in Thailand, there are currently two major organic labels for the domestic organic market: the "Organic Thailand" provided label by the Department of Agriculture and the "ACT" label provided by the Organic Agriculture Certification Thailand (ACT) (C.-C. Wang et al., 2008).

Despite increased controls and tests being carried out to inspect the maximum allowance of residues in products, the evidence widely published by ThaiPAN (2016) indicated that the random surveying of products certified as being organic found that many of them contained chemical residues exceeding the legal standards. In the most recent survey by ThaiPAN (2020), all 12 samples of oranges from markets across Thailand exceeded maximum residue limits. The survey revealed that there is a

possibility of detecting pesticide residues in up to 100% of the oranges sold in all types of markets (except oranges produced in a reliable organic system).

Consequently, consumers lack confidence in the reliability of certifications and the control system in Thailand (Kongsom & Kongsom, 2016). This lack of trust in organic food, certifications, the control system, and labeling is one of the fundamental barriers to the development of the organic food market in Thailand (Nuttavuthisit & Thøgersen, 2015; Roitner-Schobesberger et al., 2008).

While achieving trust through certification by the authorized institutions remains a cumbersome process, consumers have turned to other sources of trust. For example, they conduct more detailed search into the reputation of the retailers or the credibility of the producers. Such sources of trust are, however, limited in scope because they depend on consumer belief in the credibility of a specific group or community. Achieving trust generally relies on the effectiveness of an individual or a group in creating a reliable promise or statement, whether verbal or written, according to the expectation of the trustee (Rotter, 1967). Besides the soft skills (i.e. the combination of interpersonal, communication and social intelligence skills) of an individual or a group, information and communication technology (ICT) is expected to support and revolutionize the way transactions are performed in the future (Seebacher & Schüritz, 2017). They give us today's digital economy and its many innovative communication processes.

Some of the new advanced technologies like Blockchain are based on a distributed database shared among and agreed upon by a peer-to-peer network (Seebacher & Schüritz, 2017). Such technology is expected to transform the way we interact and transact over the Internet (Seebacher & Schüritz, 2017). It provides a means of ensuring the permanence of records and facilitating the sharing of data between different actors in a food value chain (Trienekens et al., 2012). By decentralizing the way we store data and manage information, this technology has the potential to lead or solve issues of equality and fairness in our society (Wright & De Filippi, 2015). Blockchain technology represents an opportunity to deepen and widen consumer interactions with multiple stakeholders in a decentralized supply chain network, thus leading to a greater possibility to achieve trust.

This study aims to explore the determinants of trust and develop an innovative trust-building process through a transparent and virtual interaction process. The study focuses on the organic food market in Thailand, where trust is fragile and the system or market is fragmented. An innovative trust-building platform is developed in order to be used as a tool to increase understanding of consumer trust development. The innovative trust-building process can not only contribute to the expansion of the organic food market but also be applied in a wider context for credence goods such as health-related products (e.g. vitamin supplements) and medical services (e.g. medical advice and treatments).

1.2 Research objectives

While there is general agreement on the importance of trust in behavioral outcomes for foods with credence attributes, especially organic food, the study of trust in the field of organic food is still in the early stages. As such, there is little knowledge about the reasons why consumers have trust or mistrust, what the determinants of consumer trust are, how consumers put their trust in organic food, and what the behavioral outcomes of having trust are. Moreover, the details of the trust-building process in relation to credence attribute goods have not been well examined. The main objective of this study, therefore, is to fill these gaps by conducting an explorative study on consumer trust in the organic food market.

The following six objectives of this study are constructed with the aim of achieving consumer trust development in organic foods:

1. To study the current levels of consumer trust, the trust determinants, and the impact of each trust determinant on consumer trust and trust-related behaviors in relation to organic foods.
2. To analyze and understand the requirements for designing an innovative trust-building platform for organic foods.
3. To build and test an innovative trust-building platform for organic foods by implementing trust-related technology for the organic food market in Thailand.
4. To understand how consumers respond to the innovative trust-building platform for organic foods.

5. To study consumer trust development after using the innovative trust-building platform.
6. To explore a sustainable commercialization strategy for the innovate trust-building platform organic foods.

The following research questions are explored during this study:

1. What are the determinants of consumer trust in organic foods? How does each determinant relate to consumer trust and trust-related behaviors in relation to organic foods?
2. What are the key requirements for an innovative trust-building platform?
3. What does the innovative trust-building platform organic foods look like? What is the technical performance evaluation of the platform?
4. How do consumers respond to the innovative trust-building platform?
5. How does consumer trust develop through the facilitation of the innovative trust-building platform? Do the transparency and traceability that are embedded in the innovative trust-building platform have positive effects on consumer trust in organic foods?
6. What are the potential commercialization strategies for the innovative trust-building platform for organic foods?

1.3 Research scope

To examine the innovative trust-building process as part of the wider trust-building mechanism in the organic food markets, this study is conducted in Thailand where consumer trust in organic foods is currently the key barrier to market development. Regular, occasional, and potential organic food consumers are the main focus of this study. Fresh products are chosen because they represent the area in which consumers have high concerns over safety, freshness, and origin, especially in light of the reoccurring organic food fraud that exists in Thailand. In addition, the consumption volume of fresh organic food products is high compared to processed organic food products. This study is co-developed with the Sampran Model of Sookjai Foundation which has the vision of cultivating an organic society and the mission of building an inclusive business model based on community partnership.

1.4 Definition of words in this study

1.4.1 Organic agriculture

"Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved" (IFOAM, 2015).

1.4.2 Organic food

Organic foods refer to products that are grown and processed according to organic agriculture guidelines (May, 2008).

1.4.3 Active consumers

The Thai Organic Consumer Association (TOCA) and the Sampran model have identified active consumers as consumers who have the mindset of being change agents. In relation to organic food, they are consumers who understand the organic food principles and are willing to join in any organic social movement activities. They consider social movements to be a "collective attempt to further a common interest or secure a common goal, largely through actions outside the sphere of formal, established political institutions" (Giddens & Sutton, 2017). These people are seeking change through social movements in society. People who become interested in organic activities are usually those who already show a certain level of awareness of human well-being issues relating to human well-being (e.g., health, the environment, social justice, and mindfulness) (Bopp, 2016).

1.4.4 Trust in food consumption

There is no universal and all-encompassing definition of trust. However, it is often closely associated with words like competence, credibility, confidence, faith, hope, loyalty, and reliance (Blomqvist & Seppänen, 2003). Within market relationships, trust often refers to the willingness to rely on and have confidence in a reliability and integrity of another party (Castaldo, Premazzi, & Zerbini, 2010). Rousseau, Sitkin, Burt, and Camerer (1998) referred to trust as an expectation that another party will perform a particular action. Trustworthiness is one of the expectation

driver (Rousseau et al., 1998). Two major types of trust in the sphere of food consumption are personal and system trust. Personal trust is embedded and grounded in local knowledge and in human relationships while system trust is embedded in institutions (Sassatelli & Scott, 2001; Torjusen, Sangstad, Jensen, & Kjærnes, 2004).

1.4.5 Transparency

In supply chain, transparency refers to "the extent to which all relevant stakeholders have a shared understanding of and access to the product-related information that they request, without loss, delay, or distortion" (Trienekens et al., 2012).

1.4.6 Blockchain technology

Blockchain technology refers to digital technology that can decentralize the creation, verification, validation, and secure storage of economic transactions (Wright & De Filippi, 2015).

1.5 Research contributions

1.5.1 Academic contributions

Trust is a concept that has been largely under-theorized in food studies. Most empirical studies in this area have included only sparse conceptual reflections. Although consumer trust has been studied in the past, little is known about the consumer trust development process. Trust is vaguely considered to be a positive outcome of particular forms of interactions. Nevertheless, there is hardly any evidence emphasizing trust as an outcome of transparent interaction processes and their impact on trust-related behaviors. The ideological usages of transparency cannot be justified.

This study has the aim of addressing some of these knowledge gaps by developing an innovative trust-building process to engage consumers through information transparency and traceability. Understanding current consumer trust and exploring the determinants of trust are crucial steps in developing an innovative trust building process. This will also contribute to the extension of supply chain transparency studies by exploring appropriate designs of information flow in the supply chain. The findings can contribute to future stud and/or provide further input for developing a sustainable supply chain.

1.5.2 Practical contributions

The results of this study will help to develop strategies for enhancing consumer trust in organic foods. This study sets an innovative traceability approach and explores whether transparency through traceability can be seen as an adequate medium for providing information and thus improving consumer trust. Aside from supporting consumers to receive trustworthy information, the innovative trust-building platform also supports entrepreneurs who do not have their own entity in the blockchain database to accesses the information therein. The practical contributions go beyond helping just the information provider. The platform provides the trust building mechanism with high potential for adapting to other industries whose products or services have credence attributes. The innovative trust-building platform can also lead to disrupting the current business model in organic food markets by virtually connecting farmers, businesses, and consumers through a transparent organic principles journey.

The tools and techniques of a trust-building co-creative workshop might benefit related businesses in developing new products or services and gaining consumer trust. By involving key stakeholders in the co-creation of the values, it allows for better understanding of consumer insights as well as unmet needs and requirements. Consequently, it has the potential to enhance the success rate of new products and/or service development.

1.6 Research activities

The overall research activities and timeline are summarized in Table 1.

Table 1 Research activities

Research activities	2016	2017				2018				2019				2020			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Review and analyze concept from relevant theories and studies	X	X	X	X													
Study organic food control systems from secondary data and interview		X	X	X	X												
Study antecedents that relevant to consumer trust from in depth interview and questionnaire		X	X	X													
Design innovative trust-building platform from trust building co-creative workshop						X	X	X									
Build innovative trust-building platform by applying blockchain technology									X	X	X	X	X				
Test technical feasibility													X	X			
Test user acceptance from interview and questionnaire														X			
Evaluate consumer trust development after using innovative trust building platform														X			
Propose commercialization plan													X				
Report research findings															X	X	

Chapter 2
Literature Review

Food supply chains today are encountering increased consumer demand for food transparency due to many issues being raised in relation to the reliability of information, product quality, fraud, and food safety. This study aims to foster consumer trust through increased transparency by exploring the determinants of consumer trust and developing an innovative trust-building process. In this chapter, related literature and case studies in the field of trust, transparency, trust-related technology, and technology acceptance are reviewed. The chapter consists of 5 parts: trust, trust in the organic food market, food traceability and transparency, trust-based technology (Blockchain), and the technology acceptance model.

2.1 Fundamental of trust

Trust is a fundamental aspect of everyday life and the essence of the concept of trust lies in one's psychological state (Vidotto, Massidda, Noventa, & Vicentini, 2012). Trust has been extensively studied in many fields ranging from psychology to sociology and social psychology (D. H. Mcknight & Cummings, 1998). Trust can be categorized into different dimensions, which are dispositional, institutional, and interpersonal trust (H. D. McKnight & Chervany, 2001) (Figure 1). H. D. McKnight and Chervany (2001) explained the differentiations between the dispositional, institutional, and interpersonal trust constructs. Dispositional trust comes primarily from trait psychology which usually refers to childhood-derived attributes. Institution-based trust is derived from sociology, meaning that related behaviors are situationally constructed. The action is determined by an environment or situation. Interpersonal trust emphasizes how interactions determine behavior. It is the beliefs and intentions that reflect the interactions between people and their cognitive-emotional reactions. By looking at an interdisciplinary model of trust concepts, H. D. McKnight and Chervany (2001) observed that the trust typology contains constructs that are too diverse to be related at all. In short, trust has been generally defined as the "willingness to rely on an exchange partner in whom one has confidence" (Lindgreen, 2003).

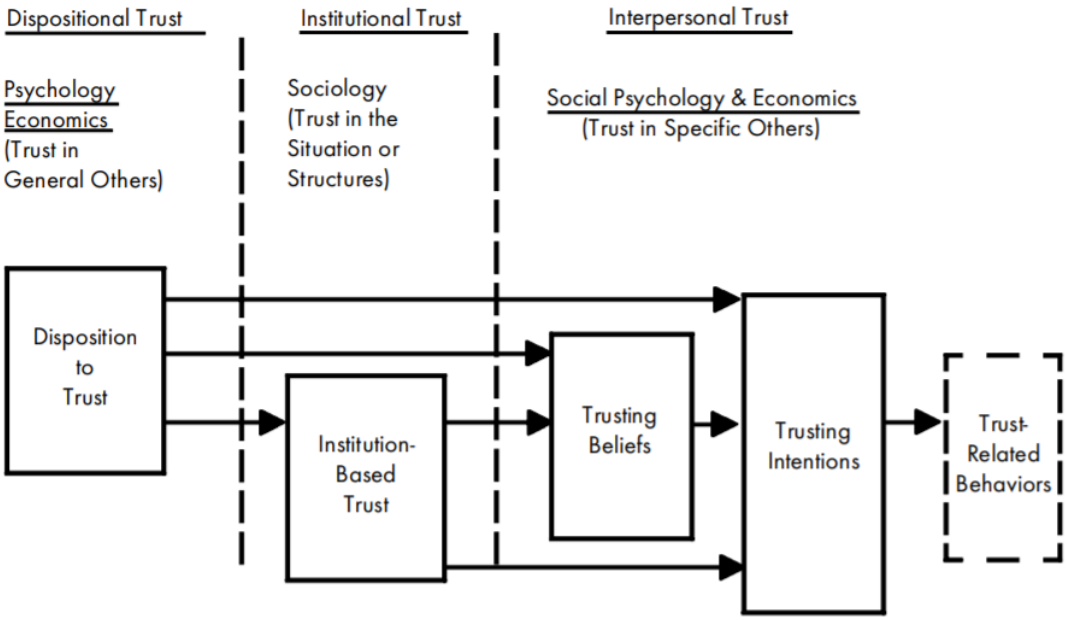


Figure 1 An interdisciplinary model of high-level trust concepts (H. D. McKnight & Chervany, 2001)

2.1.1 Components of trust

In essence, trust is comprised of two main components, namely belief and intention (Rousseau et al., 1998). The first component, trusting belief, is the associated belief that the objects of trust or the actors with whom they interact are trustworthy (Schneider et al., 2009). Benevolence, competence, and honest or integrity are described as the dimensions of trustworthiness (D. H. Mcknight & Cummings, 1998). They represent the key dimensions of trusting belief. Therefore, trusting belief is the expectation that the exchange parties will act in a manner relevant to these dimensions (Rousseau et al., 1998). Benevolence refers to the caring and actions of the trustee being in the interest of the trustor (Schneider et al., 2009). Competence is the ability of the trustee to act as expected by the trustor (Schneider et al., 2009). Honesty or integrity refer to keeping a promise and acting in according with its stated values (Schneider et al., 2009). The second component, trusting intention, refers to the cognitive, emotional, and habitual willingness of the trustor to depend on someone in a risky situation (Schneider et al., 2009). The cognitive dimension occurs when a person calculates the probability and extent of any possible benefit or damage that may arise from trusting another person or an institution (Rotter, 1967). The emotion or feeling dimension refers to sympathy or affection that can influence the decision of a person to put trust in

someone or something (Rotter, 1967). Habits form the basis of the conative dimension (Rotter, 1967). This relates to the forms of social communication that try to influence the mental or emotional state of others (Rotter, 1967). When one has a confidence in other actors (i.e. having trusting belief), it will automatically lead to the willingness to rely on these particular actors (i.e. having trusting intention) (Dimitriadis & Kyrezis, 2010). In sum, the "willingness to rely on" is regarded as a potential indicator of trust (Morgan & Hunt, 1994).

The outcomes when one has trusting belief and/or trusting intention in other actors are trust-related behaviors. Loyalty commitment, positive word-of-mouth communication, and social interaction are all examples of key relational outcomes from the positive influence of trust (Patricia M. Doney, Barry, & Abratt, 2007; Hennig-Thurau, Gwinner, & Gremler, 2002). In marketing literature, these examples are considered to be the key relationship marketing outcomes (Hennig-Thurau et al., 2002). Loyalty commitment refers to the situation where consumers make a repeat purchase, thus placing their loyalty in a particular product or brand. Consumers are changing from being a passive recipient of information to becoming more proactive by being involved in value co-creation with other stakeholders in this digital era (Krishna, Lazarus, & Dhaka, 2013). They get involved and engaged in co-creation activities either by participation or creation (Nuttavuthisit, 2010). Positive word-of-mouth and social interaction are good examples of the intention to co-create.

Consequently, intention to purchase and intention to co-create are good examples of trust-related behaviors. Customer loyalty is focused on the repeat purchase behavior of consumers and thereby increasing the company's share of purchase and profitability (Berry, 1995). While positive word-of-mouth communication is defined as the informal communications between a customer and others which usually relates to the evaluation of goods or services (Hennig-Thurau et al., 2002). The positive word-of-mouth is considered a powerful mechanism in influencing future buying decisions, especially (Grönroos, 1996; Morgan & Hunt, 1994).

Berry (1995) suggested that trust in a relationship reduces uncertainty and vulnerability, especially for intangible, complex, and technical nature type of services. Social bonds enhance the ongoing relationship between actors and they are highly

valued in trusting relationships (Hennig-Thurau et al., 2002). In short, trust leads to the customer confidence and the relationship efficiency fosters customer commitment and loyalty to the relationship (Morgan & Hunt, 1994). Trust should positively influence the relationship commitment of customers (Hennig-Thurau et al., 2002). It implies that a customer's loyalty to a firm will be greater when the customer has trust perceptions or confidence in the service provider.

2.1.2 Types of trust

Two major types of trust that can be identified in the area of food consumption are personal and system trust (Torjusen et al., 2004). Personal trust refers to the traditional, personal, and localized form of trust (Sassatelli & Scott, 2001). It is embedded and grounded in local knowledge and in human relationships. For example, one might embed his or her trust in known local producers or retailers (Sassatelli & Scott, 2001). Personal trust is often sustained by means of face-to-face interaction (Torjusen et al., 2004), while system trust or disembedded trust is mostly grounded in institutions (Sassatelli & Scott, 2001; Torjusen et al., 2004). As part of a strategy to create system trust, institutions issue certifying labels for which their success depends on trust in the control system of the institutions (Nuttavuthisit & Thøgersen, 2015; Torjusen et al., 2004). Additionally, labels achieve greater success when they communicate the specific characteristics of products, for example, details related to the locality of production or details related to the traceability of the product (Torjusen et al., 2004). The implications of these two types of trust depend on the cultural contexts (Torjusen et al., 2004). System trust is widely applied in more open markets where there are clear standardizations (Sassatelli & Scott, 2001). For example, in the UK, the standardized labels are found to have more impact on British consumers due to the good system structure and clear standardization (Sassatelli & Scott, 2001). Personal trust is applicable to other contexts like Italy and Austria where the "traditional" agricultural production and supply are still exist (Sassatelli & Scott, 2001). Both personal and system trust relations are present in all countries to differing degrees across regions and product categories (Sassatelli & Scott, 2001).

2.1.3 Sources of trust

Trust has been described as the willingness to rely on and have confidence in the reliability and integrity of the a partner among literatures in the relationship marketing (Suvanto, 2012). Prior literature has included descriptions of several factors that were found to be important in influencing trust. The five factors, or 5Cs, include control, competence, characteristics, communication, and community (Çerri, 2012).

2.1.3.1 Control or rule of law

Rule of law refers to the founding principles that people and institutions are subjected to and which are accountable to the law. It is often enforced by third-party institutions which may facilitate a supply chain relationship (Pavlou & Gefen, 2004). They act as a safeguard toward uncertainty and produce highly generalized standards of business behavior (Pavlou & Gefen, 2004). The rules of these legislative and regulatory institutions are the basic source of system trust when one places expectation in the behaviors of others (Çerri, 2012). The relationship between parties which may be relatively loose can be tightened by the rule of law (Çerri, 2012; Pavlou & Gefen, 2004). The success of the implication depends on the reliability and the effectiveness of the regulatory institutions in enforcing these rules (Çerri, 2012).

Sassatelli and Scott (2001) further emphasized how the success of control or rule of law in fostering consumer trust also depends on how trust is characterized in different countries. The UK and Italy are good examples of two different trust regimes. The UK is relatively industrialized and technology dependent, while Italy follows more artisan forms of agricultural production. This difference is reflected in the dissimilar proportions of embedded and disembedded trust in the two countries. These forms of trust are undermined by these policy positions. As a result, the control or rule of law strategies vary among different types of trust regimes.

2.1.3.2 Competence and reputation

Competence and reputation refer to the expectation that the transaction partners can perform their roles competently based the particular agreement of their arrangement (Çerri, 2012). De Jonge, Van Trijp, Jan Renes, and Frewer (2007) described competence as one of the three types of belief which relate to the trustworthiness of the actors. Competence in this context is the belief that the actor is able to act in a trustable

manner (De Jonge et al., 2007; Macready et al., 2020). A partner's competence includes technological capability, business capability, and the cooperating capability (Çerri, 2012). The final capability in that list is critical for relationship management (Anderson & Weitz, 1989). Professionalism is a good basis for building trust especially in the initial stage of a relationship (Anderson & Weitz, 1989). Competence and reputation are interconnected terms by which, when one has competence, one also builds his or her reputation (Çerri, 2012). The reputation is somehow related to the goodwill of a partner. The components of goodwill are divided into moral responsibilities (i.e. interest, care and concern, understanding, and respect) and positive intentions (Çerri, 2012).

2.1.3.3 Characteristics or personality traits

Characteristics or personality traits have a significant effect on an individual's level of trust (Schlenker, Helm, & Tedeschi, 1973). The propensity to trust is held by the individual's expectations, which are reliant on the words, promises, and oral or written statements of another individual or group (Rotter, 1967). The trustworthiness of actors is determined by three types of beliefs, which are beliefs about their competence, care and openness (De Jonge et al., 2007). Competence is described in 2.1.3.2. Care refers to the belief that an actor is motivated to act in a good manner (De Jonge et al., 2007). It is not necessary that competence and care are always related to each other. For example, an actor may be perceived as competent but ill-behaved or vice versa (De Jonge et al., 2007). The care component has also been described as integrity or benevolence responsibility in previous research on trust beliefs (Flavián, Guinalíu, & Gurrea, 2006; Gefen & Straub, 2004; Yee, Yeung, & Morris, 2005). Openness is the third belief. It refers to the extent to which an actor is believed to be transparent in doings (De Jonge et al., 2007). Transparency and traceability with regard to trust are the great importancce in today's food supply system (Macready et al., 2020). Honesty, integrity, virtue, scrupulosity, and righteousness are examples of positive personality traits that might inspire trust in others (Çerri, 2012).

2.1.3.4 Communication

In the context of trust, communication is considered a bilateral expectation that parties will provide and share useful information proactively with their partners (Heide

& John, 1992). Communication here also refers to the formal and informal sharing of meaningful and timely information between parties (Anderson & Weitz, 1989). An effective communication mechanism increases the trust building and knowledge sharing, thus leading to better achievement of collaboration and better planning of internal operations activities (Cetindamar, Çatay, & Basmaci, 2005). Good communication helps in understanding partners' needs and building mutual trust. Consequently, it is considered as the key aspect of a good relationship (Handfield & Bechtel, 2002; Wilson, 1995).

2.1.3.5 Community or social interactions

Social interactions are the most important factor influencing trust (Patricia M. Doney et al., 2007). Social interactions or interpersonal relationships refer to trust-building behaviors that influence the formation of trust. Within a community, this is the bond that exists between members through personal and social relationships (Patricia M. Doney et al., 2007). The community or social settings provide an informal environment that facilitates the building of closer interpersonal relationships (Doney & Cannon, 1997). It is an informal environment that fosters the better understanding of mutual needs (Doney & Cannon, 1997). This reduces the perceptions of risk from business partners as well as helping to build a solid foundation of trust (Çerri, 2012). The degree of interaction is bonded through personal and social relationships between parties (Çerri, 2012). Social interactions or bonds reduce the tendency of a partner to react negatively as well as creating an informal environment which are resulted in a closer interpersonal relationships and a better understanding of mutual needs (Williams, Han, & Qualls, 1998). Trust is built with respect to the frequency of interaction through the confidence of shared information (Çerri, 2012). Social interaction may strengthen trust when interaction leads to benevolent intentions toward each other in the informal setting (Çerri, 2012). Repeated interactions encourage information flow thus reducing uncertainty and fostering trust (Zand, 1972). The higher the interaction frequency, the higher the levels of encouraging information flow will be (Çerri, 2012). Frequent interaction stimulates trust by providing information that enables the future behavior prediction with confidence (Patricia M. Doney et al., 2007; Patricia M. Doney & Cannon, 1997). In this way, uncertainty is reduced, thus fostering trust.

2.2 Trust in the organic food market

The previous studies on the organic food consumption identified trust as one of the most crucial aspects when consumers make purchase decision (Kriege-Steffen et al., 2010; Zanoli & Naspetti, 2002). In this respect, consumers have to depend on the expertise of others within the supply chain, as well as the benevolence of anonymous people and institutions involved in the process (Meijboom, Visak, & Brom, 2006). Consequently, trust is highlighted as a key aspect particularly in the food sector which has to deal with uncertainty and a lack of personal control (Meijboom et al., 2006). Consumer trust can be viewed as a multidimensional concept which consists of two distinct but inter-related components, trusting belief and trusting intention (Schneider et al., 2009).

2.2.1 Components of trust in organic foods

As mentioned earlier, trusting belief refers to confidence in the competence, integrity, and benevolence of the other parties (D. H. Mcknight & Cummings, 1998). Closer relationships between consumers and sellers enhance the confidence of consumers. Consumers nowadays mention that they prefer buying organic food products directly from farmers or through retailers who can identify the source or origin of the products. These buying preferences allow consumers to assess the trustworthiness of the relevant actors and organic food products (Schneider et al., 2009). As for the second component of trust, trusting intention, it has been shown that it relates to the cognitive, emotional, and habitual willingness of the trustor to depend on other parties in certain situations (Schneider et al., 2009). Schneider et al. (2009) mentioned the relevance of trusting intension specifically in organic food consumption. A consumer's willingness to depend on other actors involved in the organic supply chain (e.g. farmers, processors, traders, retailers, and labels) is based on three aspects: calculations, feelings or emotions, and habits (Kriege-Steffen et al., 2010). Firstly, calculations are the cognitive process by which a person calculates the risk taken when trusting another person. They calculate the probability and extent of possible benefits or damages from factors such as price and knowledge about the producers, which are found to be the keys to increasing transparency and enhancing consumer trust. Secondly, feelings or emotions refer to the affective dimension, e.g. sympathy or

affection. This can influence the decision of a person to place his or her trust in someone or something. Personal contact between consumers and producers enhance the sympathy and could have a positive influence on building trust. Additionally, emotion skepticism plays a role in the perceived price of organic products. The skepticism can be lowered through more transparency on the price formation which is resulted in the positive trusting intention. Lastly, habits refer to the conative dimension in which one tries to influence the mental or emotional state of others via social communication.

2.2.2 Types of trust in organic foods

Lindgreen (2003) emphasized system trust and personal trust as the two most important types of trust for organic food products. For system trust, people base their trust upon the written rules (Lindgreen, 2003). The effective legislative and regulatory institutions who enforce the rules are important in system trust (Lindgreen, 2003). Moreover, it describes the degree of trust people have in an actor as a reliable organic exchange partner who will follow regulations (Kottila & Rönni, 2008). Written rules are important for managing the vulnerability of the organic status (Kottila & Rönni, 2008). Labeling is part of a strategy for creating system trust, and its success depends on the reliability of the control system (Sassatelli & Scott, 2001). Advanced organic food markets where strong and reliable control systems are present normally reliant on system trust. In contrast, however, system trust tends to be lacking in the countries that have weak regulations and many political issues (Sassatelli & Scott, 2001). It requires restrictive measures; otherwise, it might in turn increase the consumers' skepticism about the labels certified by authorized institutions (Sassatelli & Scott, 2001). One recent study emphasized the significantly negative impact of mistrust in the control system and in the authenticity of products especially for organic food products (Nuttavuthisit & Thøgersen, 2015).

In addition to system trust, various studies have described consumer dependence on personal trust, which is developed through repeated interactions between partners. Consequently, it largely depends on the behavior of each partner and the history of interactions among these partners (Lindgreen, 2003). For example, organic food suppliers increase their competence as exchange partners in order to enhance their relationships with retailers (Kottila & Rönni, 2008). Unlike system trust,

personal trust is usually found in cases where the traditional agricultural production and supply exist (Sassatelli & Scott, 2001). As a result, personal trust can mostly be found in developing markets where tradition, locality, and personal relations still form the strong basis for trust (Sassatelli & Scott, 2001). Personal trust is not a novel concept in the food supply chain. Wet markets where consumers and producers engage in face-to-face exchanges are the good example of personal trust (R. Y. Wang, Si, Ng, & Scott, 2015).

The widening chains of interdependency address the deficiency in system trust (Sassatelli & Scott, 2001). A confidence-building strategy which emphasizes the increasing interest in the regional origin of food from the key actors (e.g. the state, consumers' movements, retailers, and marketing board) enhances the existence of personal trust in the wider food chain (Sassatelli & Scott, 2001). One example of a confidence-building strategy is the social interaction activities that take place between producers, retailers, and consumers as a new consumption experience (Sassatelli & Scott, 2001).

The need to manage consumer trust is strongly emphasized in order to lessen the barrier to the development of markets for organic foods (Nuttavuthisit & Thøgersen, 2015). Strategies which can address the trust-related problems are the key to overcoming the stagnant nature of the organic food market. However, such strategy has to correspond with the reality of production and/or consumption patterns (Sassatelli & Scott, 2001).

2.2.3 Sources of trust in organic foods

Consumers who buy organic foods need to believe in the quality attributes of what they are purchasing (Nuttavuthisit & Thøgersen, 2015). Furthermore, they need to believe that the food being bought and consumed is really coming from the organic source (Nuttavuthisit & Thøgersen, 2015). Sources of trust are therefore strongly related to relationship quality between actors in the organic food chain.

2.2.3.1 Control or rule of law

The nature of organic foods, which are comprised of credence quality, require information to provide assurances of their authenticity, while many consumers will also

look for certification labels on the packaging (Kriege-Steffen et al., 2010). Organic labels are a mechanism used to reach out to the majority of consumers (Kottila & Rönni, 2008). Certified authorities or third parties firstly build the control system as the guiding standard for farmers. Then they will inspect the products and issue the certification to communicate to consumers that what they are consuming is truly organic (Nelson et al., 2015). This source of trust requires consumer belief that the certification authorities or third parties do their jobs strictly according to the rule of law (Kottila & Rönni, 2008). Having clear guidelines and sufficient control measures enhance the confidence of consumers that all actors in the organic supply chain will act in the desired way according to the control system (Schneider et al., 2009). However, the problem of trust in the reliability of organic certification arises when the organic foods in the market cannot deliver their promises in terms of credence attributes. This aspect of trust is still lacking in developing countries such as Thailand where the rule of law is not solid and reliable. Mistrust in the control system is still a problem among Thai consumers (Nuttavuthisit & Thøgersen, 2015). As a result, many farmers and retailers are currently not aiming to apply for organic certification.

An alternative mechanism focuses on decentralizing a significant degree of the regulatory authority while empowering grassroot actors (Nelson et al., 2015). Farmers build their own self-control system within the community. This alternative certification system refers to a participatory guarantee system (PGS) which is based on a process of peer review (Nelson et al., 2015). According to IFOAM, PGS is generally defined as "locally focused quality assurance systems [that] certify producers based on the active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange" (Nelson et al., 2015). PGS enables closer monitoring from all farmers in the group. It is a self-control system that is based on self-inspection by the farmers themselves. The decision-making authority has a certain degree of flexibility and is locally-grounded (Nelson et al., 2015). However, it is important that farmers have the competence to deliver organic foods in accordance with their group's rules. The self-control is quite strict since the effect of one farmer who does not perform according to the group's rules will affect the rest of the group. As consumers might lose their trust in this group of farmers simply if one of them breaks the rules, this leads to a high

emphasis on integrity. The role of various stakeholders in inspecting the farm members and ensuring their compliance involves sharing the elements of vision, participation, transparency, trust, and learning (R. Y. Wang et al., 2015). PGS resembles the comprehensive set of informal institutional arrangements, intended to enable and spread a good reputation through social networks (R. Y. Wang et al., 2015).

2.2.3.2 Competence and reputation

The competence of the exchange partners seems to have an important role in the trustful relationships within the organic food chain (Kottila & Rönni, 2008). The relationships between farmers and retailers or distributors are stronger when one perceives the competence of the other as an exchange partner (Kottila & Rönni, 2008). The continuation of these good relationships somehow leads to deeper relationships due to the subsequent increase in the reputation of the partners. Consumer trust may depend on trust in the competence and integrity of neighboring farmers, political advocates, doctors, and other consumers (Schneider et al., 2009). Consumers base their trust on the competence of farmers who, in their farming techniques, act according to the standard of organic agricultural practices. They also base their trust on the competence of distributors in maintaining good logistics such as clear separation between organic and conventional foods as well as on the competence of retailer channels in maintaining the integrity of the organic foods.

2.2.3.3 Characteristics or personality traits

Trust in organic foods may also emerge from the customers' interactions with characteristics of the actors involved in the process as well as those of the brands (also known as brand personality). Honesty, integrity, virtue, scrupulosity, and righteousness are examples of positive personality traits that can stimulate trust in buyer-seller relationships (Patricia M. Doney & Cannon, 1997). Integrity is an important driver in building the consumers' trust in food retailers (Steffen & Doppler, 2019). One example of food retailers' integrity is how a retailer must constantly follow a set of principles that have to be accepted by the consumers (Steffen & Doppler, 2019).

The more positive the personality traits of the various actors, the more they inspire trust between each other (Patricia M. Doney & Cannon, 1997).

2.2.3.4 Communication

Both direct and indirect communications play an important role in building trust among organic consumers. Consumers might engage in direct communication with farmers when making a purchase or during other activities such as a farm visit. The advances in information and communication technology (ICT) have widened the network of communications through which consumers can obtain information from multiple sources in the supply chain. People assess the transparency of the process from the quality of the evidence or information that they receive, resulting in the development of trust. In addition to the content of the communications, the frequency and form of communication are considered important to the creation of trust in the organic food chain (Kottila & Rönni, 2008). Good communication is one of the key aspects which help in understanding a counterpart's needs and building mutual trust, thus establishing the relationship (Çerri, 2012). Therefore, communication strategies which related to organic food production, processing, marketing, and the control system are important for the development of consumer trust.

2.2.3.5 Community or social interactions

Organic farmers are highly dependent on a small number of retailers and they often have limited access to consumers in many countries (Kottila & Rönni, 2008) including Thailand, where the organic food markets are clustered and concentrated in urban settings. Consequently, it is extremely difficult for farmers to reach the consumers directly. Overall, the nature of organic food supports horizontal interaction among stakeholders. For example, the farmers within a specific area have to work together to manage their organic agriculture process. Organic movement groups collaborate to influence a larger impact. These horizontal connections are built up into associations by which the members share information (or knowledge related to organic agricultural practices) and resources. These relationships nowadays are no longer limited to similar groups of actors (e.g. farmer communities and associations) but have also expanded to include vertical interaction (e.g. farmers and distributors or farmers and consumers via direct channels). This vertical interaction can be organized by a non-profit organization which is aimed at providing market opportunities for farmers and motivating them to continue farming in organic ways. Small retailers also try to connect

directly with farmers to secure their supply and to increase the product variety on the shelves. The degree of interaction is becoming wider and deeper, from a group of farmers to a community, and now involves more stakeholders as well as consumers. These connections and interactions between farmers and consumers are shortening the organic food chain, thus reducing the chain complexity. Integrations both horizontally and vertically are essential components in achieving trust because these relationships along the organic food chain trigger transparency in the information and the processes of the organic food chain (Kottila & Rönni, 2008).

Based on the trust and relationship patterns in the organic food industry, it is observed that the five sources of trust (i.e. the 5Cs of control, competence, characteristics, communication, and community) are varied in terms of the level of engagement between consumers (i.e. the trustor) and relevant organizations (i.e. the trustee) (Çerri, 2012). Regarding the rule of law on organic certification, consumers rely on third parties or certifying authorities to do their jobs according to the strict control system in order to verify the authenticity and integrity of the relevant organizations. Next, consumers assess the perceived competences and characteristics being presented by the organizations. Then through communication, consumers start obtaining and exchanging information. Lastly, social interaction facilitates opportunities for consumers to engage with relevant organizations in integrated networks.

Prior research has suggested that the more engagement there is between the trustor and the trustee, the better the opportunities will be for building up trust (Schneider et al., 2009). Studies on the current practices indicate that the organizations which are perceived as having good competence and sincere characteristics can gain trust among consumers even though they may not have organic certification labels but do have a self-control system (Schneider et al., 2009). Moreover, organizations that communicate information and evidence transparently, such as by the traceability of organic food, are perceived by consumers as having a good control system, competence, and sincere characteristics (Schneider et al., 2009). Even more so, organizations that can engage in interactions with consumers, such as in a specified organic community, are able to convince the consumers of the competence of their control system by way

of having personal contact with consumers or by referring them to the participatory guarantee system (PGS) (Schneider et al., 2009). With regard to competence, the organic communities are largely regarded by consumers as experts in the field and closer relationships help endorse their honest and sincere characteristics (Schneider et al., 2009). Additionally, the integrated networks can enhance the effectiveness of the communication mechanism along the organic food chain because it facilitates information sharing among the network partners including consumers. Moreover, consumers who have direct interaction with farmers tend to perceive the transparency of their organic foods and do not expect to receive fully descriptive information about the flow of organic foods (Schneider et al., 2009).

2.3 Food traceability and transparency

Supply chains today are faced with many challenges related to the reliability of information, transparency within supply chain, consumer trust, product quality, food safety, logistics issues, and environmental impacts (Trienekens et al., 2012). Transparency is generally defined as "the principle of enabling the public to gain information about the operations and structures of a given entity" (Etzioni, 2010). Supply chain transparency refers to "the extent to which all of its stakeholders have a shared understanding of and access to the product-related information that they request, without loss, noise, delay and distortion" (Trienekens et al., 2012). The concept of transparency is largely synonymous with openness and disclosure with some subtle differences (Etzioni, 2010).

Transparency can serve various needs in the food and agribusiness (Trienekens et al., 2012). Besides improving market efficiency, enhancing the exchange of information across the whole supply chain, ensuring consistent food quality, supporting product differentiation, and facilitating logistical and process optimization, transparency may also serve operations management considerations. In formulating understanding of transparency in the food context, Schiefer and Deiters (2013) revealed how transparency is achieved if relevant stakeholders in food production and consumption understands the relevant aspects of the products and processes that allow them to make informed decisions.

Consumers demand to have transparency in order to make decisions (Wognum, Bremmers, Trienekens, van der Vorst, & Bloemhof, 2011). They use their purchasing power to "vote" on which business will succeed and fail (Etzioni, 2010). Consumers must be able to know the characteristics and qualities which are associated with the goods they are about to purchase (Kriege-Steffen et al., 2010). The caloric value on food labels is one of the great examples of consumer "sovereignty" (Etzioni, 2010). The introduction of labels that disclose the attributes of various food items is initiated from the consumer demand (Etzioni, 2010). The question is who will protect transparency. When there is no strict regulation, the label is easily granted to all who pay for it (Etzioni, 2010). Consequently, consumers cannot evaluate or rely on intermediaries (i.e., labels).

The food market nowadays is very complex but also anonymous (Trienekens et al., 2012). The food production process is generally not always transparent for consumers (Kriege-Steffen et al., 2010). It becomes a major issue for food choice as well as consumer trust (Kriege-Steffen et al., 2010). Most consumers say that they just buy organic food occasionally. There are different reasons for this, such as the consumers not believing in the advantages and the credibility of organic farming. Some consumers question whether the monitoring of organic food is reliable (Kriege-Steffen et al., 2010). They are caused by an insufficient communication and a lack of information within organic food supply chain (Kriege-Steffen et al., 2010).

Consumers require more information on the agri-food supply chain due to the increasingly concerned about food safety and sustainability (Trienekens et al., 2012). A number of requirements for information systems in food industries are resulted from these transparency demands (Trienekens et al., 2012). The implementation of food traceability systems helps to increase food chain transparency, with these systems becoming an important and essential tool in the agri-food supply chain (Chrysochou, Chryssochoidis, & Kehagia, 2009). Traceability systems support the relevant stakeholders in a business to be able to manage their product flow, increase efficiency throughout the supply chain, and meet consumers' expectations with regard to product quality and safety (Chrysochou et al., 2009). Consumers gain more understanding of the complex and anonymous food system with the traceability system (Menozzi,

Halawany-Darson, Mora, & Giraud, 2015). Consumers associate the traceability benefits with health, quality, safety and control. These benefits are latter associated with trust and confidence (Bosona & Gebresenbet, 2013; Mei-Fang Chen & Chien-Hsien Huang, 2013; Menozzi et al., 2015; van Rijswijk, Frewer, Menozzi, & Faioli, 2008). Quality assurance refers to both quality and safety, both of which have been shown to be related to traceability in consumers' minds (van Rijswijk et al., 2008). Traceability has become more and more important for the food supply chain in light of incidents related to food scandals (Chrysochou et al., 2009).

The main attributes associated with traceability include origin, increased prices, production methods, quality guarantees and best before dates (Menozzi et al., 2015). These attributes reflect the main benefits of food safety and food quality (Menozzi et al., 2015). Traceability systems have been introduced as technological solutions related to the storage and carrying of food product-related information (Chrysochou et al., 2009).

Food traceability has received growing attention in the evaluation of consumers' perceptions and incentives regarding traceable food (Menozzi et al., 2015). It is predicted that it will increase transparency throughout the food chain thus fostering consumer trust in food and food producers (van Rijswijk et al., 2008). Tracking and tracing would be mostly useless if they cannot address the questions of 'how', 'when' and 'why' rather than only 'where' the food is produced (Schiefer & Deiters, 2013). One of the most important questions is on the extent to which sharing information is beneficial and appealing to consumer needs (Etzioni, 2010; van Rijswijk et al., 2008). When consumers are received excessive information in a limited time frame, consumers might have confusion, cognitive strain, and poorer decision-making due to the subsequent information overload (Etzioni, 2010).

2.4 Trust-based Technology: Blockchain

Trust plays an important role in relationships and is central to understanding individual behavior in diverse domains such as work group interactions (Mayer, Davis, & Schoorman, 1995). Information and communication technology have enabled trustworthy experiences regarding the openness and accessibility of information and created the peer-to-peer economy (Wright & De Filippi, 2015). The emerging and

advanced information and communication-based technology enables the characteristics of “shared and public” (Seebacher & Schüritz, 2017). By increasing the transparency in a system, these technologies act as a tool to facilitate trust development (D. H. Mcknight & Cummings, 1998). The arrival of Blockchain technology is set to transform supply chain activities (Kshetri, 2018). Blockchain technology provides a means of ensuring the permanence of records and the potential for facilitating the sharing of data between different actors in a food value chain (Ge et al., 2017). It may lead to the paradigm shift which brings about increased transparency, ensures food integrity and increases trust in food chains (Ge et al., 2017).

2.4.1 Blockchain technology

Blockchain technology was first introduced in Nakamoto’s whitepaper as the underlying technology of Bitcoin in 2008 (Seebacher & Schüritz, 2017). Considering TCP/IP and HTTP as a protocols of communication, Blockchain technology is a protocol of value exchange (Bheemaiah, 2015). It is centered around a peer-to-peer network, thus enabling collaboration between different stakeholders (Seebacher & Schüritz, 2017). It is a type of technology that can decentralize the creation, verification, validation, and secure storage of economic transactions (Wright & De Filippi, 2015). It has the potential to avoid the power of centralized authorities in the field of communications, business, and politics (Wright & De Filippi, 2015). While no widely-agreed definition of Blockchain has yet been established, it is loosely defined around the basis of peer-reviewed literature (Seebacher & Schüritz, 2017). Blockchain serves as a log or ledger for the documents of all transactions and activities that take place within a constructed system (Seebacher & Schüritz, 2017). It links the transactions through time-stamped sequencing, and these transactions are then broadcasted and shared with members in the peer-to-peer network. All transactions are secured through public-key cryptography. Any changes made in each transaction require the verification of their correctness by the network members. After its verification, each transaction is stored in an unpublished “block” which serves as storage unit for all transactions. The block contains a reference to a verified chain of blocks. By using a consensus mechanism, the new blocks are added to the Blockchain in a view-only manner. This

means that the details of a transaction cannot be changed anymore after being added to the Blockchain.

Blockchain has two major types, namely public and private (Seebacher & Schüritz, 2017). A private Blockchain is stricter than a public Blockchain as it has restrictions on who is allowed to enter and contribute to the network, whereas a public Blockchain is not restricted in terms of access rights and allows all participants to add new blocks.

2.4.2 Blockchain principles and characteristics

The technology concept behind Blockchain is similar to that of a database. However, the way in which users interact with a Blockchain database is different (Mougayar, 2015). There are three major types of communication networks, which are centralized, decentralized, and distributed (Baran, 1962) (Figure 2). A centralized network is clearly vulnerable, i.e., the destruction of a single central node may destroy the communication (Baran, 1962). The hierarchical structure of a decentralized network resembles a set of stars connected to a larger star with an additional link forming a loop (Baran, 1962). The complete reliance upon a single point is not always required for the decentralized network (Baran, 1962).

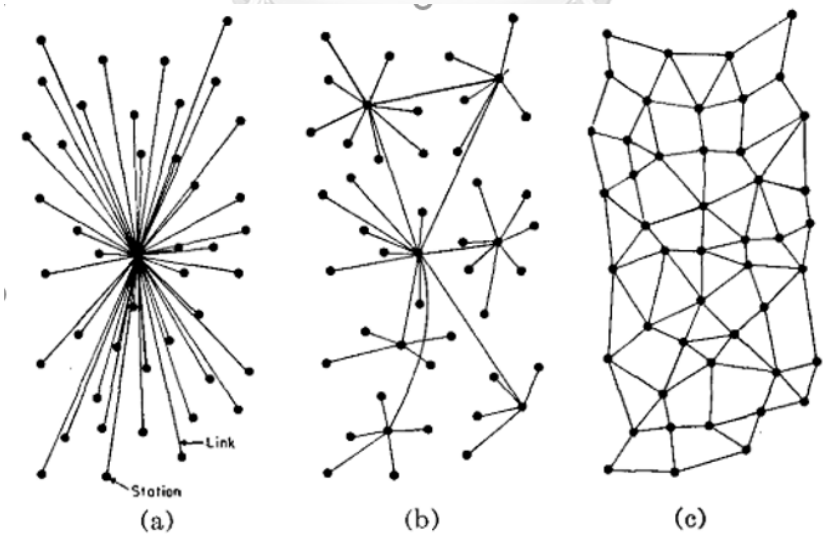


Figure 2 Communications networks (a) Centralized (b) Decentralized (c) Distributed networks (Baran, 1962)

Ge et al. (2017) highlighted the seven key principles of Blockchain technology as follows:

1. Blocks in the Blockchain – each block in a Blockchain contains two important details. Firstly, each block contains an ordered set of records or transactions. Secondly, each block contains a hash of the previous block in its header. The initial block is called the 'genesis' block. These components are the key of Blockchain's security. It helps to guarantee the permanence of information. When there is any change in the data of one block, it would affect all other blocks that follow. The changes require a new consensus process. Each block is connected into a chain and formed a Blockchain.
2. A peer-to-peer network – Blockchain depends on a network of peers or 'nodes'. These network usually provide the computing power to achieve consensus.
3. A distributed immediately replicated file – each block is replicated and distributed across all 'nodes' within the peer-to-peer network.
4. Consensus algorithm – each block must be validated by a consensus algorithm. A new set of transactions are written to a block after the validation process is completed.
5. Cryptographic signatures – all transactions in the Blockchain are cryptographically signed with public key cryptography. This principle help to prove the identity and authenticity and to enforce the rights of read and/or write access.
6. Permissioned vs. unpermissioned – Blockchain or 'distributed ledger' can be classified into unpermissioned or permissioned Blockchain. A permissioned Blockchain consists a set of owners who control the read, write, and/or mining rights. It is operated under the consensus algorithm. The Hyperledger Fabric is the example of permissioned Blochcain. An unpermissioned Blockchain has no single owner or no central control. Ethereum Blockchain is the example of unpermissioned type.
7. Smart contracts – Blockchain has the capability to run the 'smart contracts' program. It is built under the concept of the distributed database. It allows the software to run independently without human intervention, i.e., 'distributed autonomous organizations'.

Six foundational characteristics make up Blockchain technology (Mougayar, 2015; Nichol & Brandt, 2016):

1. Distributed – the data are distributed across all the peers who are participating in the Blockchain network.
2. Decentralized – Blockchain is decentralized by which each node has a copy of the transactions.
3. Public – the actors in Blockchain transactions are hidden, however, all network or 'nodes' can see all the transactions.
4. Time-stamped – the date and time of all transactions are recorded in digital form.
5. Persistent – Blockchain transactions are based on consensus and include a digital record. Therefore, transactions cannot catch fire, be misplaced, or become damaged by water. Therefore, the records have longevity.
6. Non-reputation – the sender is unable to deny that the data is sent by him or her. The algorithm is designed in a manner whereby the sender is unable to deny having sent the data. Therefore, it ensures the authenticity of the data creation and the integrity of the data by which it is unmanipulated in transit.

Blockchain is not necessarily a "trustless architecture," but it does offer "risk-minimized" solutions (Nichol & Brandt, 2016). Blockchain technology is still in the early stages of development. However, the architectures and applications of Blockchain technology is happening at a fast pace (Ge et al., 2017).

2.4.3 Examples of Blockchain applications

The interest in Blockchain technology has increase significantly in the last five years (Ge et al., 2017). The key focuses of many companies and research institutions are mainly on the potential applications of Blockchain technology across the financial, industrial and social sectors (Ge et al., 2017). There are many exaggeration and hype over Blockchain technology, consequently, it leads to the misplaced expectations and misunderstandings (Ge et al., 2017).

Blockchain technology has many potential details application, for examples, the creation of decentralized currencies and smart contracts (Wright & De Filippi, 2015). Furthermore, it also enables the development of new governance systems by allowing

more participatory decision-making and decentralized organizations over a network without any human intervention (Wright & De Filippi, 2015). The potential expectation of this new technology can be seen in Gartner's Hype Cycle (Seebacher & Schüritz, 2017). However, businesses are still waiting for a clearer understanding of where Blockchain can add value to their businesses (Seebacher & Schüritz, 2017). Currently, there are several startups which try to offer Blockchain solutions. Unfortunately, the application has not yet achieved large-scale recognition (Seebacher & Schüritz, 2017). Blockchain application and benefits are extended well beyond cryptocurrency in financial markets (Nichol & Brandt, 2016).

2.4.3.1 Finance

Blockchain technology is utilized in the Bitcoin network which is a decentralized network (Seebacher & Schüritz, 2017). There is no central authority to verify the transactions, the members of this network are required to verify and validate every transaction that occurs in the network (Bheemaiah, 2015). Transactions form the backbone of Blockchain. The structural element or architecture of Blockchain is constructed to create, broadcast, and validate the transactions.

Web wallet services are part of the Bitcoin ecosystem that first entered the bitcoin space (Bheemaiah, 2015). Currency exchange and data analytics are additional services that can provided in Bitcoin ecosystem (Bheemaiah, 2015). Cryptocurrencies have the purpose of assuring monetary exchange between the transacting parties by removing the third-party transaction validation parties (Bheemaiah, 2015). In this space, microfinance and remittances have emerged. The evolution of digital media payment schemes, such as micropayments, allows users to pay small sums to access the content in digital media (Bheemaiah, 2015). They can now pay on a use-as-they-go basis instead of paying for a monthly subscription. In addition, the transaction fees (e.g. agent commissions and access to the service) are reduced if used via the Bitcoin service (Bheemaiah, 2015).

2.4.3.2 Supply chain

Through the authenticity of transactions achieved by Blockchain technology, it allows the creation of new possibilities in different dimensions of society and business (Bheemaiah, 2015). This leads to the possibility of the development of new ideas and

business models. The core of Blockchain technology allows the establishment of an decentralized network or environment in which trusted interactions can take place without the influences of third parties (Seebacher & Schüritz, 2017). Blockchain allows suppliers to track orders individually, thus reducing the risk of fraud and counterfeit (Bheemaiah, 2015). A manufacturer signs the transaction with private key thus verifying the items are received from a supplier (Bheemaiah, 2015). On the other hand, the manufacturer's client owns another private key, which is linked to the same public key (Bheemaiah, 2015). All participants in Blockchain network have full insights into the ongoing transactions, therefore, they can rely on the integrity of unchallengeable data (Seebacher & Schüritz, 2017).

In a collaborative setting, Blockchain can be used in two different ways. Firstly, serving as a storage unit for join and individual data, it is known as a "choreography monitor" (Seebacher & Schüritz, 2017). Secondly, used to oversee and initiate the execution of joint processes, it is known as an "active mediator" (Seebacher & Schüritz, 2017). Therefore, Blockchain might facilitate the co-creation of value between stakeholders, as it provides a platform on which stakeholders can transparently and precisely interact with each other. This emerging technology is disrupting various industries today. Third parties who usually need verify the validity of a transaction are eliminated (Bheemaiah, 2015).

2.4.3.3 Healthcare

Blockchain technology has the potential to apply in healthcare industry by identifying the personal health and chronic illness management schemes (Nichol & Brandt, 2016). The patients provide the conditional access thus having control over the symmetric democratization of healthcare system (Nichol & Brandt, 2016). The healthcare platform decentralizes the health data or medical records, therefore, it provides the security of sensitive information (Nichol & Brandt, 2016). Patients use their own signature combined with a hospital signature to unlock data and give the access to secure the medical information for use in the treatment (Nichol & Brandt, 2016). The patient has full authorization of their medical record and information and also can select which information to be shared and viewed by which healthcare professionals (Nichol & Brandt, 2016).

2.5 Technology acceptance model (TAM)

Several diverse lines of research have indicated the importance of perceived usefulness and perceived ease of use as the determinants of user behavior especially in information technology (Davis, 1989). Firstly, people tend to use or not use an application based on the extent to which they perceive the usefulness of the application, this first variable is referred to as perceived usefulness (Davis, 1989; Lu, Yu, Liu, & Yao, 2003; Venkatesh, Morris, Davis, & Davis, 2003). Secondly, in addition to usefulness, the usage intention is influenced by perceived ease of use (Davis, 1989; Venkatesh et al., 2003). In some situation, the potential users might refuse to use the application if they believe the system is too hard to use given that the application is useful (Davis, 1989; Larcker & Lessig, 1980).

The perceived usefulness and usage intentions under the technology acceptance model (TAM) are explained in the dimensions of social influence and cognitive instrumental processes (Venkatesh & Davis, 2000) (Figure 3). The model is used to explains variance in usage intentions and behaviors which provides the basis for discovering the impact of external variables on internal beliefs, attitudes, and intentions (Lu et al., 2003; Venkatesh & Davis, 2000; Venkatesh et al., 2003). It constructively compares with alternative models such as the Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1975) and the Theory of Planned Behavior (TPB) by Ajzen (1991) (Venkatesh & Davis, 2000). The TAM model theorizes an individual's behavioral intention to use a system based on two beliefs: perceived usefulness and perceived ease of use.

2.5.1 Perceived usefulness

Perceived usefulness is defined as the extent to which an individual believes that using a particular system would enhance the good performance. Larcker and Lessig (1980) measured two dimensions of perceived usefulness for the design of management information systems. The two distinct factors of perceived importance and perceived useableness were identified. Perceived importance is defined as “the quality that causes a particular information set to acquire relevance to a decision maker” and the extent to which the information elements are “a necessary input for task accomplishment” (Larcker & Lessig, 1980). Perceived useableness is defined as the degree to which “the

information format is unambiguous and clear or readable". These two dimensions are similar to perceived usefulness and perceived ease of use as defined in the TAM model. Hauser and Simmie (1981) underlined ease of use and effectiveness as most influential dimensions in the formation of user preferences regarding a set of alternative communication technologies. The latter dimension is similar to perceived usefulness in the TAM model.

2.5.2 Perceived ease of use

Perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989; Venkatesh & Davis, 2000). An application perceived to be easier to use than another is more likely to be accepted by users (Davis, 1989). According to the TAM model, perceived usefulness is also influenced by perceived ease of use. When the system is easier to use, the system can be more useful (Venkatesh & Davis, 2000).

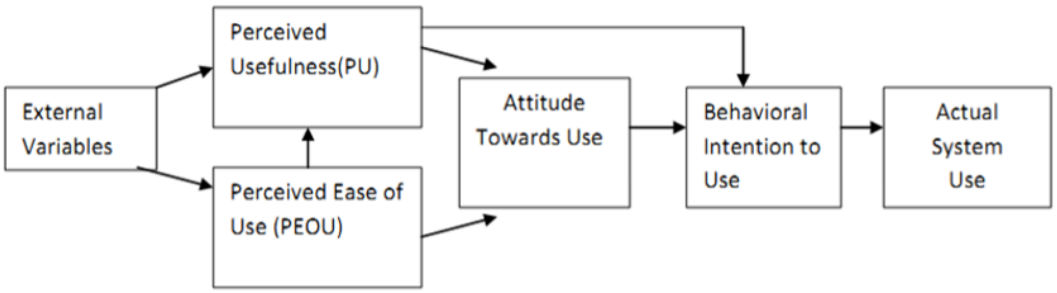


Figure 3 Technology Acceptance Model (Davis, 1989)

David and his colleagues have been validating and extending the TAM model under different contexts (Lu et al., 2003). They made it more explanatory by validating, applying, and replicating its power to predict the use of information systems (Lu et al., 2003). Lu et al. (2003) summarized the important studies which applied the TAM model from 1989 to 2001. There were 18 studies in total, from which it was indicated that the application of the TAM model was widespread in explaining and/or predicting technology acceptance in society. The TAM model is believed to be the most robust and influential model for explaining IT/IS adoption behavior (Lu et al., 2003).

Venkatesh and Davis (2000) described the theoretical extension of the TAM model which explains perceived usefulness and usage intentions in terms of social

influence and cognitive instrumental processes. The extended model is referred to as TAM2 (Figure 4). In TAM2, Venkatesh and Davis (2000) highlighted the important of understanding the determinants of perceived usefulness and also understanding their influence over time while the using experience is increasing. Social influence processes included subjective norm, voluntariness, and image. Cognitive instrumental processes included job relevance, output quality, result demonstrability, and perceived ease of use. Both social influence and cognitive instrumental processes significantly influenced user acceptance (Venkatesh & Davis, 2000).

2.6 Conceptual framework

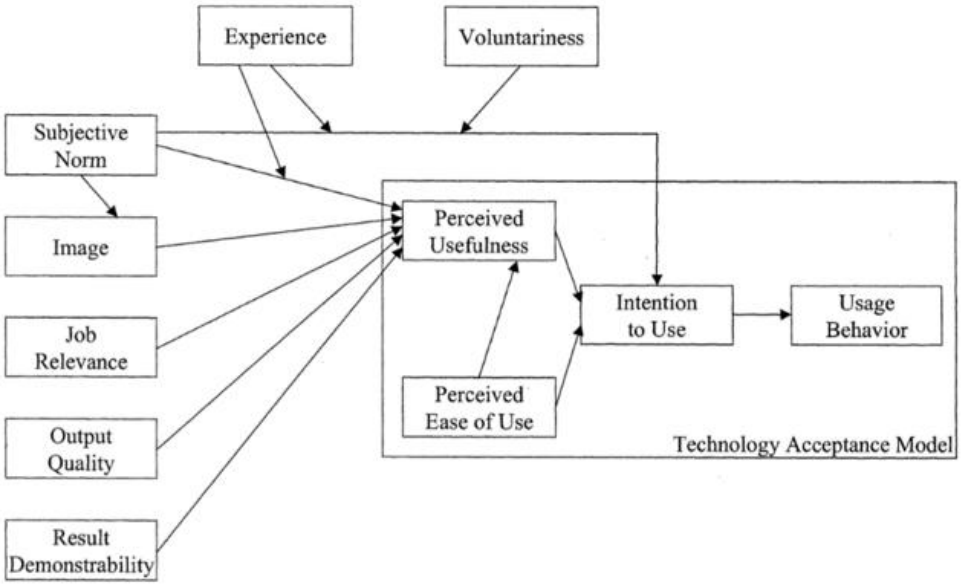


Figure 4 Extension of Technology Acceptance Model, TAM 2 (Venkatesh & Davis, 2000)

Previous researchers have identified trust as a major factor in the food supply chain, while transparency has been shown to mediate consumer trust by providing informed information. This study further explores the determinants of consumer trust and seeks to understand the mediator effect of transparency in enhancing consumer trust and trust behaviors. Trust enables more open communication, information sharing and conflict management (Barney & Hansen, 1994; Blomqvist & Seppänen, 2003; D. H. Mcknight & Cummings, 1998; Sako, 1997). In this study, the researcher focuses on intention to purchase organic food products and intention to co-create as the trust-related behaviors. The intention to co-create refers to the positive word-of-mouth, the

information sharing, and the interactions related to organic social movement. The conceptual framework is elaborated in Figure 5. An innovative trust-building platform is developed to verify the mediator effect of transparency on consumer trust and to evaluate the development of consumer trust. The Technology Acceptance Model (TAM) is applied in this study in order to further understand how consumers respond to the innovative trust-building platform. The model used in this study is adapted from the Technology Acceptance Model 2, or TAM 2, by Venkatesh and Davis (2000).

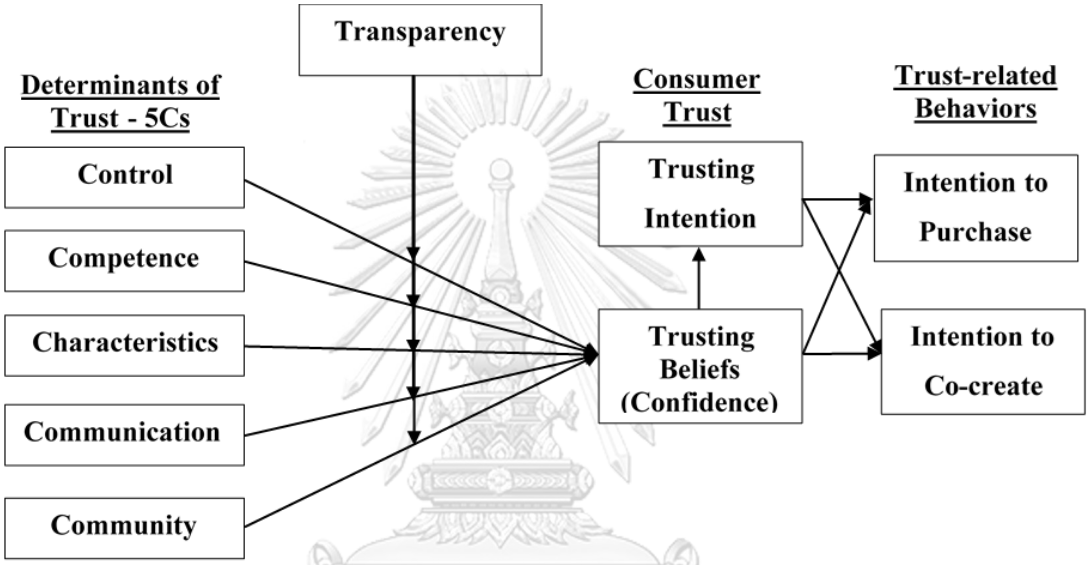


Figure 5 Conceptual framework for the innovative trust-building process

Chapter 3
Methodology

3.1 Research methodology

This study began with an exploratory research that was designed to identify the key determinants of consumer trust. The findings from the exploratory research were then used to explain further and build concrete understanding of the relationship between trust-building factors and trust-related behavioral outcomes. The second part of this study took the form of an explanatory research, which aimed to address how trust could be built through an innovative trust-building platform.

This study applied a mixed methodology approach which involved the use of both qualitative and quantitative research methods. The researcher weighted the importance of both methods equally during the study. The qualitative approach facilitated understanding of the problem and the consumer requirements which are related to trust building, while the quantitative method was applied to quantify the correlation between the determinants of trust and consumer trust and also the impact of the innovative trust-building platform on consumer trust. Consumer trust was both the key focus and the central objective of this study. Table 2 summarizes the research methodologies and outputs of each phase. This study was divided into 6 phases:

Phase 1 – Exploration of the conceptual framework and determinants of trust

Studying consumer trust in organic food products, trust-based technology, the determinants of trust, and their impact on consumer trust and trust-related behaviors.

Phase 2 – Exploration of requirements for the innovative trust-building platform through trust building co-creative workshop

Co-building a consumer trust process including the needs and requirements for achieving the creation of trust in organic food products.

Phase 3 – Development of innovative trust- building platform and evaluation of technical performance

Building an innovative trust-building platform for the organic food market and evaluating its technical performance.

Phase 4 – Consumer acceptance testing of innovative trust-building platform

Testing consumer acceptance in terms of the overall concept and user experience.

Phase 5 – Trust-related behavioral outcomes

Analyzing the development of consumer trust and identifying the barriers to the development of consumer trust and the potential trust-related behavioral outcomes.

Phase 6 – Development of a commercialization strategy

Formulating a commercialization strategy for the innovative trust-building platform.

Table 2 Research methodology details

Phase	Methodology	Output
Phase 1: Exploration of the conceptual framework and determinants of trust	1. Systematic literature review 2. Expert interview 3. Survey	1. Research conceptual framework 2. Consumer trust in organic food products 3. Determinants of trust 4. Relevant trust-related technology
Phase 2: Exploration of requirements for the innovative trust-building platform through trust building co-creative workshop	1. Trust building co-creative workshop	1. Requirements for innovative trust-building platform 2. Ideas and insights to support the design of innovative trust-building platform
Phase 3: Development of innovative trust- building platform and evaluation of its technical performance	1. Cross functional development team 2. Technical performance testing	1. Innovative trust-building platform 2. Technical performance results
Phase 4: Consumer acceptance testing of innovative trust-building platform	1. Focus group interview 2. In-depth interview 3. Survey	1. Concept acceptance results 2. Technology acceptance results
Phase 5: Trust-related behavioral outcomes	1. Survey	1. Consumer trust development 2. Barriers for consumer trust development
Phase 6: Development of commercialization strategy	1. Evaluating potential commercialization strategy	1. Commercialization strategy

3.2 Research process

Data were collected in sequential order to optimize understanding of the study problems (Creswell, 2003). The details of each phase are presented in Appendix 1. Figure 6 summarizes the action details in each phase.

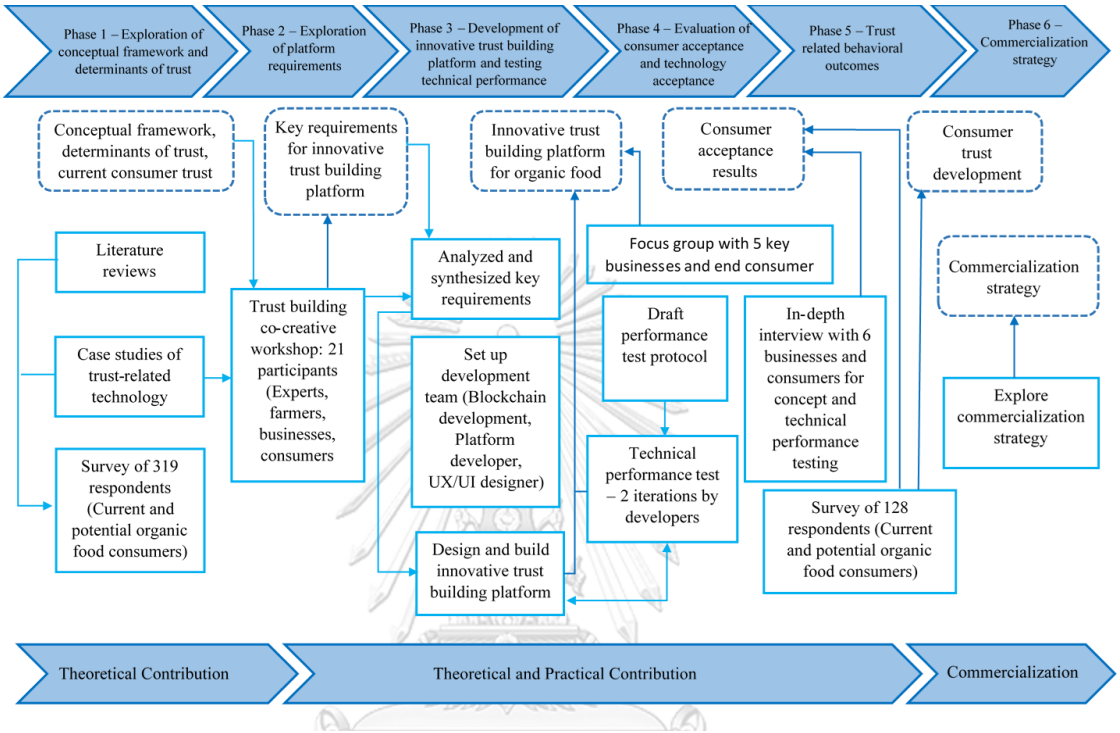


Figure 6 Research methodology diagram

3.2.1 Phase 1: Exploration of the conceptual framework and determinants of trust

This study started with a systematic literature review. The scope of this review included organic food consumption, trust in general, trust in the organic food market, transparency and traceability, and trust-based technology. The findings from this review together with the input from interviews with experts in organic food principles and key stakeholders in the organic food supply chain (organic food consumers, farmers, and business consumers) led to the construction of a preliminary conceptual framework and provided better understanding of current consumer trust in organic food products and trust-related technologies, i.e. Blockchain.

A survey was then conducted with the aim of explaining the trust-building antecedents and current consumer trust levels. The scales used for identifying the trust

antecedents were adapted from Çerri (2012). The consumer trust scales were adapted from H. D. McKnight, V. Choudhury, and C. Kacmar (2002). The full survey details are presented in Appendix 2. A pilot test was performed to test the survey's validity. A group of 10 active consumers were asked to complete the pilot survey after which they also completed a short interview session. The feedback was then used to improve the survey contents for the main study. In the past twenty years, the research in organic food market in Thailand were conducted with consumers in Bangkok metropolitan area (Greennet, 2019). Consumers in Bangkok metropolitan area were the target population of this research. Yamane provided a simplified formula to calculate sample sizes (Yamane, 1967).

$$n = \frac{N}{1 + N(e)^2}$$

Given the population in Bangkok metropolitan area was approximately ten million in year 2018 (NationalStatisticalOffice, 2018). Based on the population size with 95% confidence level, the sample size was 399 surveys. Part of the surveys were excluded due to the incomplete data. 319 with the respondents selected based on the convenience sampling technique. The survey was analyzed by SPSS software. It was summarized to draw general conclusions on the respondents' profiles and then analyzed to understand which factors influence consumer trust.

The survey started with questions about demographic information and consumption patterns. Seven-point Likert-type scales were used for measuring the current levels of Thai consumers' trust in organic food and their perceptions related to the sources of trust. The response categories ranged from 1 = "definitely disagree" to 7 = "definitely agree". The survey instrument contained 3 items measuring Thai consumers' perceptions with regard to their belief in the authenticity of organic food products, their intention to rely on organic food product in certain situations, and their overall trust in organic food products.

The respondents were asked to indicate the number on a scale from 1 to 7 that best described their attitudes towards each context or situation. The items aimed to identify the participants' perceptions of organic foods in many contexts, for example,

the extent to which they believed that organic food, for example, had no chemical residues, could improve the quality of their life and could reflect the farmers' integrity. The second element of the survey addressed the willingness of the participants to buy organic foods in certain situations, such as where there were instances of news related to fraud in the organic food industry, excess chemical residues in organic food products, and weak certification system. The final element addressed the respondents' overall trust in organic food products. The trusting scale based on these three items has high construct reliability (Cronbach's Alpha = 0.948).

Next, consumers were asked about their attitudes regarding each source of trust by means of five items, namely control, competence, characteristics, communication and community. The questions in this section included "Please indicate the number on a scale from 1 to 7 that best describes your attitude towards each source of trust". The questions were categorized into 5 groups according to each source of trust. For control, the questions were related to the control systems used by certified authorities and the control system used among farmers. For competence, the questions sought to capture consumers' attitudes regarding the competence of key stakeholders. For characteristics, the questions asked whether key stakeholders were, for example, doing their jobs for the sake of consumer wellbeing. Questions on the communication factor emphasized information accessibility and information reliability. Lastly, community or social interaction addressed the importance of engagement and interaction with key stakeholders in the organic food chain. The five-item scale had high construct reliability (Cronbach's Alpha = 0.934).

3.2.2 Phase 2: Exploration of platform requirements through a trust building co-creative workshop

An exploratory approach was used to gain a better understanding of what the trust-building process should look like. According to Gummesson (2000), "interaction research" can explore the issue at hand through a workshop organized to allow opportunities for the researcher to observe details of the co-creation process. In this study, a workshop was conducted with stakeholders from the organic food chain. Selected according to their roles in the chain, the workshop participants consisted of active consumers (i.e., green and potential green consumers), farmers (e.g., group

leaders and young farmers), community representatives (from both the farmer and the consumer side), members of non-governmental organizations (NGO), distributors, retailers (e.g., restaurants, hotels, and green shops), entrepreneur/SMEs, and other relevant stakeholders. The screening was mainly based on each individual's ability to contribute during the workshop. In addition, the selected consumers were required to have the right basic understanding of organic agriculture. The participants were selected from established organic food networks, such as the Sampran Model, and their connections. Finally, the individuals who took part in the workshop included 21 participants from four categories: 5 experts, 5 farmers, 4 business consumers, and 7 active consumers. Brief profiles of the participants are presented in Appendix 3. They were allocated into 4 groups, each of which consisted of 5-6 persons representing all four of the different categories of actors. University students from the Industrial Design Department of Chulalongkorn University also joined the workshop as facilitators.

The workshop consisted of four sessions, with each one aiming to discover information and/or problems, define problems, develop ideas and/or concepts, and screen ideas and/or concepts for the further development of an innovative trust-building platform in Phase 3. Different tools and techniques were utilized for each session. The workshop was design based on the double diamond diagram developed by the UK Design Council (Design Council, 2015). The two diamonds represent a process of exploring an issue more widely or deeply or through divergent thinking and then taking focused action or convergent thinking. The diagram consists of four phases: discover, define, develop, and deliver. The tools and techniques for designing co-creation activities while supporting and delivering the 5 aspects of trust (5Cs) in the double diamond design process (i.e., workshop design) are summarized in Appendix 3.

There were three main activities in the workshop (Appendix 5). The workshop started with a SWOT analysis to clarify the context of the organic food market. Through this analysis, both internal and external environments related to the organic food market were evaluated and meaningful information regarding the strengths, weaknesses, opportunities, and threats of the market were generated. This activity allowed all relevant stakeholders, especially consumers, to share their input and understand the contexts, which included the competence of the farmers (i.e., reflecting the strength

element) and of the control system of organic agriculture (i.e., reflecting the threat element). The participants were then asked to brainstorm ideas or solutions for supporting the strengths and opportunities, and alleviating the weaknesses and threats as identified from the analysis output.

Next, the respondents were asked to explore and identify the holistic view of the current relationships and interactions between stakeholders in the organic food chain. A stakeholder map together with a descriptive value web were used as facilitating tools to frame the insights of the organic food market. By showing how different groups of stakeholders interact and how they are related to each other (Israsena Na Ayudhya & Treeratanaphan, 2017), the stakeholder map illustrates the community, interaction, and relationships within the chain. The descriptive value web can demonstrate how value is created and exchanged in the stakeholder map (Kumar, 2013), leading to the creation of a complete network diagram. The participants were asked to list all relevant stakeholders. Then they had to identify the category and importance of each stakeholder from different levels. The relationships and values between all of the groups at different levels were then discussed and drawn. After completing the stakeholder map, a brainstorming session was conducted to generate new opportunities, for example, a new line of relationship or the addition of a new stakeholder.

The second session started with constructing the consumers' journey map to frame the insights. Using a journey map allowed greater understanding of the consumers' experiences, including their pain points and gain points at certain stages of their interaction with the products (i.e., their journey) (Israsena Na Ayudhya & Treeratanaphan, 2016; Kumar, 2013). Customer pain points refer to anything that annoys or prevents them before, during, and after trying to get a job done (Osterwalder, et al., 2014). Three types of customer pains include undesired outcomes; problems; and characteristics, obstacles, and risks (i.e., undesired potential outcomes) (Osterwalder, et al., 2014). Customer gain points describe the outcomes and benefits that customers want from the product or service (e.g., functional utility, social gains, positive emotions, and cost savings) (Osterwalder, et al., 2014). Within each group of mixed participants, the consumers identified and shared their own personal journey maps related to their experiences with organic food products. The outputs allowed the researcher to identify

the consumers' relationships with other entities, and then to analyze whether their current experiences allow them to receive relevant information related to control, competence, and characteristics. After confirming understanding of each journey map, the value proposition canvas was used to map the current opportunities (consumers' gains) and/or threats (consumers' pains) along with the possible solutions which addressed these gains and pains. The group selected a point of interaction along the journey map and identified their preferred solutions (e.g. product or service). The ideation process was carried out through divergent or convergent thinking. The ideas or solutions were screened and mapped with their objective (i.e., solving pains and building gains). Scenario and storytelling were then used to facilitate the arrangement of each solution and plot it into the sequence along the journey map. The group discussed and identified the context that best fitted each solution.

The last session focused on exploring the possible concepts based on trust-related factors. A concept-generating matrix is a key tool for structuring ideation, collecting relevant concepts, and identifying opportunities (Kumar, 2013). A two-dimensional matrix takes two sets of factors and explores the concepts at their intersections (Kumar, 2013). The two sets of factors applied in the workshops included a list of trust-supported aspects (i.e., control, competence, and characteristics) and a list of activities (i.e., communication and community/social interaction). Input related to control, competence, and characteristics was provided by means of pictures, text messages, short video clips, etc. The participants then generated ideas or concepts at each intersection within the matrix. The relevance of each co-creation technique in fostering trust development is summarized in Appendix 4.

3.2.3 Phase 3: Development of an innovative trust-building platform and evaluation of its technical performance

An innovative trust-building platform that included the implementation of Blockchain technology was designed and developed by a cross-functional team of platform developers, Blockchain technology experts, user experience and user interaction experts, and facilitators. Once the exploration phases had determined the range of solutions that could appeal to the development of the organic food market, the technical feasibility and platform development plan were studied to ensure the solution

was financially viable and meaningfully sustainable. The innovative trust-building platform was then further used to measure the development of consumer trust. The findings from Phases 1 and 2 were used as the input for the design and development of the innovative trust-building platform, which mimicked the virtual places where consumers and businesses could gain access to transparent and traceable information recorded by the farmers responsible for the particular organic food products. The innovative trust-building platform was designed to be integrated as a part of the larger system of the Thai Organic Platform which incorporates the entire value chain management process from organic farming, to E-Commerce, and customer engagement. Information about the Thai Organic Platform is provided in Appendix 7.

The first version of the designed system for the innovative trust-building platform was shared with key stakeholders from the Sampran Model. It was considered to be a showcase of platform flow and functions. After that session, the platform was also shared with members of the Thai Organic Consumer Association (TOCA) who were then asked for their opinions. All of the feedback was processed and further applied to adjust the platform content.

3.2.4 Phase 4: Consumer acceptance testing of the innovative trust-building platform

A focus group was organized, consisting of representatives from four businesses and one consumer together with the platform developers. The participants' profiles are provided in Appendix 8. The focus group session started with an introduction of Blockchain technology. It aimed to provide the participants with a basic understanding of how Blockchain technology facilitates the transparent and traceable flow of information. The participants were asked to scan the unique ID quick response code (QR) from some coffee packaging and a stand-alone flipchart, which represented the use case in a green shop, restaurant, or hotel. The focus group discussion was mainly related to the concept, function, attractiveness for consumers and businesses, and impact on their trust from a particular showcase of organic food products. The findings were used to further adjust the development of the innovative trust-building platform.

Next, the platform was tested for both its technical feasibility and its ability to be scaled up. The testing protocols included the correction of data recorded by farmers,

the correction of information stored in the Blockchain database, the flow between the raw data database and the Blockchain database, and the flow between the Blockchain database and the user interface page. There were two rounds of technical performance testing. Adjustments were made after the 1st and 2nd rounds of testing.

The level of consumer acceptance in the innovative trust-building platform was quantified from the survey of 128 respondents. A set of questions related to the concept and usage was included as one section in the survey. The scales were adapted from the Technology Acceptance Model developed by Venkatesh and Davis (2000). The technology acceptance scales had high construct reliability (Cronbach's Alpha = 0.961).

3.2.5 Phase 5: Trust-related behavioral outcomes

To study the trust-related behavioral outcomes, a second survey was conducted with the main objectives of understanding consumers' views on the importance of the platform as an alternative trust-building source (i.e., transparent and traceable information), the development of consumer trust, and barriers to continued organic food consumption. SPSS software was used to support the data analysis in order to achieve the survey's objectives.

The survey was divided into four sections. The first section featured a short video which aimed to introduce the basics of Blockchain technology and standardize the basic understanding of traceability concept through Blockchain technology. The second section applied the Technology Acceptance Model as introduced in 3.2.4. The perception analysis was based on the mean score and standard deviation from a 7-point Likert-type scale. The interpretation could be classified into 7 levels:

Analyzing the level of importance and satisfaction

Range of assessment levels = (Maximum – Minimum)/level

= (7-1)/7

= 0.86

Mean score	Interpretation
6.22 – 7.00	Definitely agree
5.35 – 6.21	Strongly agree
4.48 – 5.34	Agree
3.61 – 4.47	Neutral
2.74 – 3.60	Disagree
1.87 – 2.73	Strongly disagree
1.00 – 1.86	Definitely disagree

The third section included questions related to the 5Cs, trusting belief, and trusting intention in organic food. The trust measurement scales were adapted from the work of D. H. McKnight, V. Choudhury, and C. Kacmar (2002). The trusting belief and trusting intention scales had high construct reliability with Cronbach's Alpha scores of 0.985 and 0.944 respectively. The last section sought to gather general information from the respondents on their consumption behavior, their consumption motivation, and their barriers to continued consumption. The conceptual approach for measuring the performance of the innovative trust-building platform is summarized in Figure 7.

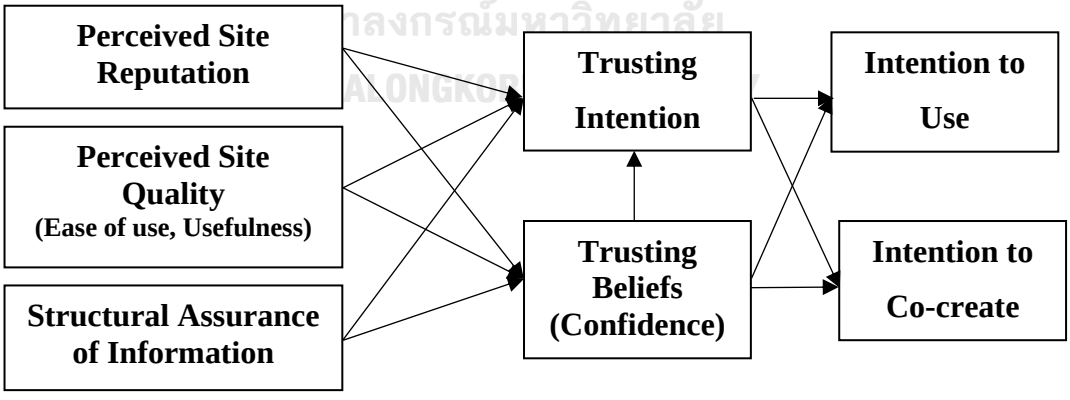


Figure 7 Conceptual approach for exploring the consumer co-creation process

The survey was first tested on a pilot group of six active consumers. The feedback from this pilot test was used to adjust the user interface page, i.e., the look and feel, as well as the required information in the Blockchain database, which the pilot

group participants mentioned should reflect the overall transparency of the organic food supply chain. Based on the pilot group feedback, the survey was also simplified for better flow and understanding. Then, the survey was distributed online to a sample of 128 respondents. The target populations included current and potential organic food consumers. The survey details are provided in Appendix 9.

3.2.6 Phase 6: Development of a commercialization strategy

The development of the commercialization strategy for utilizing the innovative trust-building platform consisted of four steps.

1. Identify the market demand and possibility – utilizing Porter's Five Force's analysis to determine the industry attractiveness of the organic food market.
2. Market analysis – utilizing SWOT analysis to identify the strengths, weaknesses, opportunities and threats, and to determine the total possible market size and identify the key businesses that might have interest in the platform.
3. Operational feasibility – assessing the total expenses from the project
4. Financial feasibility management – estimating the return on investment, payback period, breakeven point, net present value (NPV), internal rate of return (IRR), and contribution to future innovation.

Chapter 4

Requirement Analysis and Platform Development

In this chapter, the researcher summarizes the research results from Phase one to Phase three. This chapter includes analysis of the first three main objectives: the study of the determinants of trust, the exploration of the key requirements for an innovative trust-building platform, and the development of the innovative trust-building platform.

4.1 Phase 1: Exploration of the conceptual framework and determinants of trust

Phase 1 aimed to build up understanding related to current levels of consumer trust, the trust determinants, and the impact of each trust determinant on consumer trust and trust-related behaviours in the organic food industry. The phase started with the gathering of information through interview sessions with experts and key stakeholders (i.e., farmers and consumers). One of the experts mentioned “life” as the key word for organic food. This expert went on to clarify that the term “organic” refers to the way agricultural products are grown and processed through a natural approach. This is the fundamental principle of what it means to be organic that all stakeholders including consumers should understand. Therefore, the researcher was interested in learning the current degree of consumer knowledge and understanding of organic food principles and also then correlating this knowledge with the consumption behaviour. Discussions with farmers enabled the researcher to understand their cultivation activities. During these discussions, the farmers mentioned that they needed to build the right understanding of the cultivation process and solve the problems with the right competence. In this respect, it is important that the farmers have access to a group of fellow farmers with whom they can share their knowledge and build the supply power (i.e., product varieties and volume). As the farmers usually did not have direct contact with the consumers, they did not know the real needs of the consumers. They also perceived that the consumers did not have the right understanding of the nature of organic food. For example, consumers expect organic food to have a perfect appearance. In reality, there are many factors, e.g., seasonality and changing climates, that could impact the product quality.

During the interviewing sessions with consumers, they often mentioned that the control system was largely unknown to them. They only received this information when they had direct contact with the farmers. Interestingly, the consumers' perspectives on the importance of the control system generally changed after they had engaged in direct communication with the farmers. The kindness and honesty of the farmers alleviated their worries regarding the control system. These insights were used to develop a survey questionnaire. The contexts were used in the section on the trust determinants and were then further correlated with the findings and analysis section.

From the survey, a total of 319 responses were received. Of these, the responses from online sources and customers of the Sampran Model's relevant channels (e.g. Sookjai Farmers' Market, Sookjai Society Event, Patom Organic Café) accounted for 61.13% (195) and 38.87% (124) of the respondents, respectively. It is noted that the respondents from the Sampran Model sources represented those who had direct experiences with organic food products and organic farmers at the above-mentioned retail channels, while the respondents from the online source represented the current and potential organic consumers overall. Out of the 319 completed surveys, there were 60 surveys which included no answer on the organic food principles' questions. However, none of the surveys were dropped from the overall analysis.

SPSS 22 was used for the statistical analysis. The data collected from the 319 respondents were analyzed by three methods: descriptive, inferential and multiple regression analysis. First, descriptive analysis was run to determine the general demographic profiles of the respondents. In addition, this process helped to characterize the consumers according to their consumption behavior and their understanding of organic food principles. The analysis also included comparisons between the two groups of customers who were categorized as accessing the survey from either the online or the Sampran Model sources. Second, inferential analysis was used to determine whether the respondents from the two groups had different demographic profiles and consumption patterns. The respondents' perceptions toward different sources of trust were analyzed based on their mean values. The current perceptions of the respondents regarding organic food were then analyzed from their mean values through the trust components.

Next, multiple regression analysis was used to investigate the impact of different sources of trust on consumer trust (including trusting belief and trusting intention). The analytical outcomes were summarized to draw general conclusions on the respondents' profiles, including their consumption behavior and their basic understanding of organic food principles, to explore the current perceptions toward sources of trust, and to explore the factors that influence the creation of trust.

4.1.1 Consumer characteristics

The average profile of the respondents was females aged between 30-39 and 40-49 years old. The majority lived in the Bangkok metropolitan area and worked in a private company or had their own business. Most of the respondents had elderly family members and no kids under 12 years old. In addition, about 20% of the respondents had family members who were sick. Table 3 provides the overview of the consumer characteristics, which reflect that Thailand is moving toward an aging society. In short, the target groups are mostly middle-aged females who live in the Bangkok metropolitan area.

Table 3 Background characteristics of respondents

	Online (n=195)	Sookjai Market (n=41)	Sookjai Day (n=69)	Patom café (n=14)
Sex, %				
Female	57.9	75.6	65.2	42.9
Male	42.1	24.4	34.8	50.0
Other	n/a	n/a	n/a	7.1
Age, %				
Less than 20	n/a	n/a	2.9	14.3
20-29	7.7	14.6	10.1	21.4
30-39	46.7	39.0	29.0	35.7
40-49	28.7	19.5	21.7	28.6
50-59	13.8	17.1	24.6	n/a
More than 60	3.1	9.8	11.6	n/a
Address, %				
Bangkok	80.0	68.3	62.3	92.9
Others	20.0	31.7	37.7	7.1
Occupation, %				
Public employee	13.8	36.6	27.5	n/a
Private employee	40.0	31.7	29.0	28.6
Business owner/Trading	35.4	21.9	14.5	35.7
Housewife	4.1	4.9	10.2	n/a
Others	6.7	4.9	18.8	35.7
Income, %				
Less than 30,000 Baht	9.7	29.3	20.3	14.3
30,000 – 60,000 Baht	19.6	36.6	37.8	n/a
60,001 – 90,000 Baht	17.4	14.6	15.9	14.3

90,001 – 120,000 Baht	9.7	7.3	10.1	28.6
120,001 – 150,000 Baht	8.7	7.3	7.2	7.1
More than 150,000 Baht	34.9	4.9	8.7	35.7
Family with kids, %				
No	68.7	73.2	78.3	78.6
Yes	31.3	26.8	21.7	21.4
Family with elderly, %				
No	31.8	46.3	49.3	28.6
Yes	68.2	53.7	50.7	71.4
Family with illness, %				
No	68.7	85.4	78.3	85.7
Yes	31.3	14.6	21.7	14.3

In terms of buying frequency, the data suggest that both groups of respondents, from the online and the Sampran Model sources, bought organic food products once per week (Table 4). The respondents mentioned that when they bought organic food products, they would often stock up for the whole week because there were few places selling organic products and they had limited opening times. This shortage of green markets reflects one of the major pain points of organic food consumers.

When being tested on their knowledge of organic food principles, a majority of the respondents could not answer the questions correctly (Table 4). However, customers who participated through the Sampran Model's channels seemed to perform better overall in answering these questions. The data imply that consumers who have direct experience with organic food products have a higher chance of understanding the basic principles of organic food.

Table 4 Buying frequency and knowledge of the organic principles

	Online (n=195)	**Sookjai Market (n=41)**	**Sookjai Day (n=69)**	**Patom café (n=14)**
Buying frequency, %				
Once per week	31.3	31.7	50.7	35.7
Once per two weeks	16.4	14.6	17.4	14.3
Once per month	23.6	19.5	8.7	14.3
Others	9.2	17.1	7.2	21.4
Never	19.5	17.1	15.9	14.3
Understanding, %				
Right understanding	22.6	39.0	42.0	35.7
Wrong understanding	46.7	61.0	58.0	64.3
No answers	30.7	n/a	n/a	n/a

4.1.2 Consumer perceptions towards sources of trust

The current consumer perceptions toward each determinant of trust (i.e., the 5Cs of control, competence, characteristics, communication, and community) were analyzed by calculating the mean value of the perception level for each factor (Table 5). The online respondents had neutral perceptions on control, competence and characteristics of the current situations in the organic food market, whereas the respondents from the Sampran Model's sources had higher perception levels for all factors, especially the community factor. This reflects the importance of social interactions within the organic food market, such as relationships with organic farmers selling at the Sookjai Famers' Market and at Sookjai Society events.

Table 5 Overall mean value of respondents' perception toward each factor of 5Cs

Group	Dimensions	Mean value	Standard deviation	Average perception level
Total respondents (n=319)	Control	4.47	1.24	Agree
	Competence	4.65	1.18	Agree
	Characteristic	4.58	1.29	Agree
	Communication	4.85	1.23	Agree
	Community	5.07	1.32	Agree
Online respondents (n=195)	Control	4.20	1.26	Neutral
	Competence	4.38	1.22	Neutral
	Characteristic	4.28	1.34	Neutral
	Communication	4.69	1.34	Agree
	Community	4.84	1.40	Agree
Sampran respondents (n=124)	Control	4.89	1.08	Agree
	Competence	5.08	0.97	Agree
	Characteristic	5.05	1.05	Agree
	Communication	5.11	0.99	Agree
	Community	5.44	1.08	Strongly agree

There was no clear distinction between the two groups in terms of their overall perception levels toward current trusting belief, trusting intention, and overall trust (Table 6). Even so, the overall trust level was higher for the respondents from the Sampran Model sources. The online respondents had neutral perceptions regarding their willingness to rely on organic food products. This can be due to the impact of community experiences on their overall trust levels.

Table 6 Overall mean value of respondents' perception toward trust components

Group	Dimensions	Mean value	Standard deviation	Average perception level
Total respondents (n=319)	Trusting belief	4.77	1.23	Agree
	Trusting intention	4.54	1.15	Agree
	Overall trust	4.83	1.20	Agree
Online respondents (n=195)	Trusting belief	4.50	1.18	Agree
	Trusting intention	4.33	1.25	Neutral
	Overall trust	4.56	1.36	Agree
Sampran respondents (n=124)	Trusting belief	5.18	0.91	Agree
	Trusting intention	4.88	0.88	Agree
	Overall trust	5.26	1.05	Agree

4.1.3 Impact of sources of trust on consumer trust levels

Trusting belief and trusting intention are two components of consumer trust which are considered as dependent variables in this study. The overall results on how each source of trust impacted consumer trust are shown in Tables 7 and 8. Control, competence and communication had no impact on consumer trust (neither trusting belief nor trusting intention) for all respondents.

Table 7 Multiple regression analysis, regressing the impact of each source of trust towards trusting belief

	B	Standard error	beta	t	p
Online respondents* (n=195)					
(Constant)	1.456	.262		5.568	.000
Control	.191	.099	.204	1.939	.054
Competence	.170	.116	.176	1.465	.144
Characteristic	-.035	.114	-.040	-.310	.757
Communication	.009	.122	.010	.075	.940
Community	.333	.086	.396	3.855	.000
Sampran respondents (n=124)**					
(Constant)	1.085	.310		3.503	0.001
Control	.120	.091	.143	1.318	.190
Competence	.066	.111	.071	.600	.550
Characteristic	.209	.088	.243	2.367	.020
Communication	.100	.104	.109	.961	.338
Community	.296	.071	.352	4.179	.000

***** R^2 adj. = .423
****** R^2 adj. = 0.601

Table 8 Multiple regression analysis, regressing the impact of each source of trust towards trusting intention

	B	*Standard error*	*beta*	*t*	*p*
Online respondents* (n=195)					
(Constant)	1.738	.313		5.547	.000
Control	.082	.118	.082	.694	.488
Competence	.233	.139	.227	1.675	.096
Characteristic	-.135	.137	-.144	-.984	.326
Communication	.137	.146	.147	.938	.350
Community	.241	.103	.270	2.335	.021
Sampran respondents (n=124)**					
(Constant)	1.807	.383		4.714	0.000
Control	.049	.113	.060	.436	.664
Competence	-.006	.137	-.007	-.044	.965
Characteristic	.268	.109	.320	2.450	.016
Communication	.026	.128	.030	.205	.838
Community	.252	.088	.309	2.879	.005

***** R^2 adj. = .266
******R^2 adj. = 0.352

Previous findings on consumer characteristics and perceptions toward each source of trust emphasized that respondents from the Sampran Model's sources had better understanding of organic food principles, appreciated social interactions, and valued the community. It is expected that the community factor should have a direct impact on the respondents from the Sampran Model's sources. However, the data suggest that the community factor impacts trust not only in consumers who have direct experience with organic food products but also with the consumers from the online sources. However, the respondents from the Sampran Model's sources also viewed the characteristics or personality traits of farmers as an important determinant factor in their trusting belief and trusting intention regarding organic food. Honesty and integrity were essential elements influencing their trust levels. This could be due to their having direct experience with organic farmers at venues such as the Sookjai Farmers' Market and at Sookjai Society events.

In sum, the exploration of the conceptual framework and determinants of trust indicate that community is the most important determinant of trust for both the online and the Sampran Model respondents. Community had an impact on both the consumer

confidence (i.e. trusting belief) and the consumer's willingness to rely on organic food in an uncertain situation. Interestingly, characteristics was another determinant of trust, specifically for the Sampran Model respondents. The characteristics or personality traits of the farmers had a high impact on the respondents' propensity to invest their trust. This finding is in line with the findings from prior research. For example, Patricia M Doney, Cannon, and Mullen (1998) and Rotter (1967) mentioned that trust can be generalized as the expectancy held by an individual that the word, promise, or oral or written statement of another individual or group can be relied on. This implies that direct experience with organic food products and organic farmers leads to another layer of trust determinants. Respondents from the Sampran Model believed in and intended to trust organic food if the farmers could keep their word or promises on delivering authentic organic food. These key findings of the determinants of trust were used in designing an innovative trust-building platform and analyzing the impact of these determinants on the overall trust and trust-related behavior of consumers after using the platform.

4.2 Phase 2: Exploration of platform requirements through a trust-building co-creative workshop

A trust-building co-creative workshop was organized to develop understanding of the current organic food market in Thailand by creating a stakeholder map, exploring consumer journeys, and identifying the pain and gain points within the market and among the key stakeholders themselves. Involving the participation of 21 key stakeholders, including experts in this field, farmers, businesses and end consumers, the workshop facilitated the co-creation of ideas in order to synthesize the key requirements for an innovative trust-building platform. The results were classified into 4 main categories: a stakeholder map, journey map, idea generation, and consumer segmentation.

4.2.1 Stakeholder map

The participants were asked to discuss relationships between different stakeholders and draw stakeholder maps. A list of stakeholders, the relationships between them, and the strengths and weaknesses of each stakeholder were generated from this session. The participants were also asked to analyze the key values or insights

between each relationship and synthesize the possibility of enhancing the relationship, for example by identifying someone's benefit, gain, joy, satisfaction, or pain relief. Figure 8 shows the outcomes from all of the groups which participated in this activity. The results were further used to understand the needs of each stakeholder within the organic food supply chain.

The results from the stakeholder map emphazised who the key players were in the organic food supply chain, including producers (i.e., individuals and groups of farmers), businesses (i.e., retailers, green markets, services such as restaurants and hotels, community enterprise networks, distributors, and processors), consumers (i.e., individuals and families), certifying bodies, and others relevant organizations (i.e., foundations, hotel associations, universities, funding bodies). The key values or insignts were divided into the needs or requirements between each relationship, and the pain and gain points from the current relationship. The findings were analyzed and classified according to the five determinants of trust (5Cs):

4.2.1.1 Needs or requirements between each relationship

1. Farmers: Competence and charateristics were mentioned as the critical requirments from farmers, specifically the competence and charactreristics of supporting units (i.e. government bodies).
2. Businesses: Communication alongside control were the most common factors mentioned as important requirements for businesses.
3. Consumers: Consumers required clear and transparent communication.
4. Certifying body: Competence and communication were identified as key requirements, with consumers emphasizing that certifying bodies should have enough competency to certify the organic food as well as to have clear communication to consumers.

4.2.1.2 Pain points of each stakeholder

1. Farmers: Limited competency in finding markets, a lack of confidence in their own competency, not enough knowledge, and uncertainty in controlling production were the main pain points for farmers.
2. Businesses: Control and competence were the two pain points mentioned by businesses. This mostly referred to the control system and the stakeholders

involved in the control system. It was pointed out that organic food was expensive and also the businesses had no clue about the controlling process.

3. Consumers: Competence and communication were the main pain points. Consumers usually had no knowledge and/or awareness of organic food principles. They also mentioned that they did not receive full information on the origin of products.

4.2.1.3 Gain points of each stakeholder

1. Farmers: Farmers emphasized their competence. They mentioned that they could deliver the high quality produce if they paid more attention. They also explained that if they worked as a group, they could manage pricing at a fairer level, better control the production, and engage in knowledge sharing.
2. Businesses: Competence (i.e., buying power and market accessibility) and communication (i.e., linkage between farmers and consumers) were the two most important gain points identified for the businesses.
3. Consumers: One interesting point that was raised was the power of communication (i.e., positive word of mouth).

Figure 8 The stakeholder map initiation

4.2.2 Journey maps

Next, two journey maps were developed to illustrate the journeys of consumers as they embarked on their healthy lifestyles and searched for organic foods. Tables 9 and 10 summarize the findings. The data revealed that information and communication were two common activities in both of the journey maps. This can be explained by the new lifestyle of consumers in which the internet and social media have an influence on their daily routines. The pattern of each journey would typically begin with some triggers, for example, a sickness or a need for food authenticity. This was followed by the use of social media to search for information. These activities were repeated or shared with others if consumers had good experiences.

During both journeys, the consumers gained more information when they communicated and exchanged information with farmers in the market. They

emphasized that the farmers were very friendly, helpful, and knowledgeable. When they repeated their organic food consumption and began to experience a change in their body, they felt good and were willing to share their experiences and to convince their families or friends to try organic foods as well. These gain points were mentioned in both journey maps. Looking into the consumer pain points, there was a consensus that the biggest pain point was finding the necessary information and solutions at the beginning. They also had doubts about the product quality and authenticity. After they had their first experiences with organic food, they wanted to maintain their consumption lifestyle. However, it was quite an effort for them to visit an organic market and the product variety was limited. While they also looked for alternative solutions through online markets, they could not be certain whether the products were truly organic or not. Other solutions were to grow their own vegetables. This required trial and error since they did not have knowledge or experience.

The key findings from this section, including pain and gain points, will be incorporated as parts of the requirements for the innovative trust-building platform.

Table 9 Journey 1: Current active consumers started the healthy lifestyle

Phase	**(1) Anticipate**		**(2) Enter**	**(3) Engage**		**(4) Exit**	**(5) Reflect**	
Touchpoints	Personal	Social media	Online/Website	Home	Green market	Social interaction	Home	Office/Line App
Activities	1.a. Getting sick	1.c. Hearing more and more information or news on organic food	2.a. Searching for information both from internet and magazine	3.a. Growing vegetables	3.b. Talking with farmers and other consumers	4.a. Joining workshop	5.a After trying, feel different and love to maintain this new lifestyle	5.e. Tell/share friends on the new experiences
	1.b. Starting to have awareness of eating good food		2.b. Applying for Lemon Farm membership		3.c. Learning other experiences	4.b. Attend the green community meeting	5.b. Adapting lifestyle according to received information	
							5.c. Selling left-over home-grown vegetables	
							5.d. Other family members follow the new lifestyle	
Gains			Why not! Easy and convenient	Feel the difference in body e.g. healthier	Gain more information	Meet real farmers	Feel good (able to convince family members)	
			Feeling motivative	More concern about environment and sustainability			Unexpected incomes	
Baseline		Organic food becomes social trend		Consumption lifestyle changes (more control)		Know more people		Able to be a voice to support organic food farmers
Pains	Looking for solutions			Trial and error (no experience, no knowledge)				
	Unhealthy condition							

Table 10 Journey 2: Current active consumers searched for authentic organic food

Phase	**(1) Anticipate**				**(2) Enter**	**(3) Engage**	**(4) Exit**		**(5) Reflect**	
Touchpoints	TV	Organic food restaurant	Online	Supermarket	Sook Jai Market (Sampran)	Sampran farm	Home	Office	Sook jai Market	Home
Activities	1.a. Seeing organic food products from Sampran	1.b. Seeing restaurant nearby house promoting organic food products	1.c. Looking into organic community Facebook page	1.e. Seeing organic food events	2.a Seeing different rice varieties	3.a. Attending workshop organized by Sampran Model	4.a. Cooking at home	4.c. Talking with colleagues about weekend activities	5.a. Coming back from time to time	5.c. Looking for online organic supplies
			1.d. Noticing the activities with farmers via Line App and Facebook		2.b. Buying organic rice		4.b. Receiving good feedback	4.d. Inviting colleagues to visit Sook Jai market	5.b. Buying different products	
					2.c. Taking with rice farmers					
Gains			Interesting activities with farmers	Happy to see varieties of products	Exciting with all food products at the market	Eyes opening and receiving many information	Happy that others like products	Want to share good/new experiences with others	Motivating to go back and buy organic food products for family	
				Exchange information with farmers and other consumers	Farmers are very friendly, helpful, and knowledgeable	Knowing other consumers	Trying new stuffs		Happy hear farmers share experience and explain how to cook ingredients	
Baseline	Look good	Seem trusted restaurant								
Pains		Still doubting: Are they use the real organic food?	Still not interested in organic food products			Quite far to drive			Far from home	Difficult to find
			Want to go to the market but the market is quite far and no time						Not so many varieties available	Not sure whether it is a real organic product

4.2.3 Key values and requirements

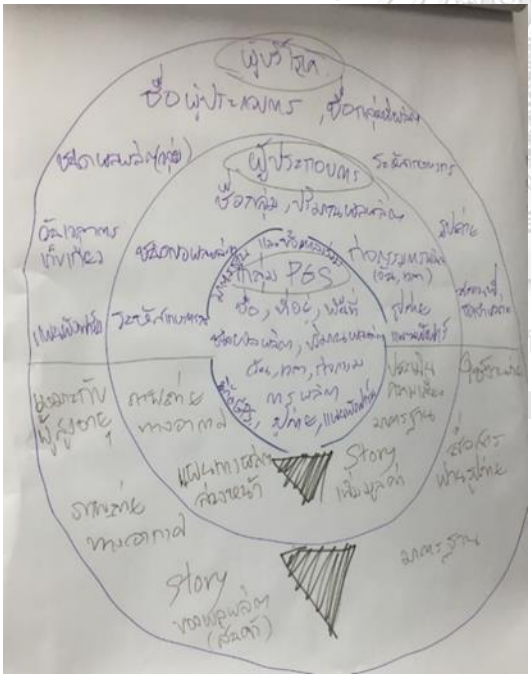
The key requirements were extracted from the values identified during the idea generation and from other insights gained during the trust-building co-creative workshop (Figure 9 and Table 11). Transparency was the most important value and key requirement for all stakeholders. Figure 9 depicts the key values proposed by the different groups of participants. The key findings can be categorized into four groups:

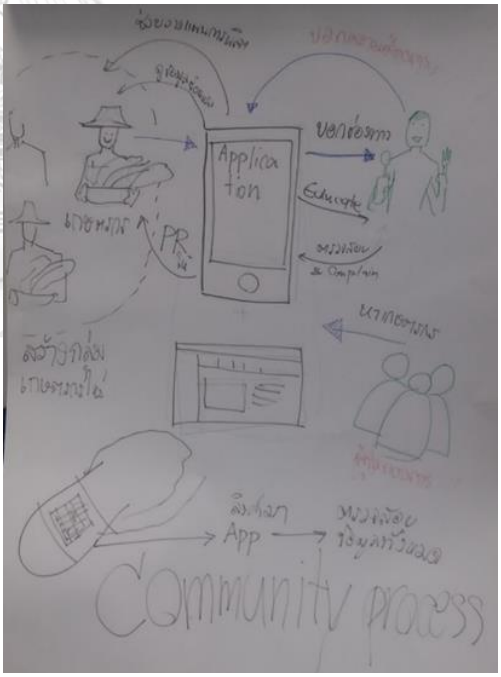
1. Group 1: Real data and pictures were necessary sources for value creation. They helped to connect the three layers, which were farmers, businesses, and consumers. It was important that the real data and pictures reflected the group of farmers, their farming activities, as well as the harvest information. It was important to provide the true story via photos.
2. Group 2: The key requirements included the information that allowed consumers to connect with the farmers. It was necessary to create a win-win situation by which farmers got enough information for their production planning. At the same time, consumers also required information on where to find the products. Furthermore, appropriate information could also help to educate consumers on the organic food principles. The ultimate goal was to be able to verify and validate the products, and then provide feedback directly to the farmers.
3. Group 3: This group valued the flow of organic food information. They emphasized the importance of information transparency. Information related to the source of the organic food, certification details, and also the retailer details (i.e. where to find organic food) were identifies as being necessary.
4. Group 4: The key values short supply chain process which included only farmers and consumers. The participants from this group mentioned the values of having a distribution center which collected the products, both raw and processed. The center could distribute the products directly to consumers thus alleviating the pain of searching for organic food.

Next, the proposed values were developed to suggest requirements for the platform. Table 11 summarizes the key requirements which included transparency, experience, lifestyle, education, and accessibility. Transparency is the most important

requirement. This refers to the transparency of control, competence, and characteristics of the key stakeholders. Secondly, activities and interaction were part of the experience, and they should reflect a community-building approach, for example, a small community comprised of friends who support each other through the sharing of knowledge, who have common interests, and who engage in activities with farmers that enable direct interaction and the exchange of knowledge. Lastly, communication is another important requirement. Good communication should incorporate the organic principles and lifestyle, provide adequate information for educational purposes, and be accessible to everyone.

In sum, the findings from this activity highlight that transparency is the most important value and key requirement for all stakeholders. Transparent communication helps consumers to access the farming activities, thus indirectly education them. However, the information should be accessible by everyone.





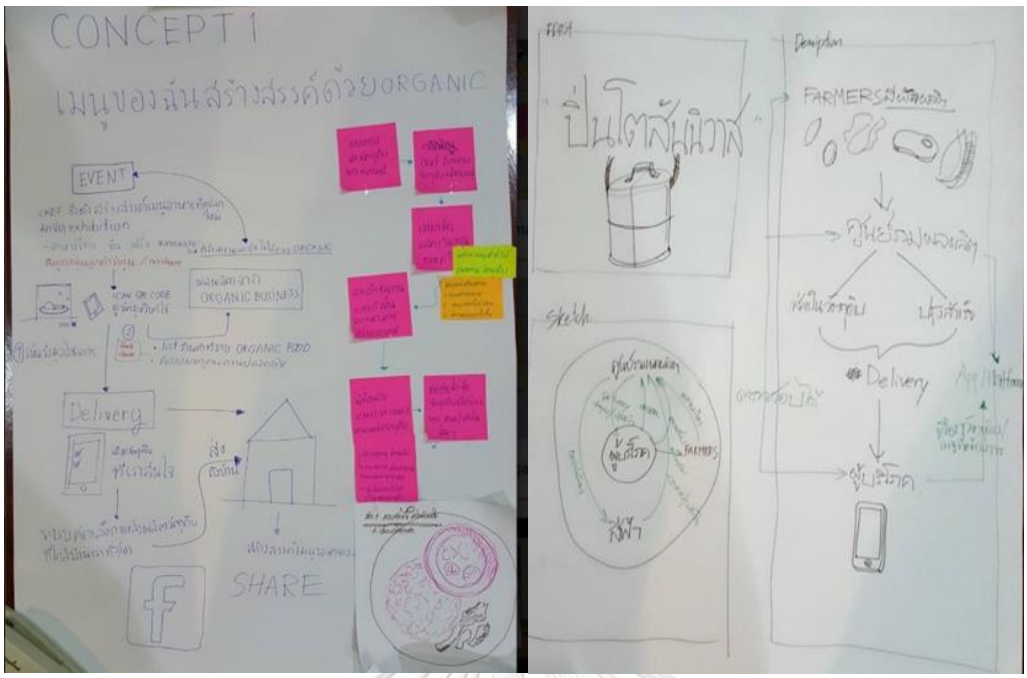


Figure 9 Key values from idea generations

Table 11 Key requirements

Values	Relevancy to 5Cs	Platform requirements
Transparency	Control Competence, Characteristic Communication	Transparency is the most important value/requirement. The scopes of transparency included control, competence and characteristic of key stakeholders.
Experience	Competence Community	Experience referred to activity or interaction. Platform needs to design to mimic the activities which related to competence and community.
Lifestyle	Communication	Platform should communicate the organic food lifestyles/principles.
Education	Communication	Platform should provide useful information in order to educate consumers.
Accessibility	Communication	Information/communication should be accessible to everyone.

4.2.4 Consumer segmentation

Next, the data collected about the different key values suggested that the consumers could be classified into 4 segments: hunter, seeker, believer, and involver (Table 12). When they start to have an interest in organic food, consumers can usually be described as being in the believer and seeker segments. Both believers and seekers look for information and reviews from current organic food consumers. Their

confidence in the products depends on the information they receive from others. The difference between these two segments is that believers prefer to have direct interaction in order to gain confidence, whereas seekers are more reliant on indirect interaction with others. Once the believers and seekers have enough confidence, they will gradually move on to become a hunter. Accessibility and convenience are important to hunters and hence they represent the main barriers to the hunter achieving organic food consumption. The last segment, the involver, refers to active consumers who are willing to be part of the organic movement and include organic food as part of their lifestyle. Figure 10 illustrates the differences between these four consumer segments according to the two dimensions of interactive experiences and confidence. Hunters and seekers rely more on indirect interaction. Hunters usually gain confidence from themselves, while seekers tend to gain confidence from others. In the opposite dimension, involvers and believers require direct interaction. Believers tend to place their confidence in others, while involvers build their confidence from themselves.

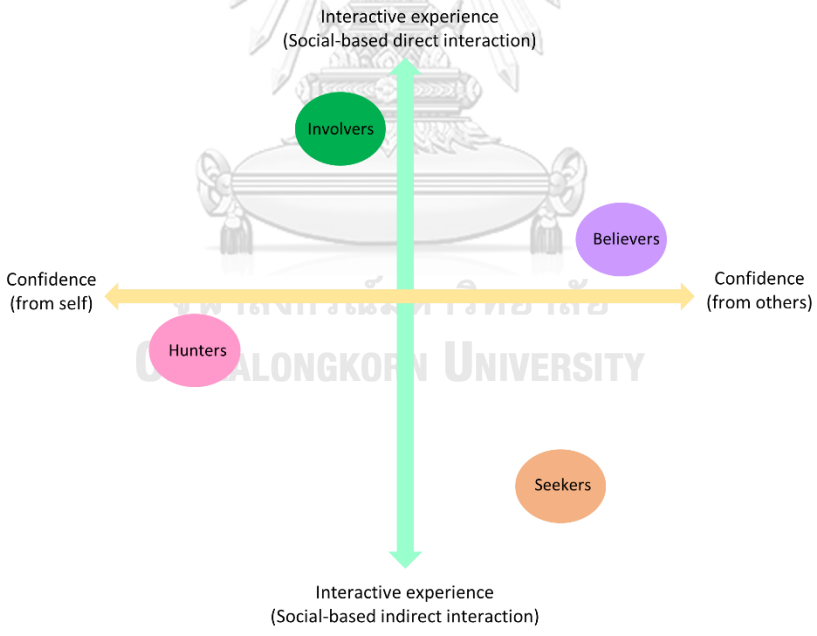


Figure 10 Interactive experience and confidence

In addition, consumers from the different segments also search for different experiences, and thus different values are sought. Hunters value convenience and accessibility, while seekers pay more attention to information and the competence of

the relevant stakeholders. Hunters usually look for convenience and seekers value the importance of information. Believers require visibility and market voices, while interaction, connection, and education are important to involvers. Believers usually look for other opinions, whereas involvers prefer to have interactions and aim to build up connections and a community

Relevancy was observed between the values of each segment and the impact of the trust determinants. Hunters are usually triggered by transaction-related factors, indirectly implying the importance of the competence and reputation of whichever stakeholders they are in contact with. On the other hand, seekers are triggered by competence and communication. They search for useful means of communication which can enhance their trust. Believers are quite similar to seekers in this respect. The differences are that believers prefer direct over indirect communication. Last but not least, involvers are classified as organic movers who treasure the importance of communication and social interaction. They are interested in building a community through participation and interaction. These findings are summarized in Table 12.

Table 12 Consumer segmentation based on experience sought

Values	**Segment**			
	Hunters	**Seekers**	**Believers**	**Involvers**
Convenient	x			
Accessibility	x			
Visibility (Safety and Security)			x	
Consumers/Market voices			x	
Information		x		
Interaction/Participation/Engagement				x
Competence		x		
Connection				x
Educating				x
Segmentation	Reachability based benefit sought	Communication and information-based lifestyle	Social based lifestyle	Involvement based lifestyle
Relevancy to components of trust	Trusting intention (Cognitive willingness)	Trusting belief (competence and belief/expectation on other actors that they are trustworthy)	Trusting intention (Habitual willingness)	Trusting intention (Cognitive willingness)
Relevancy to 5Cs	Indirectly related to competence and reputation	Competence, (Indirect) communication	(Direct) communication, Social interactions	(Direct) communication, Social interactions
Stakeholders	Consumers and Organizations	Consumers more than Organizations	Consumers and Retailers	Organizations more than Consumers

		(Organizations seek more for competence)		
Persona/Characteristic	Seeking for something reachable i.e. convenient and easy to access	Seeking for information based on both direct and indirect ways of communication	Seeking for word of mouth of others and visibility	Seeking for participation and interaction and looking for connection/community building
Triggers	Transaction related factors	Trust related factors	Trust related factors	Trust related factors

In summary, the data obtained from the second phase of exploration (i.e., the trust-building co-creative workshop) suggest that communication together with information transparency are essential for building trust among the various stakeholders within the organic food chain. The communication could be classified as either direct or indirect. Different consumer segments require different communication approaches. However, the consensus was that transparency in communication is the most important factor in building greater trust among the stakeholders.

4.3 Phase 3: Development of an innovative trust-building platform and evaluation of its technical performance

The key findings from the survey in Phase 1 emphasized the community and characteristics of the farmers as the important determinants of trust. Therefore, in this phase, a platform is designed to capture these trust determinants by including information that can reflect the characteristics of the farmers and other key stakeholders as well as incorporating the aspect of community. Additionally, the key findings from the co-creative workshop in Phase 2 further suggested that the transparency of information and communication is crucial for the development of trust. It is important to provide information that can reflect the transparency of the key stakeholders' characteristics and their competence in controlling the quality of organic food.

The insights obtained from the prior phases of this study are applied in this phase of the development of the innovative trust-building platform, which consists of three major elements. First, a Blockchain system is developed with the support of the technology expert team from the King Mongkut Institute of Technology Ladkrabang. Next, an application system is designed to facilitate the integration of the Blockchain system into the overall system (i.e., the Thai Organic Platform). The user experience

and user interaction (UX/UI) components are also developed and incorporated to enrich the consumer experience of using the innovation. It should also be noted that the innovative trust-building platform is designed to be integrated into the Thai Organic Platform. which is the total management system of the organic food value chain, ranging from organic farming to E-Commerce and customer engagement. Hence, the data input is derived from the Thai Organic Platform's database (e.g., farmers' records of their organic farming). Lastly, the technical performance was assessed through the testing protocol designed by the development team.

4.3.1 Blockchain system

The innovative trust-building platform begins with the development of the Blockchain system. Here, Blockchain is used as an enabling technology to ensure the traceability and transparency of information (i.e., data records from farmers about their organic farming practices and products derived from the Thai Organic Platform). Therefore, this section begins with the proposed roles of Blockchain in the platform and then follows with the design of blockchain system.

The Blockchain system has six key roles in supporting the Thai Organic Platform.

1. Distributed ledger – the information which farmers have recorded in the Thai Organic Platform's farmer application is kept in a decentralized storage of data holders.
2. Programmable – every organization in the network is able to co-validate the information thus enhancing transparency.
3. Transaction and network – every organization in the network shares their activity details of what, when, and how.
4. Immutable – by having a validation process, the recorded data cannot change the order or content of what has already occurred.
5. Traceability – traceable data are reliable evidence. The timestamp proves when and what has happened on the Blockchain and makes it possible to trace back to the data's origin.
6. Network Blockchain platform – interested organizations which want to take part in data collection and verification can join the Blockchain network.

Figure 11 gives example of how the data from the farmer application are stored on each block in the Blockchain system.

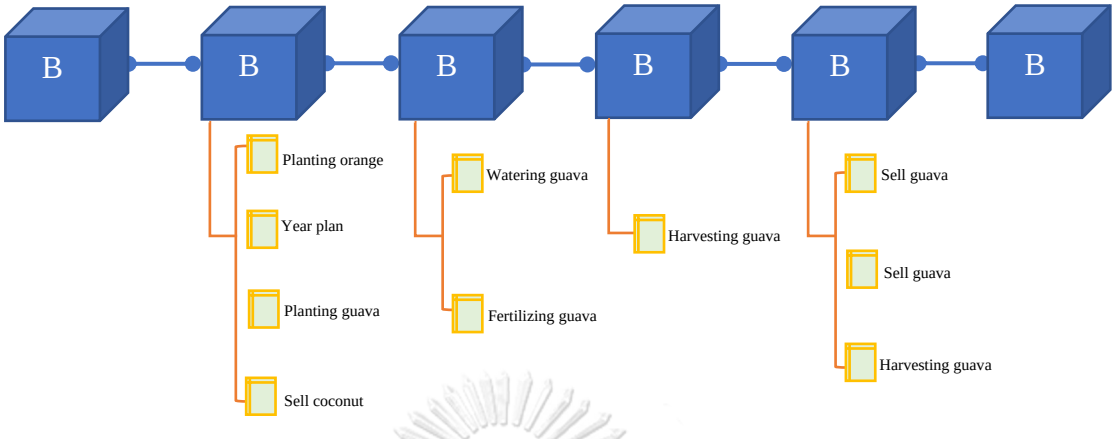


Figure 11 The example of data recording in blockchain

Next, the development of the Blockchain system begins with the design of the Blockchain database. Here, the architecture of the Thai Organic Platform, into which the Blockchain system is being integrated, is designed to allow parallel operation with the farmer application for data collection. Before recording data in the farmer application, the information will firstly be record on the Blockchain. The system will then wait for the recording results before recording the data in the farmer application database. Figure 12 illustrates the flow of data recording from the farmer application to the Blockchain and the farmer application database.

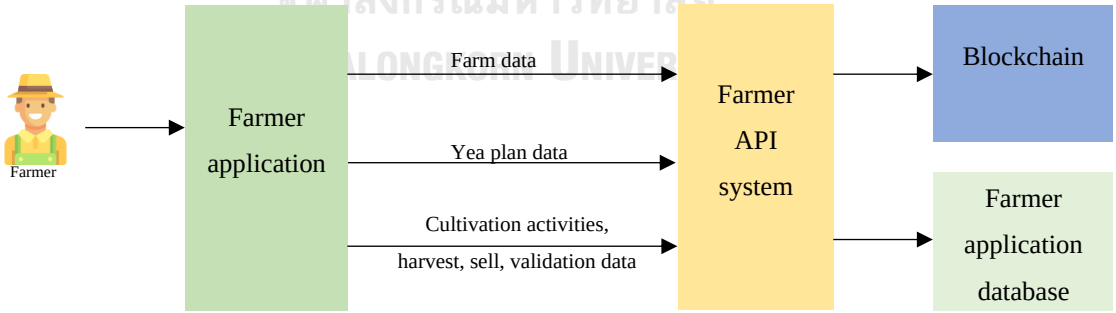


Figure 12 Flow of data recording from farmer application to blockchain database

From the Blockchain database, the ecosystem is designed to be decentralized (Figure 13) whereby every full node (i.e., participating organization that has data storage and monitors the transactions) has a copy of the information stored in the Blockchain.

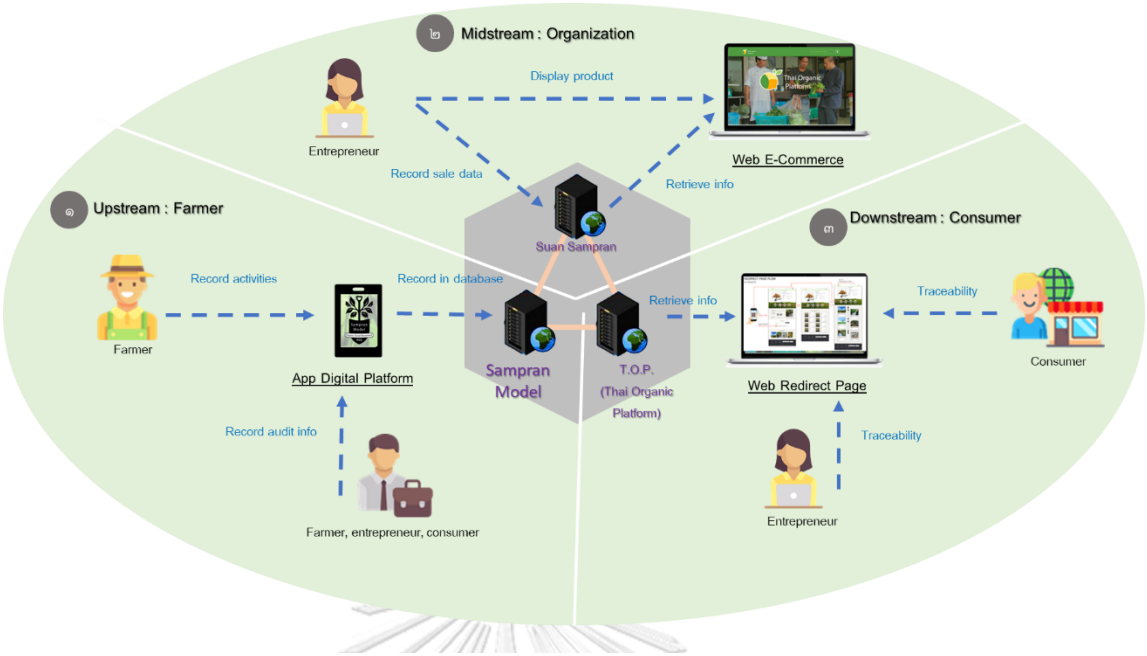


Figure 13 The overview of TOP architecture

There were four nodes or entities within the current development of the Blockchain architecture (Figure 14). In addition, three nodes were created for three organizations, namely the Sampran Model (the farmer network), Suan Sampran (a hotel business), and the Thai Organic Platform's E-Commerce page. Each organization had two nodes. Both nodes had identical information by which one node was in use and the other node was used for backup storage. Both nodes were interchangeable in performing their duties. The last node was called the orderer, which was designed to perform the tasks of organizing and sorting the data in the blocks. The role of the orderer is similar to that of a post office, which receives, organizes, and sorts the letters.

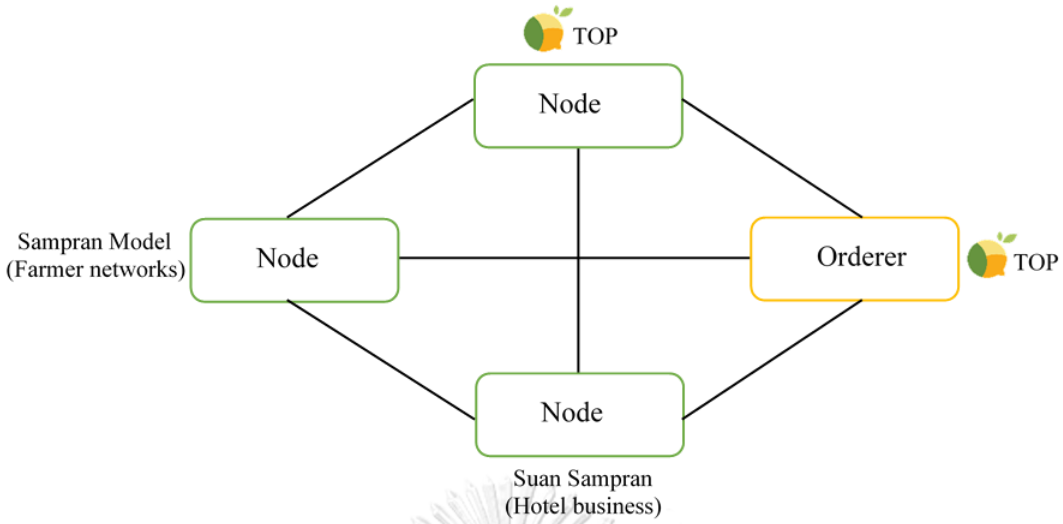


Figure 14 The overview of Blockchain database

The most important design process involved the screening of necessary information to be stored in the Blockchain for traceability purposes. In this research, the main focus is the information related to the organic food process, from farming until selling. The data screening process includes:

1. The key stakeholders within the blockchain network discuss the reasons, benefits, and disadvantages of using the private Blockchain network.
2. The data set is analyzed and designed to be shown as evidence of the traceability.
3. The recorded information received from the farmers is screened with a focus only on the data which affect confidence and trust in organic food.

The source codes are written by blockchain developers. The files are kept separately for future development. The information in the Blockchain must be disclosed among the stakeholders with mutual benefits. In case the data is from a single organization, it is recommended that the data be stored in an internal database rather than on the Blockchain.

4.3.2 Application design

The next stage in the development was the design of the usage applications to support the functions of the Blockchain system as part of the Thai Organic Platform. Figure 15 depicts an overview of system that connects the farmers (who record the

data), auditors (who audit the farms), and customers (both businesses and end consumers who have access to the Blockchain system via the redirect page linked from the Thai Organic Consumers' E-Commerce page). The diagram illustrates the user interaction and the flow of data within the system. The flow of data starts from the farmers recording their activities in the farmer data application. There is a farmer administrator who coordinates and supports platform usage. The farming activities are then recorded in the Blockchain database. Next, a peer auditor can retrieve the information from the Blockchain database and confirm it. Farmers also send information about their harvesting quantities to the TOP's E-commerce page to be displayed alongside their products. A lot number is used to retrieve the data from the Blockchain database and display it on the redirected page. After the consumer scans the QR code or searches for the lot number in the E-commerce page, they will be taken to the redirect page which contains information from the Blockchain database.

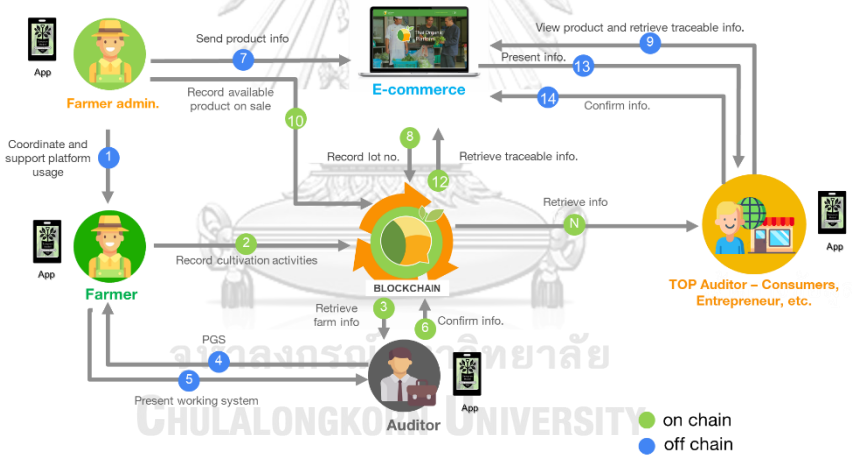


Figure 15 The user and data flow overview

Customers (both businesses and end consumers) have access to the Blockchain system via the redirect page, which was designed to display traceability information from the Blockchain database. This page redirects the information from the Blockchain database into a more user-friendly view and it is linked with the Thai Organic Platform's E-Commerce channel to provide supporting information for the products. The information includes the data recorded by the farmers, such as planting and harvesting data, while the lot number, generated from the E-Commerce platform, is

used as the search key for information stored in Blockchain. Figure 16 illustrates the flow of information between 3 databases and 1 redirect page.

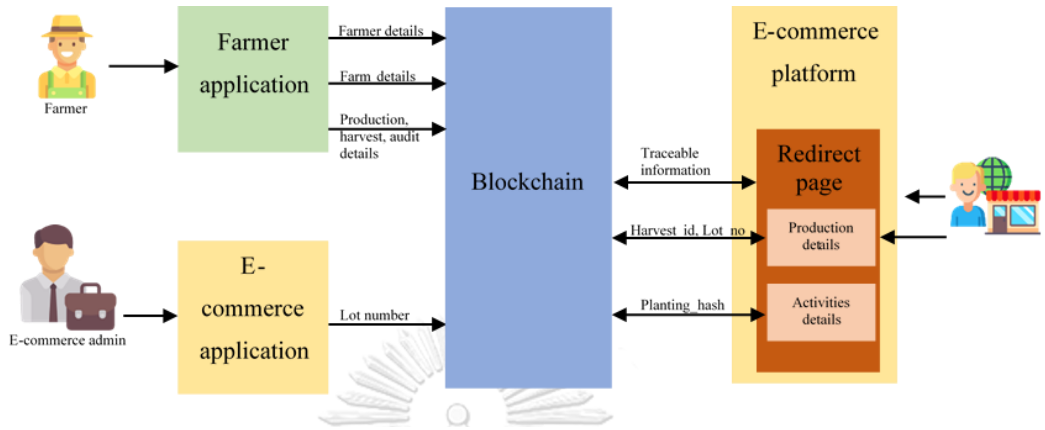


Figure 16 Information flow diagram

The redirect system was developed by using a web application. The webpage can be displayed on both desktop and mobile screens. Here, an Application Programming Interface (API) can retrieve data directly from the Blockchain database. The extraction process consists of:

1. Product details – including farmer details, production details, auditing details, harvesting details, and sale details. The web application will send the harvest_id which is the identification data related to harvest information and also send the lot_no which is the number used to identify the product in E-Commerce platform.
2. Activity details – including the details of farming practices all the way through until selling the product. The information will be retrieved from the planting_hash which is related to the information in the first part.

4.3.3 User experience and user interaction design (UX/UI)

Lastly the Blockchain system and its application as part of the overall system of the Thai Organic Platform are further developed by incorporating the UX/UI design. Here, the keywords from the workshop in Phase 2 are used to design the look and feel of the innovative trust-building platform (Figure 17). “Trust”, “Blockchain”, “healthy”, and “connect” were the main keywords. From these keywords, three design options

were proposed: one focusing on trustable, serious, and story; the second focusing on trustable, accessible, and fresh; and the last one focusing on craft, realistic, and diary (See appendix 10). A decision was made to go with a combination of all options to reflect the trustable and accessible characteristics through the systematic timeline and real pictures and information from the Blockchain system.

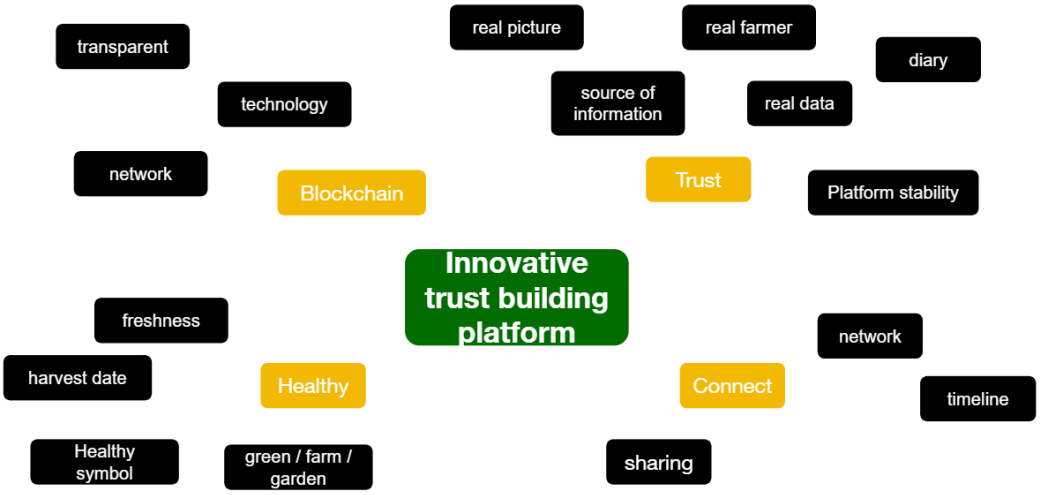


Figure 17 Keywords for designing the innovative trust building platform's experience

Figure 18 illustrates the overall user experience and user interaction. The main information appearing on this page is linked to the front end application and the Blockchain system. Based on the key requirements extracted from the trust building co-creative workshop, the content shown in this redirect page highlights real information and photos. It consists of 4 main sections. The first section includes key information such as the product name, farmer's name, harvest quantity, harvest date, organic status, and validators. The aim is to give overall information and target all consumer segments. The second section provides a summary of the details in timeline format. The details include initial production date and latest information related to auditing, harvesting, and selling. The information in the timeline format is designed specifically to capture the important information which is required by consumers (refer to the findings from Phase 2). The third section provides more information for consumers who seek deeper understanding of organic food principles. It provides extensive information on, for

example, the farmer’s details, planting activities, auditing details, harvesting, and selling information. The last section provides the most detailed information by having a “Read Now” icon at the end of the page. This is designed particularly for the seeker segment, as identified in the workshop from Phase 2, who seek more specific information.

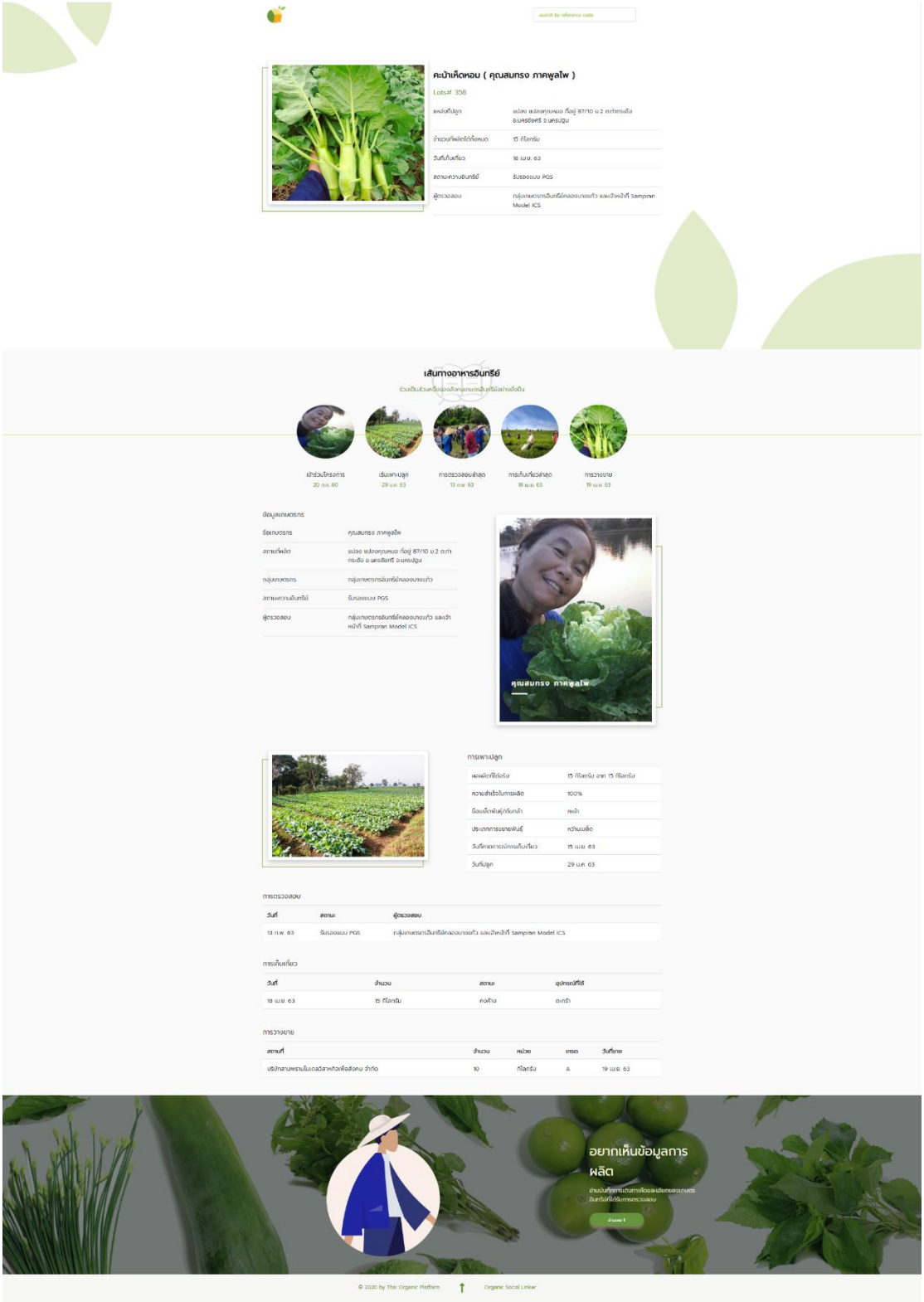


Figure 18 Overall user experience and user interaction of the innovative trust building platform

Besides enabling the easy sharing of information, the interaction between the consumers and the platform is designed to have the most simplified interaction process in order to capture all age ranges. In addition to the link placed in the Thai Organic Platform's E-Commerce channel, consumers can gain access to the Blockchain database by scanning the QR code which was designed to store data information and to be read by smartphones. This QR code can be present at various touchpoints, e.g., on the Thai Organic Platform's E-Commerce page, on product packaging, or on a QR standee (to be used as a communication tool at venues such as restaurants and shops) (Figure 19).

(1) Thai Organic Platform's E-Commerce page

(1) Packaging (3) QR Standee

Figure 19 Touchpoints for the innovative trust-building platform (1) TOP's E-commerce page (2) packaging (3) QR standee

Figure 20 illustrates example presentations of the QR code to engage various groups of consumers.

Figure 20 QR code design

4.3.4 Technical performance testing

Technical performance testing was conducted to test technical aspects of the performance such as the functionality and the system designed for the innovative trust-building platform. This represents the last phase of the platform testing process. In this case, the requirements for specifications such as data insertion, data flow, and data recording were checked with two iterations. The technical issues were fixed after the first iteration and then any remaining issues were fixed after the second iteration. The technical issues that were found were mainly related to the recording of the data. For instance, a photo was not shown, the error messages were unclear, the page froze after recording data, and special fonts could not be recorded. There were no major technical issues involved with the flowing and recording of data in the Blockchain database.

Chapter 5

Consumer Acceptance and Consumer Trust Development

In this chapter, the researcher summarizes the research results from Phase 4 and Phase 5. The results provide answers to objectives four and five, which relate to consumer acceptance of the innovative trust-building platform for organic food and to the development of consumer trust after using the platform.

5.1 Phase 4: Consumer acceptance testing of the innovative trust-building platform

In this context, consumer acceptance includes two dimensions: concept acceptance and technology acceptance. Both dimensions provide useful insights into the platform's performance from conceptual and technical design perspectives.

5.1.1 Concept acceptance results

The concept acceptance testing evaluated the users' judgment of the overall platform concept and usage. The purpose of this test was to evaluate the platform concept in relation to its primary purpose of building trust. The results provided useful insights into whether the concept addressed all of the requirements and whether it would be accepted for implementation in the mass market.

The concept acceptance results were derived from the two main research activities. The first activity was a focus group session involving four businesses and one consumer. The results of the focus group session were used for finetuning the details of the innovative trust-building platform. The second research activity involved the administration of a survey to assess and test both the concept in Phase 4 and the trust-related behavioural outcomes in Phase 5. Short interviews were also incorporated into this second research process to not only validate the results from the survey but also gain additional clarification on the platform usability and trust impact.

5.1.1.1 Focus group

The focus group brought together active consumers, i.e., businesses and end consumer, and to discuss the platform concept and performance. The aim of the session was to gather consumer feedback on areas such as overall experiences and areas of improvement after they had used the platform. Four businesses and one consumer

participated in the focus group, and their brief profiles can be found in Appendix 8. The session started with the introduction of the innovative trust-building platform. The participants were first given an overview of the system and then its information flow and the implementation of Blockchain technology in the platform were explained. The participants were asked to access the platform through a QR code and then to provide their feedback on different topics including the platform's usage convenience, trust and/or information credibility, the information requirements and selections, overall perceptions of the website's communication features, trust in the products presented on the website, the reasons for their trust, and their long-term interest in using the platform. The key findings firstly identified some concerns about the overall image of the platform. The participants suggested the need for more communication about the Thai Organic Platform including its background, objectives, and work procedures in order to first and foremost build trust in the organization. The participants also mentioned that they were interested in knowing more about the screening process for the farmers and products, the principles for forming the farmer groups, the methods used for the regular inspections of farmers and their farming processes, the data collection methodology, and the data validation methodology. This feedback suggests that the participants were interested in the type of information provided on the platform. As the participants tried using the innovative trust-building platform, they mentioned the information that they wanted to see in the redirect page. Table 13 presents the information that the consumers were most interested in, sorted by ranking.

The participants were also interested in having more information that could help to identify the product characteristics. The product name, its special characteristics, and real photos of it were among the examples of more information they wanted to see. The product characteristic information was especially important to them in cases where the produce label did not match the product characteristics. In addition, they were keen to know more about the product sources which they felt would allow them to verify the provenance of the product. General information related to planting activities and certification were also identified by the participants as being important to them.

Table 13 The interested information by consumers

Rank	Information	Reason
1	Product characteristic information – product name and special characteristic. The most preferable format was real photos.	To correctly identify the product in case the product label did not match with the product.
2	Product source – cultivated sources, cultivation environments and farmer information.	To be able to verify the product origin.
3	Organic data – certification, raw material and fertilizer usage.	To identify the organic level.
4	Planting date and harvest date.	To verify product freshness.
5	The story details behind cultivation process.	This information was specifically for consumer who wanted to know very details information.

Between the two groups (businesses and end consumer), there were some differences in terms of the types of information that were of most interest to them. Businesses showed more interest in the information that impacted their purchasing process. This included the expected harvesting quantity and estimated harvest date. They were also interested in the overall product specifications, such as size, color, and grade. One interesting point was that they were also interested in learning about the supplier's qualifications for being organic only when they made a first-time purchase with a new supplier. They usually bought organic products from the same source that they trusted. Additionally, business customers showed interest in the redirect page. They foresaw the added value of traceable information because they felt it could be used to communicate with their consumers about the authenticity of their products, thus enhancing their business image.

As for the active consumer, he focused more on the farming process and the product origin. They were interested in farmers' stories and the techniques they used for growing organic produce. Also, they paid attention to the harvest date as it was related to the product freshness.

5.1.1.2 Consumer acceptance survey

The objectives of the survey were to understand the consumption behavior, consumer acceptance of the concepts and technology after using the platform, the development of consumer trust after using the platform, and the barriers to making an organic food purchase. After the questionnaire was formulated, short interviews were conducted with six active consumers, comprised of three business customers and three end consumers. The aims of these interviews were first to validate the trust survey and

then also to validate the platform usability and its impact on trust. The participants were first asked to try the innovative trust-building platform and then complete the survey. Short interviews were also conducted after survey completion. The participants were asked to provide their feedback on the survey details, the usage of the platform, and the overall platform concept. Table 14 summarizes the respondents' feedback.

Table 14 Interview session feedback

	Overall survey	Convenient	Impact on trust
End consumers 1	Overall survey is easy to understand.	Convenient to use	The platform has impact on trust e.g. details section and timeline.
	Some repetition questions		
	Better understanding if trying e-commerce platform beforehand.		
End consumer 2	A lot of reading and many questions	Easy to use	Seem to be trustable due to details information
	The questions are clear.	Font is slightly too small	Using blockchain technology allow transparency
	Like the "other" option when there are no relevant answers	Very details information	Able to remember farmer face and farm details after using platform
		Timeline is very useful i.e. provide key information.	Complete information but some people might not value it
End consumer 3	Quite long to complete answering all questions	Very clear instruction	Information in platform has more impact than information on product in supermarket.
	Some questions are repetition.		
Business consumer 1	Some questions are too generic and hard to answer.	Easy to use	Platform has impact for business i.e. able to use for PR and audit purpose.
		Difficult to find farmer name from e-commerce website	Not only general logo but very details and traceable information
			Might try to scan only once, next purchase will only look for TOP logo
Business consumer 2	Some questions are similar and too long	Simple process	QR on packaging looks more reliable than standee QR.
			It will be more trustable if information changes every day.
			The information should reflect more the organic principles.
			Able to use in business e.g. build confident for purchase team.
			The details section is very useful but it can be more specific.
Business consumer 3	Need to try platform before answering survey	Easy to sue	More details in inspection e.g. PGS/IFOAM
		Cannot scan QR code with Androida	Real data and pictures are important.
			Support the PR work in restaurant

Overall, the participants indicated that the survey instructions were clear and easy to follow. However, most of the participants also mentioned that the survey contents were too long and with some repetition. These comments were used in revising the questionnaire. In term of usage, the platform was found to be easy to use with a simple process. The respondents commented that the information was descriptive and the timeline section was very useful because it helped to highlight the key information and was suitable for Thai consumers in general as they are not keen on reading in detail.

The respondents also emphasized that the platform had an impact on their confidence and trust in organic food products. The detailed, reliable, realistic, and transparent information and pictures helped to boost their confidence and thus impacting their trust. One consumer mentioned that the information in the platform had more value and impact on her trust than the information that was displayed on the product packaging in the supermarket. All of the businesses emphasized the usefulness of the information, which they could further use to communicate with their consumers and which also increased their own confidence when purchasing products and selecting their vendors. Some recommendations were also provided. Firstly, the information should change every day and reflect the real-time situation. Secondly, the details should be more specific and relate to organic food principles, for example, real pictures of organic farms, information on the types of fertilizer used, and details on the type of certification and inspection applied. According to this feedback, the questionnaire, platform content, and the overall user experience of the innovative trust-building platform were adjusted.

Next, the survey was distributed online via various channels to reach current and potential organic consumers. There were 128 respondents who tested out the platform and then answered the questionnaire.

Table 15 shows the overall demographic profiles of the 128 respondents, 57% of whom were female. The vast majority of the respondents were aged between 30 and 59 years old. More than half of them lived in the Bangkok metropolitan area. Nearly 80% of the respondents lived in a family of 2-5 members.

Table 15 Demographic profiles of the respondents

	Percent
Sex, %	
Female	57.0
Male	42.2
Other	0.8
Age, %	
20-29	4,7
30-39	35,2
40-49	26,6
50-59	23,4
More than 59	9,4
Missing	0,8
Address, %	
Bangkok	62.5
Outskirts of Bangkok	18.8
Central region	6.3
Northern region	3.9
North eastern region	0.8
Southern region	3.1
Eastern region	4.7
Occupation, %	
Official	15.6
Private employee	30.5
Business owner	25.0
Freelance	16.4
Housewife	8.6
Others	3.1
Missing	0.8
Family member, %	
Alone	5.5
2-5 persons	76.6
More than 5 persons	17.2
Missing	0.8
Family income, %	
Less than 30,000 Baht	11.7
30,000 – 60,000 Baht	22.7
60,001 – 90,000 Baht	14.8
90,001 – 120,000 Baht	7.0
120,001 – 150,000 Baht	8.6
More than 150,000 Baht	35.2

The family size was related to the household food spending. Almost 60% of the total respondents mentioned that they spent more than 10,000 baht per month on food. They usually consumed organic food at least once per week and bought organic food almost once every week (Table 16).

Table 16 Consumption pattern of the respondents

	Percent
Family food spending, %	
1,000 – 3,000 Baht	3.1
3,001 – 5,000 Baht	15.6
5,001 – 7,000 Baht	7.8
7,001 – 10,000 Baht	14.1
More than 10,000 Baht	59.4
Family organic food consumption frequency, %	
Every day 3 meals	7.0
Everyday some meals	18.0
Once per week	20.3
2 – 3 times per week	15.6
More than 3 times per week	17.2
Others	21.9
Family organic food buying frequency, %	
Less than 1 – 2 times per month	18.8
1 – 2 times per month	27.3
Every week	31.3
More than once per week	12.5
Others	10.2

As the majority of the respondents lived in Bangkok, they usually purchased organic food from supermarkets or hypermarkets. Additionally, the consumers also purchased their organic food from green stores and fresh markets, with many of them also self-growing their own organic food (Table 17). When looking into the reasons for consuming organic food, there were three level of reasons for consumption. The highest level of responses, which were all 59.4% or higher, included health, supporting farmers, and product quality. To support their aim of having good health, consumers searched for good quality or authentic organic food. Interestingly, consumers identified supporting farmers as one of the top three reasons why they consumed organic food. It emphasized the role of the community in the nature of the organic food market. The second level of reasons, ranging from 40.6% to 43.8%, included environment and participation in a sustainable system. It could be interpreted from this that consumers were firstly concerned about themselves while they then became concerned about the environment and sustainability at a later stage. The last level of reasons, with responses of 26.6% or lower, included a worthy choice, life balance, and lifestyle. This implies that these more conceptual reasons were not of primary concern among the respondents.

Table 17 Consumption behavior of the respondents

	Percent
Organic food purchasing location, %	
Self-growing	28.9
Market	29.7
Grocery store	12.5
Super/hypermarket	65.6
Green store	35.9
Online market	7.8
Online store	10.9
Organic food consumption reason, %	
Health	83.6
Life balance	22.7
Quality	59.4
Valuable choice	26.6
Environment	43.8
Participation in sustainable system	40.6
Support farmers	61.7
Lifestyle	10.2

5.1.2 Technology acceptance model (TAM)

In this section, the assessment of consumer acceptance of the innovative trust-building platform is emphasized based on the Technology Acceptance Model (TAM). This includes perceived usefulness (i.e., the information usefulness and completeness, the reflection of the organic food identity, and the correlation with organic principles and lifestyles), perceived ease of use (i.e., overall usage experience and effortless involvement), and intention to use the redirect page. There were three points related to perceived usefulness: information usefulness, information reflected reality (credibility), and information related to organic principles and lifestyle. From the 128 respondents participating in the questionnaire, the average response was 'strongly agree' for all three points related to perceived usefulness (Table 18). When looking more closely at the sub questions of each point, pictures of the farmers, farms, and products received an average rating of 'definitely agree'. It could be interpreted from this that providing real pictures is useful for the consumers because they reflect the transparency and true organic food identity, thus boosting the consumer confidence.

Table 18 Perceived usefulness factors

		Mean	Standard deviation	Perception level
Useful and complete information	Complete farmer details	5.84	1.083	Strongly agree
	Picture of farmer, farm and product make more interesting	6.22	1.042	Definitely agree
	Systematically display information	5.88	1.040	Strongly agree
	Overall	5.98	0.895	Strongly agree

Reflect organic food identity	Real picture of farm and product boost confidence	6.31	0.962	Definitely agree
	Information increase confidence in food safety	5.97	1.019	Strongly agree
	Information is enough to reflect real organic food	5.42	1.308	Strongly agree
	Overall	5.90	0.894	Strongly agree
Relate to organic principles and lifestyles	Details information is help to understand organic principles	5.87	1.118	Strongly agree
	Information is useful in understanding organic principles	5.82	1.132	Strongly agree
	Information in timeline format is well elaborated organic principles	5.99	1.126	Strongly agree
	Overall	5.89	1.039	Strongly agree

In terms of ease of use, the overall response from both the focus group and the survey was that the innovative trust-building platform was easy to use. It facilitated the information searching process by providing a user-friendly platform which had a simple look and feel and most importantly required less effort to use (Table 19).

Table 19 Perceived ease of use

		Mean	Standard deviation	Perception level
Perceived ease of use	Platform is easy to use overall	5.71	1.123	Strongly agree
	Easy to find interested information	5.66	1.152	Strongly agree
	No need much effort to use website	5.72	1.203	Strongly agree
	Overall look and feel are easy to understand	5.88	1.091	Strongly agree
	Overall	5.74	0.986	Strongly agree

In terms of platform usefulness, the respondents perceived that it was very useful. The platform helped them to access useful information thus reducing their concerns about product quality and authenticity. It was also useful in terms of supporting the purchase decision (Table 20).

Table 20 Perceived usefulness

		Mean	Standard deviation	Perception level
Perceived usefulness	Able to make purchase decision easily	5.80	1.109	Strongly agree
	Reduce worries in food quality	5.80	1.164	Strongly agree
	Very useful website	6.03	1.122	Strongly agree
	Overall	5.88	1.016	Strongly agree

In general, the respondents found the innovative trust-building platform to be of interest to them (Table 21). While they were eager to try the platform, the ongoing intention to use was not clearly identified at this stage. It is advised that the intention to

use level along with perceptions toward ease of use and perceived usefulness be monitored and reviewed again after the launch of the platform.

Table 21 Intention to use

		Mean	Standard deviation	Perception level
Intention to use	Want to try entering platform and read information	5.84	1.173	Strongly agree
	Willing to try if there is such a platform which provide complete organic food details	6.00	1.027	Strongly agree
	Overall	5.92	1.041	Strongly agree

After identifying the current consumer perceptions of the perceived usefulness antecedents, perceived usefulness, perceived ease of use, and their acceptance to use the innovative trust-building platform, the correlations were further explored. The correlation between the perceived usefulness antecedents and perceived usefulness is shown in Table 22. The information on the timeline format which reflects the organic principles and lifestyle had the most impact on the respondents' perceptions of the platform's usefulness. The information that can reflect the organic food identity, e.g., real pictures and traceable data, also had a significant impact on perceived usefulness.

Table 22 The correlation between perceived usefulness antecedents and perceived usefulness

	B	Standard error	beta	t	p
(Constant)	.492	358		1.373	.172
Useful and complete information	.030	.091	.026	.325	.746
Reflect organic food identity	.344	.102	.302	3.364	.001
Relate to organic principles and lifestyles	.540	.097	.553	5.575	.000

R^2 adj. = .703

Moreover, perceived ease of use had a significant impact on perceived usefulness. Perceived ease of use suggests that the overall experience is easy to use and requires less effort to search for information (Table 23).

Table 23 The correlation between perceived ease of use and perceived usefulness

	B	Standard error	beta	t	p
(Constant)	1.592	.368		4.327	.000
Perceived ease of use	.746	.063	.725	11.822	.000

R^2 adj. = .522

In this study, the perceived ease of use and perceived usefulness of the platform were the two factors that were used to determine the level of consumer acceptance.

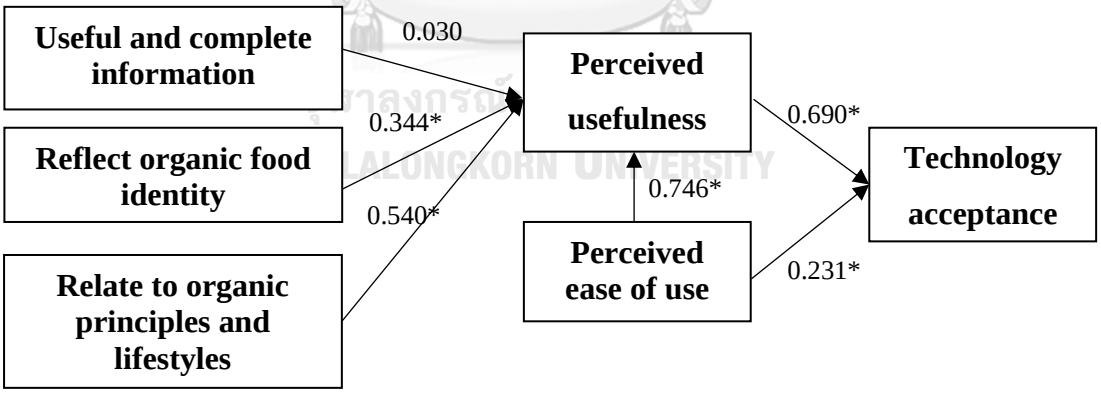
Table 24 shows that both perceived ease of use and perceived usefulness had an impact on the respondents' intention to use the innovative trust-building platform. In addition, perceived usefulness had more impact than perceived ease of use on the overall intention to use the platform. It seemed that it was a combination of the transparency and quality of the information as well as the user-friendliness of the platform that had the greatest impact on the overall level of consumer acceptance.

Table 24 The correlation between perceived ease of use and perceived usefulness and intention to use

	B	Standard error	beta	t	p
(Constant)	.535	.315		1.702	.091
Perceived ease of use	.231	.073	.219	3.160	.002
Perceived usefulness	.690	.071	.673	9.716	.000

R^2 adj. = .711

Figure 21 summarizes the correlation of all factors related to technology acceptance and intention to use the innovative trust-building platform. Providing real information related to the organic food identity and principles is important in convincing consumers to use or accept the innovative trust-building platform. However, the convenient and simple process also supports acceptance of the platform.



*p <0,01

Figure 21 Technology acceptance model for the innovative trust-building platform (Adapted from Venkatesh and Davis, 2000)

5.2 Phase 5: Trust-related behavioral outcomes

When someone has trusting beliefs and/or trusting intentions in other actors, it will be reflected in his or her trust-related behaviors. Loyalty commitment, positive word-of-mouth communication, and social interaction are examples of key relational outcomes from the positive influence of trust. Trust creates benefits for the customer, i.e., fostering his or her confidence and loyal commitment to the relationship. In this study, the researcher focuses on the intention to purchase organic food and the intention to co-create (i.e., participation and interaction) as the two main trust-related behaviors to be assessed.

In this section, consumer trust is the key focus of analysis based on the survey data. Although the results in general suggest that there is no clear distinction between the types of trust that matter to consumers (Table 25), system trust and hybrid personal trust seem to outweigh the importance of personal trust. Hybrid personal trust refers to direct interaction through online sources. In terms of system trust, the respondents commented that they still looked for certification or a known logo when buying organic food. From the research results, both certification and information transparency seem to be equally important.

Table 25 Type of trust in organic food market

	Mean	Standard deviation	Perception level
System trust	5.83	1.130	Strongly agree
Personal trust	5.63	1.025	Strongly agree
Hybrid personal trust	5.83	0.977	Strongly agree

The information presented in Table 26 further underlines the previous findings. The participants perceived the importance of Blockchain technology in providing systematic and traceable information. They cited the traceable nature of the information as the primary reason for placing their confidence in the innovative trust-building platform. They were also happy to place their trust in the farmers' honesty and competence under the participatory guarantee systems principles. The images of the TOP also had quite a significant impact on their trust. This finding is in line with the previous findings from the focus group session. However, there was no clear distinction between the four reasons related to the participants' perspectives of trust toward platform. There are two possibilities that could explain these findings. The first reason

is that there was a high degree of correlation among these four reasons. Another possible reason is that building trust is time dependent. Therefore, consumers might not be able to give distinctive answers on their key reasons for trusting the platform.

Table 26 Reason for trusting the innovative trust-building platform

	Percent
Trust in the data which recorded by farmers	47.7
Trust in group of farmers under participatory guarantee system (PGS)	58.6
Trust in innovative trust building platform or so-called TOP which organized by Thai organic consumer association (TOCA)	58.6
Trust in systematic and traceable data storage by blockchain technology	64.1

Next, the participants were asked to identify which situations would create barriers to purchasing organic food (Table 27). With a response rate of 73.4%, fraud was cited as the top reason for preventing the purchase of organic food. Price (52.3%) and information transparency (49.2%) were also ranked as important by the respondents. Fraud and information transparency are somehow interrelated. As many consumers are afraid of purchasing fake organic food products, they look for transparent information and will stop purchasing organic food if the information is unclear. These findings emphasize the urgency of building credibility and trust through the transparency of information in the organic food supply chain.

Table 27 Barriers for purchase

	Percent
Fraud	73.4
Expensive	52.3
Not variety	10.2
Difficult to find	48.4
Not enough information	29.7
Non-transparent information	49.2
Wrong information	43.0
Farmers lack of competence	12.5
No direct interaction with farmers	17.2

Regression analysis was used to analyze the correlation between the antecedents of trust (i.e., reputation, quality – ease of use and usefulness, and traceable information) trusting belief, trusting intention, and trust-related behavioural outcomes (Tables 28 – 32). Figure 22 presents the overall results of consumer trust development. The reputation of the innovative trust-building platform has an impact on consumer confidence and therefore consumer trust. The structural assurance of information has

slightly more impact than platform reputation on consumer confidence. Consumers seem to believe and place their confidence in organic food when the information they receive is both traceable and transparent.

In the previous survey, both characteristics and communication were found to have an impact on consumer trust. The findings were slightly different from this survey. Among the 5 Cs, communication was the only determinant that had an impact on consumer trust. The differences might be due to the fact that the characteristics of the farmers were already provided and/or clarified in the redirect page communication. Intention to purchase and intention to co-create are the two trust-related behavioural outcomes which are emphasized in this study. In this respect, there was no distinction between the impact of either trusting belief or trusting intention on behavioural outcomes, with both trusting belief and trusting intention having a positive impact on behavioural outcomes.

Looking deeper into the overall correlation presented in Figure 22, the platform reputation and the traceability of the information are the two triggers that need to be built first. Once these two triggers are ready, they will impact consumer confidence and consequently both consumer intention to purchase organic food and consumer intention to co-create within the organic food community, e.g., giving feedback or participating in activities.

Table 28 The correlation between trust antecedents and trusting intention

	B	Standard error	beta	t	p
(Constant)	1.038	.477		2.174	.032
Perceived site reputation	.532	.100	.521	5.336	.000
Perceived site quality	.020	.085	.018	.233	.816
Structural assurance of information	.189	.100	.196	1.891	.061

R^2 adj. = .460

Table 29 The correlation between trust antecedents and trusting beliefs (5Cs)

	B	Standard error	beta	t	p
(Constant)	.516	.262		1.1967	.051
Perceived site reputation	.309	.055	.319	5.644	.000
Perceived site quality	.012	.047	.011	.249	.804
Structural assurance of information	.584	.055	.638	10.639	.000

R^2 adj. = .819

Table 30 The correlation between trust beliefs (5Cs) and trusting intention

	B	Standard error	beta	t	p
(Constant)	.973	.391		2.487	.014
Control	.024	.132	.024	.178	.859
Competence	.007	.182	.007	.036	.971
Characteristic	.289	.156	.298	1.856	.066
Communication	-.093	.201	-.091	-.462	.645
Community	.499	.169	.494	2.947	.004

R^2 adj. = .477

Table 31 The correlation between trust beliefs (5Cs) and trusting intention and intention to purchase

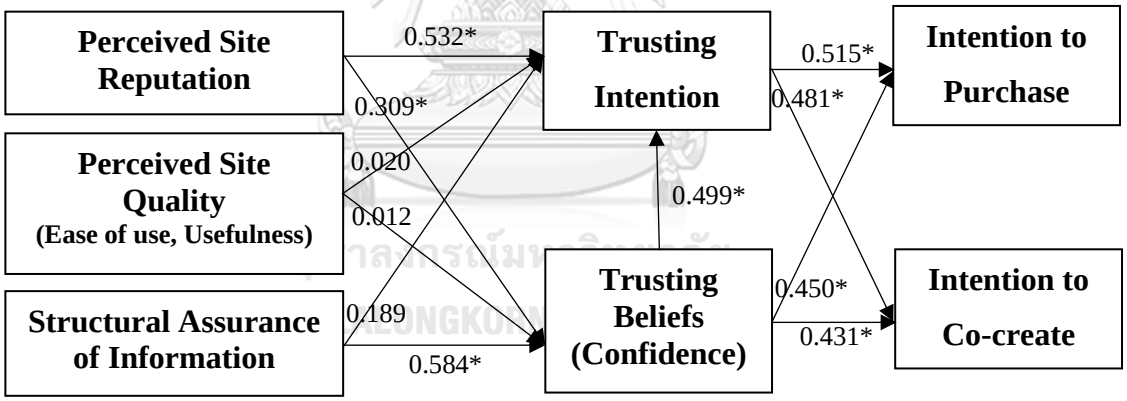
	B	Standard error	beta	t	p
(Constant)	.272	.311		.873	.384
Trusting intention	.515	.069	.498	7.414	.000
Trusting beliefs	.450	.073	.413	6.139	.000

R^2 adj. = .696

Table 32 The correlation between trust beliefs (5Cs) and trusting intention and intention to co-create

	B	Standard error	beta	t	p
(Constant)	.501	.369		1.358	.177
Trusting intention	.481	.082	.456	5.853	.000
Trusting beliefs	.431	.087	.387	4.967	.000

R^2 adj. = .592



*p <0,01

Figure 22 The consumer trust development and their correlations to trusting behaviors

Chapter 6
Commercialization

The innovative trust-building platform has been developed as one of the functions to be incorporated into the Thai Organic Platform (TOP). Initiated by the Sampran Model with support from the National Innovation Agency and the Thailand Research Fund and later transferred to the Thai Organic Consumer Association (TOCA), the TOP has the goal of engaging a wider scope of stakeholders, i.e., farmers, businesses, and consumers, to support the driving of the organic social movement and the adoption of new business practices, namely an inclusive business model. The innovative trust-building platform utilizes Blockchain technology as the core component in the design and building of its traceability system. The platform's transparent and traceable information from stakeholders upstream, such as farmers and auditors, and midstream, including E-commerce businesses, is presented in a reliable and friendly user experience and user interaction format. The innovative trust-building platform intends to foster trust throughout the organic value chain by promoting traceable information.

In this chapter, the commercialization strategy for the innovative trust-building platform is described in detail, including a summary of the technology, value chain analysis, situation analysis (PESTEL, Porter's 5 Forces, market assessment, and SWOT analysis), technology exploitation, and financial calculation. The details start with the summary and assessment details of the technology product. The value chain analysis provides a better understanding of the business values to potential customers, thus maximizing business efficiency. Next, the situations are analyzed by using PESTEL, Porter's 5 Forces, market assessment, and SWOT as the main analytical tools. The results provide better strategic planning for technology exploitation and financial calculations.

6.1 Summary of product (business): Innovative trust-building platform

In this section, explanations are provided of the technology details and technology assessment. The technology details include four perspectives. The first part focuses on the key features of the technology. The second and third parts focus on the potential benefits of the technology and the technological advantages. The last part

includes the potential for the commercialization of the technology. Next, a technology assessment is performed in six dimensions, which include technology readiness, required skills (i.e. developers), required skills (i.e. users), possibility for extension, resource management, and market acceptance.

6.1.1 Technology details

Technology in this context refers to the Blockchain technology embedded in the innovative trust-building platform. This section aims to provide information related to the technology's features, potential benefits, advantages, and commercialization benefits.

6.1.1.1 Key Features

The database platform stores the transaction data of farmers and auditors in a Blockchain database and presents the trustable information in the redirect webpage for businesses and consumers.

6.1.1.2 Potential benefits

Designed to store the details of all farming and auditing activities, the Blockchain database has the potential to build transparency in the organic food supply chain by ensuring the information is traceable. The database has many potential benefits. The two main benefits for businesses and consumers include:

1. Potential benefits for businesses – there are two scenarios. The first scenario is the potential benefits for businesses which have nodes in the TOP. They will have full access to all activity details. They can retrieve information and use the information for communicating with consumers. In addition, the information can also be used by their purchasing unit to secure their organic food supply. The second scenario covers the potential benefits for businesses which have not invested in building nodes. These businesses can still retrieve information from the database; however, they can only retrieve the information via a QR code or the TOP's E-commerce channel.
2. Potential benefits for consumers – consumers can easily access the information via a QR code or the TOP's E-commerce channel. The information has the potential to boost their confidence in the product quality and also to educate

them about organic food principles. In addition, the transparent information also has the potential to build a community atmosphere.

6.1.1.3 Advantages

The advantages of applying Blockchain technology in the innovative trust-building platform are summarized as follows:

1. The platform collects and displays activities in a systematic, traceable and decentralized structure.
    a. The data collection algorithm is trustable due to the Blockchain technology's traceable system.
    b. The data are transparent and available to everyone due to the Blockchain technology's decentralized system.
2. The design of the redirect webpage takes into account the user experience and user interaction.
3. The information displayed on the redirect webpage integrates the requirements from real users. Therefore, the platform has a high potential advantage in fostering consumer trust.
4. Everyone can access the information in the innovative trust-building platform.

6.1.1.4 Commercialization benefits

Trust is one of the key barriers to the expansion of the organic food market, especially in developing countries where trust in the control systems is fragile. Businesses and consumers generally cannot access reliable information on the authenticity of organic food even after consuming it. The Blockchain database fosters information reliability through its decentralized and traceable system. The technology can also be applied in other industries (e.g., healthcare) which have the same credence characteristics as the organic food industry. In addition, the possibility to expand the network is high. This can be achieved by increasing the number of nodes in the Blockchain database. In doing this, the reliability of the information also increases since there are more entities who can validate the transactions.

6.1.2 Technology assessment

The researcher assessed and evaluated the technology in many dimensions which included technology readiness, the skills required to use the technology, the possibility for extension, resource management, and market acceptance.

6.1.2.1 Technology readiness

Blockchain is an emerging technology that is still in its early stages of development, and with considerable potential for commercial applications (Ge et al., 2017). The innovation and development around Blockchain architectures, applications, and business concepts are happening at a fast pace (Ge et al., 2017). Blockchain technology is considered as the disruptive technology to the traditional players in many industries (Ge et al., 2017). However, the prototype and the consumer acceptance results show the high potential of the technology's readiness.

6.1.2.2 Skills required to use the technology

The skills required to use this technology are divided into the skills required for development and the skills required by users.

1. Skills required for development – as mentioned in 6.1.2.1, Blockchain is an emerging technology; therefore, the number of Blockchain developers and experts might be limited. However, there have been many graduate students from well-known universities in Thailand in recent years with the potential to become Blockchain specialists.
2. Skills required by users – consumers perceive that platform as being easy to use and the process of obtaining data is not complicated (refer to consumer acceptance results – Phase 4).

6.1.2.3 Possibility for extension

As mentioned earlier in section 6.1.1.4, the platform is designed to facilitate network extensions. It is possible for businesses to have their own nodes, thus utilizing the database for business purposes. It has the high chance to extend to other businesses or industries which have the credence attributes. In addition, it has high possibility to further integrate with other technologies, e.g., IoT, AI and machine learning.

6.1.2.4 Resource management

The resource management is linked to section 6.1.2.2. Currently, there are still limited numbers of Blockchain developers and experts. However, this is not a big risk. Within the last three years, there has been an explosion of interest in Blockchain technology (Ge et al., 2017). Many companies and research institutions are focusing on the potential applications across financial, industrial and social sectors (Ge et al., 2017).

6.1.2.5 Market acceptance

The findings on consumer acceptance (refer to Phase 4) show that consumers have the intention to try and use the innovative trust-building platform. They perceive the usefulness of the information provided by the platform alongside its ease of use. As the platform is still in the early development stage, it is important to continue fine tuning the contents and functions in the platform. As a result, the chance of market acceptance will only become higher.

6.2 Value chain analysis

Value chain analysis is used to gain an overview of platform usage and to explore the value-added opportunities for key stakeholders in the value chain. Figure 23 summarizes the value chain analysis of the innovative trust-building platform (the ITB platform). As mentioned in Chapter 3, the ITB platform is part of the Thai Organic Platform (TOP). It focuses on providing traceable information through a trustable system for businesses and consumers. Therefore, the main focuses of the ITB platform are the Blockchain database and the redirect webpage. The Blockchain database is the center of the value chain. It is surrounded by upstream stakeholders, i.e., farmers, mid-stream stakeholders, i.e., businesses, and downstream stakeholders, i.e., consumers. The database is designed to connect the information flow from upstream, to mid-stream, and on through to downstream. By having a special web application or so-called redirect webpage, it allows for a better consumer experience. The information is presented in an easy format, e.g., a timeline with the support of real pictures.

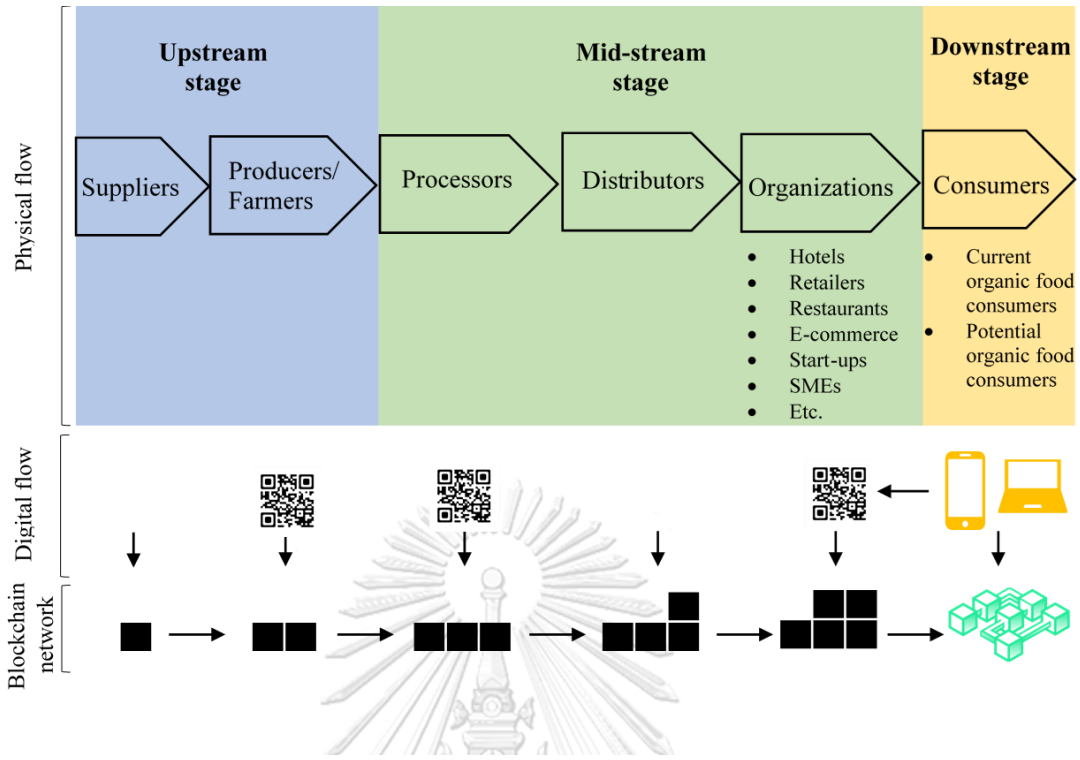


Figure 23 Value chain analysis of innovative trust-building platform

The key users of the innovative trust-building platform for organic food can be segmented into direct and indirect users of the Blockchain database. The value chain analysis for the platform consists of 3 main parts:

1. Upstream stage

The upstream stage refers to the activities at the start of the process, i.e., farming and auditing activities. The key players in this stage, therefore, are farmers and auditors. The transactions from this stage are recorded via the TOP upstream application. The recorded farming activities include details of planting preparation, product supervision, harvesting, and sales. The recorded auditing activities from this stage include PGS, IFOAM, or ICS (Internal Control System) auditing details. At this stage, the auditors are members of central bodies who have trained to be auditors and also the farmers themselves (Participatory Guarantee System, PGS). The transactions will be recorded and stored in the Blockchain database. For example, all transactions from the farmers under the Sampran Model will be stored in the Sampran Model's node.

2. Mid-stream stage

The mid-stream stage refers to the direct users of the Blockchain database. The direct users include businesses, such as farmers' groups, processors, hotels, restaurants, SMEs, start-ups and E-commerce companies. Currently, the TOP's E-commerce channel is one such business example, with the produce from the Sampran Model's farmers displayed in the TOP's E-commerce platform. All participating businesses have to be members of the Thai Organic Consumer Association (TOCA). The TOCA has the role of the central body which manages the TOP. Therefore, the Blockchain database is also managed by TOCA in order to avoid any conflict of interests. All users or members of the TOP are considered to be the platform owners. The TOCA earns revenue from the membership fees paid by the businesses. In addition to paying a membership fee, the businesses also invest in the Blockchain node development. The businesses can retrieve information from the Blockchain database for their business purposes.

3. Downstream stage

Downstream users are the consumers. In this context, they are the current organic food consumers and potential consumers who are concerned about their health and are willing to support farmers (Chapter 4: the rationale of organic food consumption findings). Consumers are the ultimate stakeholders in the organic food value chain. While consumers in general are sensitive to fraudulent practices and information, this is especially so in relation to credence attribute goods like organic products. Consequently, the consumer demand can easily fluctuate or fall depending on their trust in the product. Through the innovative trust-building platform for organic food, the consumers have free access to information on the redirect webpage. They can enter the webpage through a QR code or via an E-commerce webpage.

In short, the value chain positioning of the innovative trust-building platform covers the midstream and/or downstream technological integration. The technology has the potential to be integrated into both midstream and downstream stages. The traceable information has the potential of adding value to busines development and creating cost advantages (e.g., procurement–supply chain efficiencies, auditing, communication

strategy with consumers, and brand trust) as well as the potential of adding value through building transparency and thus enhancing consumer trust.

6.3 Situation analysis

This section aims to develop understanding of the external and internal factors which might impact the implementation and adoption of the technology. The analysis consists of PESTEL, Porter's Five Forces Model, market assessment, and SWOT analysis.

6.3.1 PESTEL

PESTEL analysis is a framework used to examine the impact of political, economic, social, technological, environmental, and legal factors on a business, such as the organization's performance and its competitive standing. This analytical tool provides a 360-degree view of both the organic food market and the role of Blockchain technology within that market, thus identifying the attractiveness of investing in the technology. The data obtained from this analysis can be used to adjust any weaknesses, reinforce the strengths to fortify the competitive advantage, and create business opportunities. The details of the analysis are explained in the following:

6.3.1.1 Political aspect

Organic food market – the political arena has a significant influence upon the regulation of businesses and the spending power of consumers (Oraman, 2014). The National Organic Development Strategy 2017-2021 has set the vision for Thailand to be a regional leader in the production, consumption, and trade of goods and services in the organic foods market with sustainability and internationally-recognized standards (DIT, 2017). Under this strategy, the goal is to more than double the current volume of organic agriculture over the next five years.

Blockchain technology in the organic food market – despite the large growth forecasted by analysts worldwide, the use of smart contracts is still new to the market. Therefore, this concept is facing many challenges, especially regarding government regulations. Whether there is government support or opposition as well as the level of adoption by the public sector are extremely influential factors in the future of Blockchain technology's application. However, with the decentralized nature and lack

of power structures inherent in the foundation of Blockchain technology, many regulating bodies might use it to stabilize markets which require transparency.

6.3.1.2 Economics aspect

Organic food market – the organic food market is one of the most significant markets for Thailand's economy as identified by the Department of Internal Trade (DIP), Ministry of Commerce, which promotes and supports the trade of organic food products in both national and international markets. As such, organic food contributes to both domestic and international revenues for the country.

Blockchain technology in the organic food market – Blockchain technology helps to cut out the middleman by facilitating peer-to-peer interactions and utilizing a decentralized structure. Consumer demands are changing toward more transparency in the supply chain. As they expect to have accurate details of the products they purchase, more consumers are demand full transparency of product information, which then boosts their confidence in their organic food consumption.

6.3.1.3 Social aspect

Organic food market – in terms of consumption, a growing number of consumers are becoming concerned about their health and wellbeing. They pay more attention to their food selection and consumption and demand high quality food products. Continuing its previous three-year master plan, the Thai Heath Promotion Foundation (ThaiHealth) focuses on promoting health fairness that responds to the social and economic reform policy under the direction of national development strategies as specified in the constitution of the Kingdom of Thailand (ThaiHealth, 2017). Besides these health-consciousness policies, the government also encourages the cultivation of healthy crops for consumption.

Blockchain technology in the organic food market – the way of life of Thai people has changed over recent years. Technology has had a significant impact on their lives by increasing the accessibility to information and networks and enhancing the convenience of performing transactions.

6.3.1.4 Technological aspect

Organic food market – the Thai Heath Promotion Foundation (ThaiHealth) supports innovation development in the area of digital technology. It aims to promote and increase the heath literacy of Thai consumers through digital technology (ThaiHealth, 2017). In the organic and local food industry, there are various technological issues that should be taken into consideration. These technological issues start from the production and packaging of the products through to the effectiveness of product delivery.

Blockchain technology in the organic food market – according to IDC, Global spending on Blockchain solutions in 2018 was USD 2.1 billion, while Netscribe predicted that there would be a 42.8% expansion of the Blockchain space every year up to 2022 (Inc42, 2018). This reflects the potential of Blockchain technology and its applications. The Blockchain database supports traceable information, thus fostering trust. With the support of webpages and/or other IoT applications, it facilitates the information accessibility of consumers.

6.3.1.5 Environmental aspect

Organic food market – organic agriculture excludes synthetic pesticides, chemical fertilizers, synthetic preservatives, pharmaceuticals, GM organisms, sewage sludge and irradiation (Oraman, 2014). Organic agricultural practices aim to minimize the use of external inputs. Consumers in developed countries are willing to pay price premiums of 10 to 40% for organic produce, while government subsidies have helped to make organic agriculture economically viable (Oraman, 2014). In Thailand, consumers have become more aware of the need for sustainable practices to protect the environment. The environment is the fourth ranking reason for organic food consumption, while health is still the first (refer to findings in Phase 5 – Table 17).

Blockchain technology in the organic food market – the creation of a Blockchain database requires significant energy inputs. It needs high computing power to solve complex system design issues and to provide the process that the network agreed upon in order to build a Blockchain record of transactions.

6.3.1.6 Legal aspect

Organic food market – the legal aspects have very close links with the government's policy on economic factors (Oraman, 2014). In Thailand, the government supports the organic food agriculture. However, it is still vital to monitor and pay attention to the legal requirements with regard to business operations. One of the strategies of the National Organic Development Strategy 2017-2021 is to encourage the implementation of standardized organic certification inspection systems. The four main operational guidelines include: (1) build confidence in and acceptance of the logo as well as the standards of Thai organic products; (2) establish a One-Stop Service to develop public and private agencies which are involved in organic certification and the certification system of the community (PGS: Participatory Guarantee System); (3) encourage Thai organic standards to be internationally accepted and establish a certification and traceability system for Thai organic products; and (4) promote product and service development according to international standards, i.e., Internal Control System (ICS) and PGS at the community level and also promote these systems to be accepted by manufacturers, consumers, the public and private agencies.

Blockchain technology in the organic food market – Blockchain is a disruptive technology. There are no regulations that are directly bound to the technology or the application itself. In Thailand, however, there was an announcement on the trading of cryptocurrency, which will be taxed with 7% value added tax (VAT) and return taxed with a 15% capital gains tax (Li, 2019). This would create uncertainty in the country. It might drive Thai start-ups to move their registration for ICO fundraising to more investment-friendly states, like Singapore.

6.3.2 Porter’s Five Forces Model

Porter's Five Forces is a framework for analyzing a company's competitive environment. The number and power of a company's competitive rivals, potential new market entrants, suppliers, customers, and substitute products influence a company's profitability. Porter (1989) stated that Five Forces analysis can help companies assess how attractive an industry is, how trends will affect the competition within industry, which industries a company should compete in, and how companies can position

themselves for success. In short, the analysis helps to create a competitive advantage. The details of the Five Forces analysis in the current study are as follows:

6.3.2.1 Barriers to entry or threat of new entrants

High investment in hiring skilled Blockchain developers is required. The Blockchain technology is considered to be a form of disruptive technology and it is still relatively new. There may not be enough skilled developers even though there is support from the government to promote the professional development of human resources. As the current application of Blockchain technology is mainly restricted to the financial industry, the demand for skilled developers is still manageable in Thailand.

The government supports sustainable agricultural practices, meaning that the supply might increase in the future. A Blockchain database has high potential for increasing the demand side, especially among consumers who have little trust in organic food. Therefore, the difficulty in entering the organic food industry is quite low.

6.3.2.2 Bargaining power of buyers

Businesses which are involved in the organic food market encounter the ongoing issues of fraud in the market. Therefore, it is essential for them to rebuild consumer trust. A Blockchain database is one solution since it provides traceable information. However, the bargaining power of buyers is in the medium to high bracket/range since there are also other possible solutions for building trust, for example, marketing campaigns. Blockchain technology is still in the early stage of development. One of the key challenges is its scalability. Therefore, the threat of substitution is medium to high.

6.3.2.3 Bargaining power of suppliers

The innovative trust-building platform is considered as being targeted at niche market who implement a Blockchain database in the organic food supply chain. The trustable cloud providers are mainly resided in other countries. The specialized developers are limited and might impact the hiring costs. Therefore, the bargaining power of suppliers is medium.

6.3.2.4 Rivalry among existing competitors

The rivalry among current competitors in the same industry is relatively low or nonexistent. There are no existing competitors which have implemented Blockchain technology in the organic food supply chain.

6.3.3 Market assessment

A market analysis was conducted to study the attractiveness and the dynamics of the organic food market within the food and service industry. The market assessment focused on the market size of the organic food market and of Blockchain in the agricultural market.

6.3.3.1 Size of the organic food market

The global organic market is currently worth up to 104 billion US dollars, or about 3.55 trillion baht, and growing at a rate of approximately 20% per year (Sentangsedtee, 2019). The world's most important organic producers are the United States, Canada, Germany, France and China. The ASEAN markets are Singapore, Malaysia, Indonesia, the Philippines, and Thailand. The market value is approximately 3 billion baht which is divided into 900 million baht for domestic consumption and 2.1 billion baht for foreign markets.

The Department of Internal Trade (DIT), Ministry of Commerce implemented four strategies for promoting and developing the organic market over the period 2017–2021. The four strategies aimed to establish Thailand as a leader in the production, trade, and consumption of organic products in the ASEAN region by: (1) building awareness among relevant parties throughout the supply chain, (2) pushing standards and certification systems for organic agriculture, (3) developing and expanding the market for organic products and services, and (4) developing added value for organic products and services (Sentangsedtee, 2019).

Ms Banjongjit Angsusingha, the director of the Department of International Trade Promotion (DITP), revealed that a ‘Local to Global’ policy had been implemented to focus on market penetration into niche markets and niche product markets. The DITP planned to expand the market for healthy and environmentally-friendly products (e.g., organic food) to Nordic countries as the first entry point to

further export into other European markets. This approach was particularly attractive because Denmark and Sweden have the highest organic food consumption rate in the world (InfoQuest, 2019).

6.3.3.2 Blockchain in the agricultural market

The global market for Blockchain in agriculture and the food supply chain has been projected to grow from USD 60.8 million in 2018 to USD 429.7 million by 2023, at a compound annual growth rate CAGR of 47,8% (Figure 24). The increase in food fraud and food wastage as well as the increase in demand for food traceability is attributed to the rise of the market growth of Blockchain in agriculture and the food supply chain (MarketsAndMarkets, 2018). The Asia Pacific region is expected to exhibit strong growth in the Blockchain in agriculture and food supply chain market, due to the growth in consumer concerns for food safety and increases in investment by major players in this region (MarketsAndMarkets, 2018).

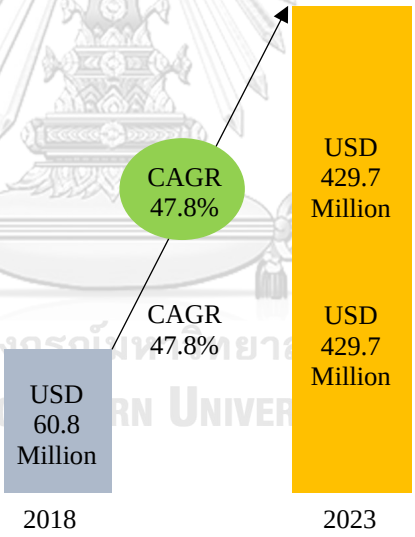


Figure 24 Food product traceability to drive the growth of the market for blockchain in agriculture and food supply chains (MarketsAndMarkets, 2018)

In the agriculture market and food supply chain, the Blockchain technology has been segmented, based on organization size, with differentiations made between large enterprises and small and medium-sized enterprises (SMEs) (MarketsAndMarkets, 2018). In 2017, the large enterprises segment (especially in North America) starts to

dominate the Blockchain in agriculture and food supply chain market (Figure 25). They are actively piloting Blockchain technology in various processes within food and agriculture sector (MarketsAndMarkets, 2018). The large enterprises segment in Asia Pacific market are expected to grow at the highest CAGR due to the majority of food contamination cases in India and China (MarketsAndMarkets, 2018).

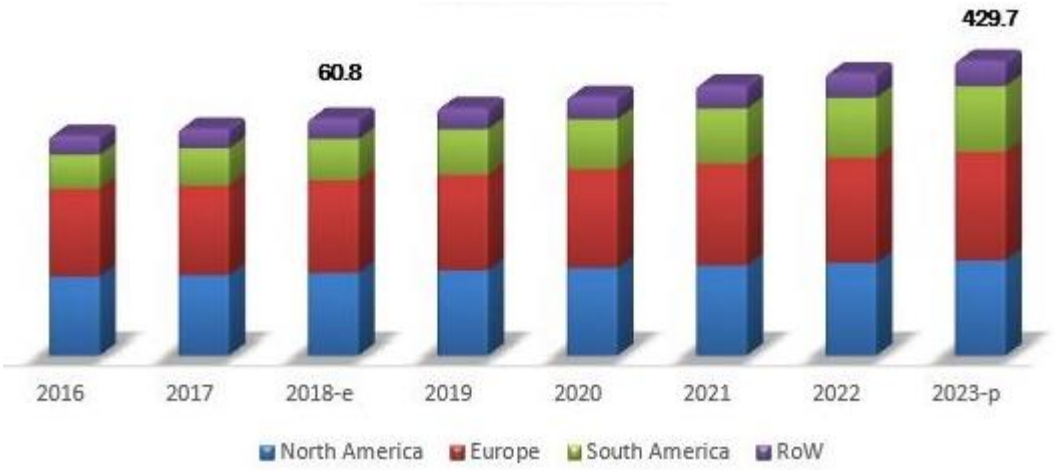


Figure 25 Blockchain in agriculture market, by region (USD million) (MarketsAndMarkets, 2018)

The Blockchain providers in the agriculture market and food supply chain have been segmented into infrastructure and protocol providers, middleware providers, and application and solution providers (MarketsAndMarkets, 2018). Of these, the infrastructure and protocol provider segment are estimated to account for the largest share during the forecast period of 2018 to 2023 (MarketsAndMarkets, 2018). Depending on its application, Blockchain application has also been segmented into 4 segments (MarketsAndMarkets, 2018). The first segment is related to product traceability, tracking, and visibility. The second segment is involved with payment and settlement. Smart contracts are the third segment. Governance, risk, and compliance management are the last segment. Among all segments, product traceability and tracking held the largest share in 2017 (MarketsAndMarkets, 2018). The trend is expected to continue throughout the forecast period of 2018 to 2023, owing to factors such as increased investment in food safety and a greater need for transparency along

the supply chain as well as rising consumer demand for knowledge on the provenance of food products (MarketsAndMarkets, 2018).

IBM (US), Microsoft (US), SAP-SE (Germany), Ambrosus (Switzerland), Arc-net (Ireland), OriginTrail (Slovenia), Ripe.io (US), VeChain (China), Provenance (UK), ChainVine (UK), AgriDigital (Australia), and BlockGrain (Australia) are the key players which are dominated the markets (MarketsAndMarkets, 2018). These players focus on the application of Blockchain technology in enhancing the innovative new product launches, expansions, funding, and partnerships and collaborations (MarketsAndMarkets, 2018). Consequently, it increases the demand for Blockchain technology in the agriculture market and food supply chain (MarketsAndMarkets, 2018).

6.3.4 SWOT analysis

SWOT analysis helps to analyze the technology status and to build an effective strategy for an organization. The SWOT analysis details are summarized in Table 33.

Table 33 SWOT analysis

Strength	**Weakness**
- Developed from the key stakeholders' recommendation, i.e., experts, farmers, businesses, and consumers - Attract both businesses and consumers - Easy to access via smart phone or laptop - User friendly - Unique technical service provider - Proving provenance of organic food - Traceable recorded data - Irreversible and immutable data - Transparency - No intermediaries - No data loss, modification, falsification	- Financial instability due to new enterprise - High investments for implementations - Limited availability of technical skillsets - Providing education for regulators and legal teams are needed. - Early stage of technology development - Scalability - Energy consumption - Maintenance - Agreement among key stakeholders - Inevitably take time for smart contracts to become mainstream
Opportunity	**Threat**
- Market opportunity due to high demand on food transparency and ongoing fraud - Ongoing trend in healthy lifestyle - Government supports the expansion of organic food markets (i.e., local and export market). - Opportunity to integrate the platform with IoT, AI, and machine learning - Possibility to expand to new markets which have credence attributes' characteristic (e.g. health care industry) - Data analytics (know your consumers)	- Target groups have limited understanding and knowledge on blockchain technology. - Low adoption rate - Alternative trust building solution, e.g., new technology, marketing campaigns, other direct interaction - Uncertainty of regulatory and standards - The threat of bugs getting into the smart contract's code - Not all distributed applications featuring smart contracts may be beneficial.

- The future of legal contracts may involve a hybrid mode. Contracts are verified on Blockchain with the filled paper documents. Eventually, the smart contract concept takes over the industry in the future.	- Limited nodes increase the likelihood that all nodes are falsify the information.

6.4 Technology exploitation

An analysis of technology exploitation was conducted to define how best to maximize the utilization of the new technology. The value chain was used to support the analysis of technology exploitation, whether it is seeking to move backwards or forwards in the value chain. From the value chain analysis mentioned above, there are three main possibilities for maximizing the benefits of technology exploitation as follows:

6.4.1 New enterprise

Establishing a new business, either as an SME or as a start-up, depends on the design of the business. A start-up focuses on quick growth and high revenues right from the beginning, whereas small and medium enterprises (SME) focus more on sustainable growth and revenues. SMEs usually target business operations with revenue growth of approximately 100%-200% per year at the beginning and then 30-50% per year thereafter. In contrast, start-ups aim to grow at a rate of at least 1,000% per year. Paul Graham, co-founder of Y Combinator, further explained that being a successful start-up is largely dependent on two criteria, namely (1) offering something that is needed by a large market and (2) having the ability to access that large market.

The nature of technology facilitates the establishment of SMEs, specifically as technical solution providers. As the new business would focus on providing a technical solution to businesses which have credence attributes, the first stage would focus on the key competence, which in this case is the organic food industry. The SME could also offer a consultancy service in order to provide a 360-degree view of the technical solution. For example, the SME would not only provide the design and development of the Blockchain system but also provide additional services on webpage solutions and consultancy.

- **Target group:** Businesses related to credence attributes or businesses which require high transparency, including both domestic and international businesses

- **Advantages:** Own business identity, thus receiving continuous benefits and opportunities to use and expand the technology to other target groups including new segments
- **Disadvantages:** The solid and sound business model would require high initial costs related to operations.

6.4.2 Non-exclusive licensing

Non-exclusive licensing grants the licensee the right to use the intellectual property. However, the licensor remains free to exploit the same intellectual property and to allow any number of other licensees to also exploit the same intellectual property.

The use of non-exclusive licensing generates revenues from the software license fees (e.g. per month/year/user). The researcher only provides implementation support; licensee businesses would need to have their own information technology (IT) team to manage future maintenance.

- **Target group:** Organic food networks, associations, and/or businesses
- **Advantages:** Professional management and accessibility to users, thus offering high revenue opportunities
- **Disadvantages:** Strict restrictions required to avoid intellectual property violation because the chance of infringement is higher than other options

The decision making for selecting the most appropriate method of technology exploitation must take into consideration which option has the strongest potential to create the highest value based on the following assumptions:

1. Computer programs are protected as literary works under Copyright Act 1994 without any registration requirement. Under the Copyright Act, the copyright holder has the sole right to receive the benefits from the software. The holder has the right to duplicate, modify, publish, rent the originals or copies, and receive any other benefits arising from copyright.
2. The technology is immature, and the direct competitors are minimal.
3. The resources, e.g., developers who specialize in Blockchain technology are still limited.

4. The technology is immature, and there is an opportunity to benefit from further development.
5. There are opportunities for the wide application of the technology in a credence attributes market or a market that requires consumer trust, thus offering high market and commercial potential.

The use of technology to add value to the technology value chain can be achieved by using *Market for Embedded Technologies (MfET)*. The technology development can be embedded in the complex system which allows and gives rights to relevant businesses to use the technology for creating added value. As technology solution providers, there is no need to invest or sell the technology, instead being able to rely on the expertise and strength of an enterprise that already exists. In addition, the solution provider can strive to conduct research and development as well as to expand the technology application to other markets or industries.

As the intellectual property is belonged to TOCA, it is not possible to select the non-exclusive licensing option. The value of software, i.e., the redirect page is also not attractive enough. Therefore, the non-exclusive licensing is not the ideal commercialization strategy.

Based on the findings of previous external factor analysis, internal factor analysis, technology assessment, market assessment, and options for technology exploitation analysis, the agreed option is to set up a *new enterprise* as a technology solution provider. The “BioChain” enterprise will provide Blockchain technology consultancy services and solutions for organizations or businesses which require a trust-based technology solution for their operations. As a technology solution provider, the business will also help to design, develop, and provide maintenance of the system or platform for its customers. The solutions will be based on the requirements of the customers and also on agreements made between the provider and the customers. The details of the business plan are provided in the following section.

6.5 Financial calculation

6.5.1 Investment estimation

For the initial company establishment, the investment required to cover all expenses is estimated at approximately 3,000,000 baht. The proportion of own investment to loans from financial institutions is 60:40. Details of the investment estimation are shown in Table 34.

Table 34 The investment estimation

Details	Duration (Year)	Owner (Baht)	Loan (Baht)	Asset values (Baht)	Depreciation cost per year (Baht)
Cash flow		1,800,000	-	1,800,000	-
Decoration/ office equipment	10	-	400,000	400,000	10,000
System and program	5	-	800,000	800,000	150,000
Total		**1,800,000**	**1,200,000**	**3,000,000**	

The following are the details for long-term loans from financial institutions:

Type and amount of loan: Loans for business from financial institutions

Loan objective : For initial investment.

Loan amount : 1,200,000 baht.

Interest rate : Minimum retails rate (MRR) 8 percent.

Loan duration : 5 years

6.5.2 Revenue estimation

The details of the revenue generation are estimated based on small to medium sized projects:

1. Development revenue

   Man day (baht) * Period (days) * Personnel (persons) = 1,500 * 24 * 5

   The development revenue is separated into 2 phases: analyze customer requirements and design network and data storage. For new projects of a small to medium size, *the development cost is approximately 180,000 baht per project.*

2. Testing revenue

   After finishing the development, the next step is to perform system integration testing (SIT) and user acceptance testing (UAT). The rule of thumb for the length of the testing period is double the development time with a ratio of 60:40 for UAT and SIT.

   Man day (baht) * Period (days) * Personnel (persons) = 1,500 *48 * 3

   The testing cost is approximately 216,000 baht per project.

3. Maintenance revenue/Go-live revenue

   Maintenance revenue refers to income from the service maintenance that the company will provide as a service.

   Man day (baht) * Personnel (persons) = 6,000 * 2

   The maintenance cost is approximately 12,000 bath per month or 144,000 baht per year per project.

4. Cloud storage

   The cloud cost includes (1) API service connection to node, (2) committer node (controller and database), (3) validator node (validator smart contracts), and (4) database store by user. The cloud cost is approximately 2,500-7,000 baht per node per month.

   Assumptions:

   - 2 nodes per project including cloud cost is 2,500 baht per month per node; the total amount is paid to the cloud providers.
   - The company charges 10% of the total amount as an administration fee.

6.5.3 Cost estimation

1. Royalty fee and upfront fee

   As mentioned at the beginning of the chapter, the development of the TOP was supported the National Innovation Agency and the Thailand Research Fund and then later transferred to the Thai Organic Consumer Association (TOCA). The researcher agreed to pay a royalty fee of 3% of total revenue to the TOCA for a period of 5 years. In addition, free maintenance support from the TOCA is included for the period of 5 years with no need to pay an upfront fee.

2. Personnel costs

The personnel costs are approximately 2,280,000 baht for Year 1. For Years 2-5, this is expected to increase at a rate of 5% per year.

The initial stage includes 8 employees with a total salary bill of 190,000 baht per month (2,280,000 baht per year). The details are as follows:

- CEO – 1 position with a salary of 40,000 baht. The salary increases at the rate of 5% per year. The CEO's responsibilities include managing and supervising the general administration of the company. In addition, this person has the key roles of finding customers and also cultivating networks.
- Blockchain developer – 5 positions (4 new graduate students and 1 experienced developer) with salary rates of 20,000 baht for the new graduates and 30,000 baht for the experienced developer. The salaries increase at the rate of 5% per year. The key roles include the design, development, and testing of the Blockchain database.
- Admin – 2 positions a with salary rate of 20,000 baht for new graduates. The salary increases at the rate of 5% per year. The key roles include system maintenance and webpage development.

The company plans to increase the number of personnel in order to take on more new projects and to support the increase of system maintenance.

3. Marketing costs

   The marketing costs are estimated at approximately 100,000 baht for Year 1. For Year 2-5, these costs are expected to increase by 10% per year.

4. Office

   The rental cost is approximately 240,000 baht per year.

5. Miscellaneous expenses

   The miscellaneous expenses are estimated at around 200,000 baht per year.

Table 35 shows the overall revenue and cost estimation for Year 1-5. It provides the basic financial estimation. The full version is needed for future development. The financial feasibility details are presented in Table 36:

Table 35 Revenue and cost estimation Year 1-5

Details	Year 1	Year 2	Year 3	Year 4	Year 5
Project (number)	3	6	9	12	15
Project size	Small-Medium	Small-Medium	Small-Medium	Small-Medium	Small-Medium
Development (baht)	540,000	1,080,000	1,620,000	2,160,000	2,700,000
Testing (baht)	648,000	1,296,000	1,944,000	2,592,000	3,240,000
Maintenance (baht)	432,000	864,000	1,296,000	1,728,000	2,160,000
Cloud administration fee, 10% (baht)	18,000	36,000	54,000	72,000	90,000
Total revenue (baht)	1,638,000	3,276,000	4,914,000	6,552,000	8,190,000
Revenue increase (%)		100%	50%	33%	25%
Royalty fee (3% of revenue)	49,140	98,280	147,420	194,400	245,700
Personnel (baht)	2,280,000	2,394,000	2,513,700	2,639,385	2,771,355
Marketing (baht)	100,000	110,000	121,000	133,100	146,410
Office (baht)	240,000	240,000	240,000	240,000	240,000
Miscellaneous (baht)	200,000	200,000	200,000	200,000	200,000
Total cost (baht)	2,869,140	3,042,280	3,222,120	3,406,885	3,603,465
Cost increase (%)		6%	6%	6%	6%
Primary profit (baht)	-1,231,140	233,720	1,691,880	3,145,115	4,586,535
Depreciation (baht)	160,000	160,000	160,000	160,000	160,000
Loan interest (baht)	96,000	96,000	96,000	96,000	96,000
Profit before corporate income tax (baht)	-1,487,140	-22,280	1,435,880	2,889,115	4,330,535
Corporate income tax (baht)			287,176	632,391	866,107
Net profit (baht)	-1,487,140	-22,280	1,148,704	2,256,724	3,464,428
Retained earnings (%)		-1,509,420	-360,716	1,896,008	5,360,436

Table 36 Financial feasibility

Initial assets	3,000,000 baht
Investment ratio	Owner:Loan = 60:40
Profitability	From Year 3
Payback period	Year 4
IRR	22%
NPV (12% discount rate)	1,116,309 Baht

Chapter 7
Discussion and Conclusion

The research *Building trust through an innovative trust-building process: the case of the organic food market in Thailand* applied both exploratory and explanatory research methodology. The exploratory research allowed the exploration of the trust determinants which were then further used to clarify and build understanding of the correlation between each determinant and the trust-related behavioral outcomes. The explanatory research was used in combination with the development research with the aim of explaining how trust was built through the application of the innovative trust-building platform. The following section summarizes the key finding from Phase 1 to Phase 6, the theoretical contribution, the practical contribution, the limitations of this research and recommendations for future research.

7.1 Phase 1: Exploration of the conceptual framework and determinants of trust

Phase 1 aimed to answer the research question: What are the determinants of trust in organic food and how are they related to consumer trust and trust-related behavior? The answers to this multi-part question fulfilled the research objective – the study of *current consumer trust, trust determinants, and the impact of each trust determinant on consumer trust and trust-related behaviors* in organic food. The qualitative and quantitative research applied by the researcher was divided into 3 steps: a systematic literature review, expert interviews, and a survey.

7.1.1 Expert interviews

During a series of interviews, experts in the field of organic food addressed the need for all stakeholders, especially farmers and consumers, to have the right basic understanding of organic food principles. Conversations with organic farmers allowed the researcher to gain a better understanding of the cultivation process. The farmers were knowledgeable and had good intentions to provide good quality organic food to consumers. However, the farmers also mentioned that they wished consumers had a better understanding of the nature of organic food (e.g., appearance and varieties). In addition, they did not have many direct interactions with consumers. From another perspective, the current organic food consumers who participated in this research

mentioned that the information they required or would like to have related to the control system used in the organic food industry was either not available or not trustable. Interestingly, the consumers' interest in the control system was reduced when they had a chance to communicate directly with the farmers. They mentioned that they perceived the kindness and honest character of the farmers, thus enhancing their confidence in the product authenticity.

7.1.2 Consumer trust survey

The key findings on the determinants of trust and their impact on consumer trust are summarized as follows.

7.1.2.1 Determinants of trust

The five determinants of trust were identified by reviewing previous literature and interviewing experts from this field. The determinants of trust included control, competence, characteristics, communication, and community, the so-called 5Cs. The researcher evaluated the consumer perceptions toward each determinant. It was found that the online respondents had neutral perceptions of control, competence and characteristics in relation to the current situation in the organic food market, while the respondents participating through the Sampran Model's sources had higher perception levels for all factors, especially the **community** factor. This implies that consumers who had experiences of interaction with farmers perceived community or social interaction and/or relationships as important factors. There was no clear distinction on the level of current consumer trust between the two groups. However, the overall trust level, including trusting belief and trusting intention, was higher for respondents from the Sampran Model sources. Interestingly, the online respondents had neutral perceptions of the willingness to rely on organic food products. It can be implied from this that community experiences might lead to higher levels of trust toward key stakeholders, especially farmers.

7.1.2.2 Impact of the determinants of trust on consumer trust

The researcher identified trusting belief and trusting intention as the two components that best reflect consumer trust. In this study, consumers were asked to rate their perceptions of each of a series of situations linked to the 5Cs. Regression analysis was used to analyze the impact of the 5Cs on the trusting components. Control,

competence and communication had no impact on consumer trust for any of the respondents, whereas community had an impact on consumer trust for both groups of respondents. Respondents from the Sampran Model sources also indicated that characteristics had an impact on their trust. In short, both community and characteristics were found to be important determinants of trust. Characteristics was an important factor for consumers who had experience of communicating with farmers. Community included participation in social activities which enabled interaction with farmers and the exchange information with other consumers. The researcher interpreted these findings as the level of engagement and interaction that leads to the development of trust. Even though communication seemed to have no impact on consumer trust, it was considered to be part of the interaction strategies that had the potential to enhance consumer trust levels.

7.2 Phase 2: Exploration of the requirements for the innovative trust-building platform through a trust building co-creative workshop

Phase 2 aimed to answer the research question: What are the key requirements for an innovative trust-building platform? The answers to this question fulfilled the research objective – the understanding of the *requirements* for designing an innovative trust-building platform for organic food. A workshop was used as the research tool. The workshop protocols applied the co-creation concept which was designed to include key stakeholders and to co-create the concepts and requirements of the platform.

7.2.1 Trust building co-creative workshop

The key stakeholders participating in the workshop were producers (i.e., individuals and groups of farmers), businesses (i.e., retailers, green markets, service providers such as restaurants and hotels, community enterprise networks, distributors, and processors), consumers (i.e., individuals and families), certified bodied, and other actors from the private sector (i.e. foundations, hotel associations, universities, and funding bodies). The farmers addressed the need for the support bodies to have competence and good characteristics, while the consumers raised the need for clear and transparent communication of relevant information and the control systems of the businesses. All stakeholders expected certified bodies to have enough competency to certify the organic food as well as to provide clear communication to consumers.

Two journey maps were developed to illustrate the journeys along which consumers started their pursuit of healthy lifestyles and the search for organic food. The interesting findings included:

1. Consumers gained more information when they communicated and exchanged information directly with farmers in the market.

   Interpretation: communication allowed the consumers to receive more information and at the same time it allowed them to sense the positive characteristics and competence of the farmers (i.e. friendly, helpful, and knowledgeable).
2. When they repeated their organic food consumption and noticed the change in their health, they felt good and were willing to share their experiences and to convince their family members or friends to try the same organic food.

   Interpretation: good experiences lead to the intention to co-create (e.g. sharing information and inviting other people to try and receive the same experience).
3. Consumers mentioned that it was difficult to find the information and solution they required at the beginning.

   Interpretation: the availability of information was essential especially when the consumers had no or limited experience of something.
4. In order to maintain their organic consumption lifestyle, they had to put in some extra effort to visit organic markets. In addition, the product variety was usually limited.

   Interpretation: product accessibility and variety were two important triggers for maintaining ongoing consumption.
5. Online markets were mentioned as an alternative solution. However, the consumers had concerns about the product authenticity through these channels. It required trial and error to confirm the product quality.

   Interpretation: online markets have the potential to address the needs of consumers. However, it was important to provide useful and reliable information related to product quality.

In the workshops, the participants synthesized the key requirements for building trust. These included information transparency and the communication process. Firstly, consumers want to have information related to the control, competence and characteristics of the key stakeholders. Secondly, there is a need for communication which is related to organic food principles and reflects the competence of organic food producers, and which can be accessed through the organic food community. In short, transparent communication helps consumers to gain understanding of the farming activities, thus indirectly education them.

7.3 Phase 3: Development of the innovative trust-building platform and evaluation of its technical performance

The development of a Blockchain system begins with the design of the Blockchain database. The Blockchain system developed in this research will be integrated into the architecture of the Thai Organic Platform. The ecosystem of the platform was designed to be decentralized. Every full node (i.e. participating organization that has data storage in the system and monitors the transactions) has a copy of the information stored in the Blockchain. This prevents data manipulation and also further enhances information transparency. Within the current decentralized system, there are four nodes or entities. Of these, three nodes were created for three organizations namely the Sampran Model (a farmers' network), Suan Sampran (a hotel business), and the Thai Organic Platform's E-Commerce channel. The last node is called the orderer and it was designed to perform the tasks of organizing and sorting data in the blocks (Figures 13 and 14).

Next, the user and data flow were designed to support the functions of the Blockchain ecosystem as part of the TOP (Figure 15). Firstly, the system connected farmers (who record the data), auditors (who audit the farms), and customers (both businesses and end consumers who have access to the blockchain system via the redirect page linked from the Thai Organic Consumers' E-Commerce channel). Secondly, the flow of information reflects the user interactions. The information starts with the cultivation activities conducted by the farmers, and then includes auditing information provided by the auditors, harvesting information recorded in the TOP's E-commerce channel by the farmers, and information shared in the redirect page.

Lastly, the user experience and user interaction functions were designed to reflect the keywords of trust, Blockchain, healthy, and connect as well as addressing the trustable and accessible characteristics of the innovative trust-building platform. Real photos of the farms and farmers were also presented in the platform to further build trust. The information was presented in 4 main sections (Figure 18).

7.4 Phase 4: Consumer acceptance testing of the innovative trust-building platform

Phase 4 aimed to answer the research question: How did consumers respond to the innovative trust-building platform? The answers fulfilled the research objective – the understanding of consumer acceptance of the innovative trust-building platform for organic food. The researcher applied qualitative and quantitative research methods, which were divided into 3 steps.

7.4.1 Focus group discussion

A focus group discussion was held with the aim of getting feedback on the concept and usage of the innovative trust-building platform from representatives of four businesses and from one consumer. The participants were first asked to experience with platform first hand by scanning a QR code and accessing the information through the redirect page. The key findings included:

1. Overall image and communication of the platform – the participants requested to have more communication about the TOP including its background, objectives, and work procedures in order to first and foremost build trust in the organization.

   Interpretation: Since the innovative trust-building platform was integrated into the TOP, it was important to provide sufficient information about the TOP, which was considered to represent the image or brand of the platform; therefore, ensuring there is sufficient information could increase consumer trust in the organization, in this case the TOP.
2. Information – there was significant interest in the farmer and product screening process, the principles for forming the farmer groups, the methods of regular inspection of the farmers and their farming process, data collection methodology, and data validation methodology.

Interpretation: the feedback suggested that the participants were interested in the type of information currently provided on the platform.

3. Information requirements – there was interest in having more information that could identify the product characteristics (e.g., product name, special characteristics, and real photos), product sources, planting activities and certification.

   Interpretation: the findings (i.e. a need for real photos and information related to product quality/authenticity) concurred with the previous findings collected before the workshop.

7.4.2 In-depth interviews

The platform has a simple usage process, and is thus very straightforward and easy to use. The platform also provided enough descriptive information. Information presented in the timeline format was considered to be very useful as it helped to highlight the key information. This reflects the nature of Thai consumers who prefer quick and convenient information, while they are not very interested in reading detailed information. The platform had a positive impact on their confidence, thus resulting in increased trust in organic food. In sum, the reliable, realistic, and transparent information and pictures had an impact in boosting their confidence.

7.4.3 Consumer acceptance

Among the 128 respondents from online sources, 57% were female with the majority also in the age range between 30 and 59 years old. Nearly 65% of the respondents lived in the Bangkok metropolitan area, while 80% of the respondents had 2-5 family members in their household. Overall, the respondents perceived that the platform supported all three points of perceived usefulness. They emphasized the usefulness of having real pictures as this helped to create transparency and reveal the organic food identity. The platform was also considered useful to the respondents because it helped to reduce their concerns about product quality and authenticity, thus supporting their purchase decision. Furthermore, there was a consensus among the respondents that the platform was easy to use. Specifically, the platform performed its job well in facilitating the information searching process with a user-friendly

environment that required minimal effort. In general, the respondents expressed their interest in trying and using the innovative trust-building platform.

7.5 Phase 5: Trust-related behavioral outcomes

Almost 60% of the respondents mentioned that they spent more than 10,000 baht per month on food. The household spending was related to family size. The respondents usually consumed organic food at least once per week and also bought organic food almost every week. They usually purchased organic food from supermarkets or hypermarkets. The three main consumption reasons included health, supporting farmers, and product quality. It is therefore recommended that organic food products incorporate these factors in their offerings.

There were many perspectives of trust that could be interpreted and summarized from the survey. This included the type of trust, barriers to consumption, the impact of the 5Cs on trusting components, and the trust-related behaviors.

1. Type of trust – the researcher classified trust in this research context into three types: system trust, personal trust, and hybrid personal trust. The findings revealed no clear distinction on which type of trust mattered most to consumers. This indicates that both certification and information transparency are equally important.
2. Reasons for trusting the platform – the systematic and traceable information provided by Blockchain had an impact on consumer trust. The level of trust in farmers and farmer groups (PGS) as well as in the TOCA were equally important in impacting consumer trust. It can be implied from this that consumer trust is influenced by information transparency, farmer characteristics, and the reputation of the organization.
3. Purchase barriers – 73.4% of the respondents mentioned fraud as the main reason why they would not buy an organic product. Price (52.3%) and information transparency (49.2%) were also important purchase stoppers.
4. Impact of 5Cs on trusting components – among the 5 Cs, communication was the only determinant that impacted consumer trust. However, the previous survey identified both characteristics and communication as having an impact

on consumer trust. This indicates that the characteristics of the farmers was presented effectively in the redirect page.

5. Trust-related behaviors – the researcher identified intention to purchase and intention to co-create as the two most important trust behavioral outcomes. There was no distinction between the effects of the two trusting components on the behavioral outcomes. Both trusting belief and trusting intention had a positive impact on behavioral outcomes.

In short, the platform's reputation and use of traceable information were the first two triggers of trust. They will impact consumer confidence and consequently consumer intention to purchase organic food as well as consumer intention to co-create within the organic food community.

7.6 Phase 6: Commercialization strategy

The key values of the innovative trust-building platform were in building a traceable and trustable system for businesses and consumers. The main features of the innovative trust-building platform were the Blockchain database and the redirect webpage. The Blockchain database was the center of the value chain. It was designed to connect information from upstream, mid-stream, and downstream stakeholders. The web application or redirect page enabled better consumer accessibility and a better user experience.

PESTEL, Porter's Five Forces, market assessment, and SWOT analysis supported the analysis of the factors that affected the usage of the innovative trust-building platform and its business operations. A technology exploitation assessment identified the best potential routes to exploit the technology. The three most attractive routes included launching a new enterprise, selling non-exclusive licensing, and selling the technology. After considering the external and internal factors, the decision was made to exploit the technology by establishing a new enterprise. The full details of the new enterprise and the financial projections were introduced in Chapter 6.

7.6 Theoretical contributions

Trust is a fundamental aspect of everyday life; however, understanding one's psychological state is a rather abstract and subjective concept. In addition, trust has

been largely under-theorized in food studies, although it has been vaguely mentioned as one of the positive outcomes of interaction. This present research contributes to the trust theory in social science by integrating the trust-building process and examining the development of consumer trust through the process. The findings provide a complete consumer trust-building process in the organic food market, comprised of three dimensions: the determinants of trust, the trusting components, and the trust-related behavioral outcomes. In the first dimension, this research defined the 5Cs of control, competence, characteristics, communication, and community as the key determinants of trust. In the organic food context, only characteristics and community were found to foster consumer trust. However, the results are context specific. The 5Cs can be extended to other studies that aim to examine the factors which foster consumer trust. In the second dimension, this research extends the findings from the work of H. D. McKnight and Chervany (2001) on the interdisciplinary model of high level trust concepts. The findings explained the phenomena of trusting components (i.e., trusting belief and trusting intention) and trust-related behaviors. In the last dimension, this research applies the theory of co-creation and relationship marketing to explain and quantify the complex relationship between the trust-building process and trust-related behaviors.

The positive impact of transparency on trust has been mentioned in many previous studies (Bosona & Gebresenbet, 2013; Mei-Fang Chen & Chien-Hsien Huang, 2013; Menozzi et al., 2015; Trienekens et al., 2012; van Rijswijk et al., 2008). However, there is very limited evidence supporting trust as an outcome of transparency. This research contributes to addressing this gap by identifying the moderator effect of transparency on trust related behaviors. To examine this relationship, an innovative trust-building platform is developed as the research tool. The platform implements the core values of Blockchain technology, i.e., the traceability. The use of traceability as the core value of transparency also contributes to the theories related to the supply chain. Last but not least, the tools and techniques used during a trust-building co-creative workshop help to explain how key stakeholders co-create, thus contributing to better understanding of the theory of co-creation (Martinez-Canas, Ruiz-Palomino, Linuesa-Langreo, & Blazquez-Resino, 2016; Nuttavuthisit, 2010; Pichyangkul,

Nuttavuthisit, & Israsena, 2012; Prahalad & Ramaswamy, 2004; Randall, Gravier, & Prybutok, 2011). Figure 26 summarizes the model of innovative trust-building platform.

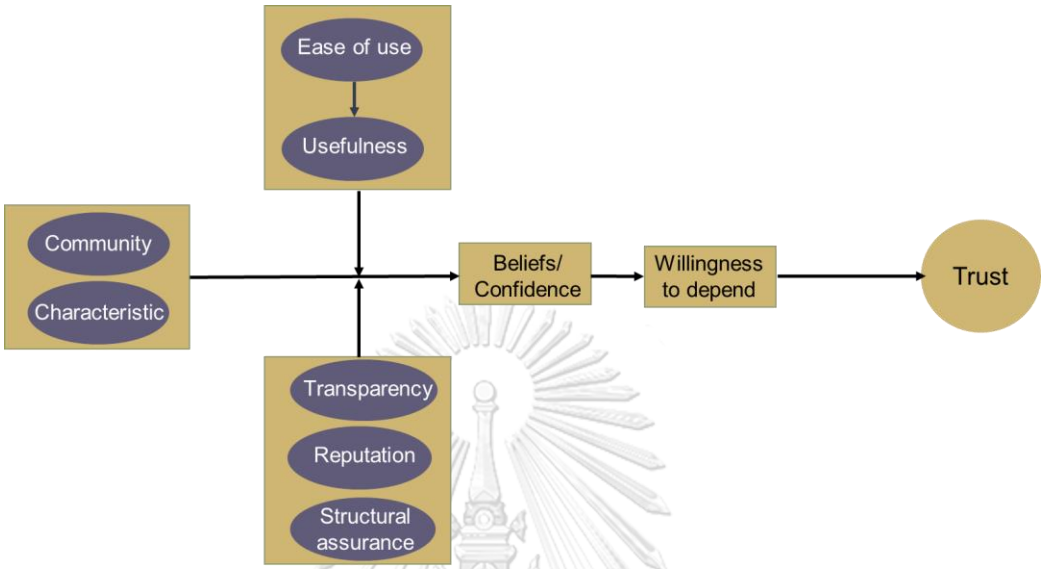


Figure 26 Innovative trust-building process flow

7.7 Practical contributions

This research has practical contributions in five dimensions. Firstly, the key findings related to the impact of the determinants of trust on consumer trust can be used to formulate effective trust -building strategies at the national policy level, for public and private agencies, and for businesses. Figure 27 summarizes the key components of achieving trust in the innovative trust-building platform.

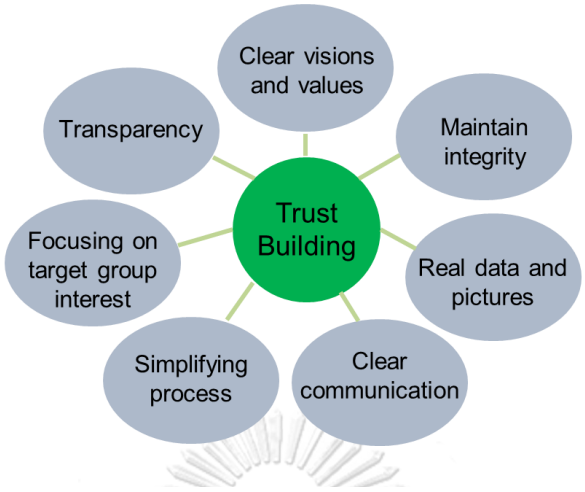


Figure 27 The key trust building components of innovative trust-building platform

As consumers become more confident in organic food, consequently the sustainable expansion of the organic food supply chain is feasible. Secondly, the tools and techniques used during the trust-building co-creative workshop can not only contribute to the theory but also impact the practical contribution to the area of consumer trust. Public and private agencies and businesses can benefit from implementing the workshop structure in developing new products or services and gaining consumer trust. By involving and co-creating the values with key stakeholders, these beneficiaries can enjoy a better understanding of consumer insights, consequently developing the success rate of their new products and/or services to a high level. Thirdly, the innovative trust-building process and platform have gone beyond being just information providers. They provide the trust-building mechanism which has high application potential beyond organic food and/or agribusiness. This can be expanded to other industries which have credence attribute characteristics, for example, healthcare industry or the high-end fashion industry. Fourthly, the innovative trust-building platform can also lead to the disruption of the current business model in the organic food market by virtually connecting farmers, businesses, and consumers through transparent organic principles' journeys. Lastly, the platform has the potential to educate and leverage consumer literacy on organic food principles and build a sense of community through its interactive features. Sustainable market expansion and

consumer trust are the ultimate goals of developing the innovative trust-building platform for the organic food market.

7.8 Limitations and future research recommendations

From this study, there were some research limitations as well as some suggestions for future research development as follows:

7.8.1 Limitations

1. The key stakeholders, i.e., farmers, used during the data collection process were mainly sourced through the Sampran Model.
2. The Blockchain technology is still immature. There were some main external uncertainties, e.g. legal matters, as well as some internal issues, e.g., a shortage of Blockchain developers.
3. The second survey was collected only from online sources due to the COVID – 19 situation.
4. The sampling was based on the convenience sampling technique.
5. The data collection of the development of consumer trust was limited due to the research timeline.
6. The study was conducted under some budget limitations.

7.8.2 Future research recommendations

1. The 5Cs were identified as the key trust determinants in this research. Future research could explore other factors or triggers that might also have an impact on consumer trust, such as brand reputation and consumer experiences.
2. In order to identify the development of consumer trust more deeply, future research should conduct a survey of participants after they have used the platform for an extended period of 3-6 months.
3. In current research, it is identified that consumers place their trust in the systematic and traceable data by blockchain technology. It is important to further distinguish whether consumers are trust in data provided in the redirect webpage (i.e., UI) or trust in the storage mechanism of Blockchain technology.
4. Blockchain can enhance the traceability and transparency of information. However, it does not fully support the validity of input data. The implementation of the Internet of Things (IoT) and sensor and systems

technology are essential. The IoT network refers to a collection of interconnected devices that communicate with other devices without the need for human involvement. The applications of sensors and big-data analytics are classified in Figure 26. Their usage allows enhanced, real-time tracking of goods from their origins.

5. The innovative trust-building platform for the organic food market used in this study was designed for fresh produce. Further development is needed before it can be implemented in the complex environment of the processed products supply chain.

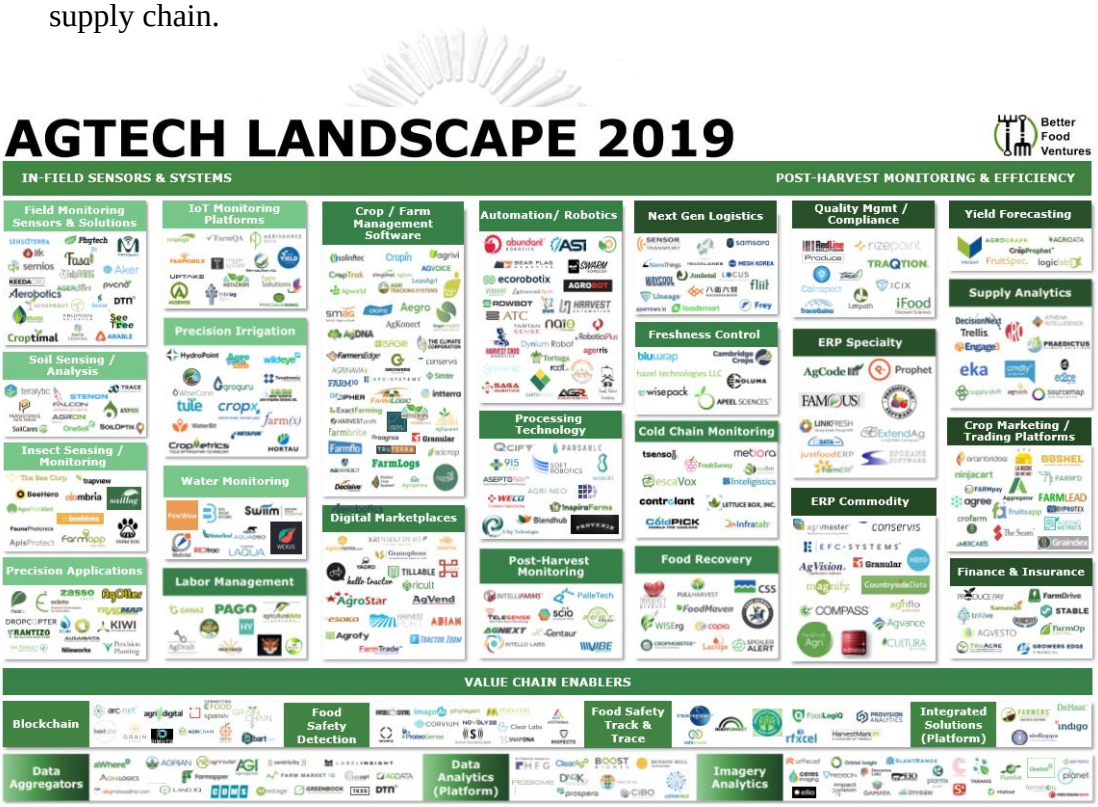


Figure 28 AgTech Landscape 2019 (Day, 2019)

REFERENCES

Anderson, E., & Weitz, B. (1989). Determinants of continuity in conventional industrial channel dyads. *Marketing Science, 8*.

Baran, P. (1962). On Distributed Communications Networks. *RAND Corporation*, 1-9.

Barney, J. B., & Hansen, M. H. (1994). Trustworthiness as a Source of Competitive Advantage. *Strategic Management Journal, 15*, 175-190.

Berry, L. L. (1995). Relationship marketing of services—growing interest, emerging perspectives. *Journal of the Academy of Marketing Science, 23*(4), 236-245. doi:10.1177/009207039502300402

Bheemaiah, K. (2015). *Why business schools need to teach about the blockchain. An overview of cryptocurrency and blockchain technology based business initiatives and models*. Retrieved from

Blomqvist, K., & Seppänen, R. (2003). *Bringing together the Emerging Theories on Trust and Dynamic Capabilities - Collaboration and Trust as Focal Concepts*. Paper presented at the 19th Annual IMP Conference.

Bopp, J. (2016). *New momentum to Bangkok's organic food movement: interspersed scenes led by mindful pioneers.* (Doctoral degree), University of Cologne,

Bosona, T., & Gebresenbet, G. (2013). Food traceability as an integral part of logistics management in food and agricultural supply chain. *Food Control, 33*, 32–48. doi:10.1016/j.foodcont.2013.02.004

Castaldo, S., Premazzi, K., & Zerbini, F. (2010). The meaning (s) of trust. A content analysis on the diverse conceptualizations of trust in scholarly research on business relationships. *96*(4), 657-668.

Çerri, S. (2012). Exploring Factor Affecting Trust and Relationship Quality in a Supply Chain Context. *Journal of Business Studies Quarterly, 4*(1), 74-90.

Cetindamar, D., Çatay, B., & Basmaci, S. O. (2005). Competition through collaboration: insights from an initiative in the Turkish textile supply chain. *Supply Chain Management: An International Journal, 10*(4), 238-240. doi:10.1108/13598540510612686

Chen, M.-F., & Huang, C.-H. (2013). The impacts of the food traceability system and consumer involvement on consumers' purchase intentions toward fast foods. *33*(2), 313-319.

Chen, M.-F., & Huang, C.-H. (2013). The impacts of the food traceability system and consumer involvement on consumers' purchase intentions toward fast foods. *Food Control, 33*, 313-319.

Chrysochou, P., Chryssochoidis, G., & Kehagia, O. (2009). Traceability information carriers. The technology backgrounds and consumers' perceptions of the technological solutions. *Appetite, 53*(3), 322-331. doi:10.1016/j.appet.2009.07.011

Darby, M. R., & Karni, E. (1973). Free Competition and the Optimal Amount of Fraud. *Journal of Law & Economics, 16*(1), 67-88.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3). doi:10.2307/249008

De Jonge, J., Van Trijp, H., Jan Renes, R., & Frewer, L. (2007). Understanding consumer confidence in the safety of food: Its two-dimensional structure and determinants. *27*(3), 729-740.

Dimitriadis, S., & Kyrezis, N. (2010). Linking trust to use intention for technology-enabled bank channels: The role of trusting intentions. *Psychology and Marketing, 27*(8), 799-820. doi:10.1002/mar.20358

DIT. (2017). National Organic Development Strategy 2017-2021.

Doney, P. M., Barry, J. M., & Abratt, R. (2007). Trust Determinants and Outcomes in Global B2B Services. *European Journal of Marketing, 41*(9/10), 1096-1116.

Doney, P. M., & Cannon, J. P. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journa of Marketing, 61*, 35-51.

Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of national culture on the development of trust. *23*(3), 601-620.

Etzioni, A. (2010). Is Transparency the Best Disinfectant? *Journal of Political Philosophy, 18*(4), 389-404. doi:10.1111/j.1467-9760.2010.00366.x

Flavián, C., Guinalíu, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management, 43*(1), 1-14.

Ge, L., Christopher, B., Spek, J., Smeenk, A., & Top, J. (2017). *Blockchain for Agriculture and Food - Findings from the pilot study*. Retrieved from

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services. *Omega, 32*(6), 407-424.

Giddens, A., & Sutton, P. W. (2017). *Essential concepts in sociology*: John Wiley & Sons.

Greennet. (2019). ผู้บริโภคออร์แกนิคในประเทศไทย: บทวิเคราะห์.

Grönroos, C. (1996). Relationship Marketing Logic. *Asia-Australia Marketing Journal, 4*(1), 7-18.

Handfield, R. B., & Bechtel, C. (2002). The role of trust and relationship structure in improving supply chain responsiveness. *Industrial Marketing Management, 31*, 367-382.

Hauser, J., & Simmie, P. (1981). Profit Maximizing Perceptual Positions: An Integrated Theory for the Selection of Product Features and Price. *Management Science, 27*, 33-56. doi:10.1287/mnsc.27.1.33

Heide, J. B., & John, G. (1992). Do Norms Matter in Marketing Relationships? *Journal of Marketing, 56*(2), 32-44.

Hennig-Thurau, T., Gwinner, K. P., & Gremler, D. D. (2002). Understanding Relationship Marketing Outcomes: An Integration of Relational Benefits and Relationship Quality. *Journal of Service Research - J SERV RES, 4*, 230-247. doi:10.1177/1094670502004003006

Inc42. (2018). 4 Things That Made Blockchain The Most Disruptive Tech In Decades.

InfoQuest. (2019). พาณิชย์แนะผู้ส่งออกสินค้าและอาหารเกษตรอินทรีย์ขยายตลาดในกลุ่มนอร์ดิกส์. *InfoQuest*.

Kongsom, W., & Kongsom, C. (2016). Consumer Behavior and Knowledge on Organic Products in Thailand. *World Academy of Science, Engineering and Technology, 10*(8), 2250-2254.

Kottila, M. R., & Rönni, P. (2008). Collaboration and trust in two organic food chains. *British Food Journal, 110*(4/5), 376-394.

Kriege-Steffen, A., Boland, H., Lohscheidt, J., Schneider, F., & Stolze, M. (2010). *Transparent Food and Consumer Trust.* Paper presented at the System Dynamics and Innovation in Food Networks

Krishna, A., Lazarus, D., & Dhaka, S. (2013). Co-Creation Channel - A Concept for Paradigm Shift in Value Creation. *Journal of Management Science and Practice, 1*(1), 14-21.

Kshetri, N. (2018). Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management, 39*, 80-89.

Larcker, D. F., & Lessig, V. P. (1980). PERCEIVED USEFULNESS OF INFORMATION: A PSYCHOMETRIC EXAMINATION*. *11*(1), 121-134. doi:10.1111/j.1540-5915.1980.tb01130.x

Li, S. (2019). *A PESTLE Analysis of the Cryptocurrency Industry: An Investment Perspective.* (Master), Siam University,

Lindgreen, A. (2003). Trust as a valuable strategic variable in relationship marketing - different types of trust and their implementation. *British Food Journal*, *105*(6), 310-328.

Lu, J., Yu, C.-S., Liu, C., & Yao, J. (2003). Technology acceptance model of wireless Internet. *Internet Research, 13*, 206-222. doi:10.1108/10662240310478222

Macaulay, S. (1963). Non-contractual relations in business - A preliminary study. *American Sociological, 28*(1).

Macready, A. L., Heike, S., Klimczuk-Kochańska, M., Szumiał, S., Vranken, L., & Grunert, K. G. (2020). Consumer trust in the food value chain and its impact on consumer confidence: A model for assessing consumer trust and evidence from a 5-country study in Europe. *Food Policy*. doi:10.1016/j.foodpol.2020.101880

MarketsAndMarkets. (2018). *Blockchain in Agriculture Market (and Food Supply Chain), Application (Product Traceability, Payment and Settlement, Smart Contracts, and Governance, Risk and Compliance Management), Provider, Organization Size, and Region - Global Forecast to 2023*. Retrieved from

Martinez-Canas, R., Ruiz-Palomino, P., Linuesa-Langreo, J., & Blazquez-Resino, J. J. (2016). Consumer Participation in Co-creation: An Enlightening Model of Causes and Effects Based on Ethical Values and Transcendent Motives. *Front Psychol, 7*, 793. doi:10.3389/fpsyg.2016.00793

May, C. (2008). *PGS Guidelines - How Participatory Guarantee Systems can Develop and Function*. Germany: IFOAM.

Mayer, R. C., Davis, J. H., & Schoorman, D. F. (1995). An Integrative Model of Organizational Trust. *Academy of Management Review, 20*, 709-734.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a web site - a trust building model. *Journal of Strategic Information Systems, 11*, 297-323.

Mcknight, D. H., & Cummings, L. L. (1998). Initial Trust Formation in New Organizational Relationships. *Academy of Management Review, 23*(3), 473-490.

McKnight, H. D., & Chervany, N. L. (2001). What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *6*(2), 35-59.

McKnight, H. D., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *11*(3-4), 297-323.

Meijboom, F. L. B., Visak, T., & Brom, F. W. A. (2006). From Trust to Trustworthiness: Why Information is not Enough in the Food Sector. *Journal of Agricultural and Environmental Ethics, 19*(5), 427-442.

Menozzi, D., Halawany-Darson, R., Mora, C., & Giraud, G. (2015). Motives towards traceable food choice: A comparison between French and Italian consumers. *Food Control, 49*, 40-48. doi:10.1016/j.foodcont.2013.09.006

Morgan, R. M., & Hunt, S. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing, 58*(3). doi:10.2307/1252308

Mougayar, W. (2015). Understanding the blockchain. from O'Reilly

NationalStatisticalOffice. (2018). จำนวนประชากรในเขตกรุงเทพมหานคร เขตปริมณฑล และทั่วราชอาณาจักร พ.ศ. 2543 - 2561

และประมาณการของ พ.ศ. 2562 - 2565.

Nelson, E., Tovar, L. G., Gueguen, E., Humphries, S., Landman, K., & Rindermann, R. S. (2015). Participatory Guarantee Systems and the Re-imagining of Mexico's Organic Sector. *Agriculture and Human Values, 33*(2), 373-388.

Nichol, P. B., & Brandt, J. (2016). Co-Creation of Trust for Healthcare: The Cryptocitizen Framework for Interoperability with Blockchain. doi:10.13140/RG.2.1.1545.4963

Nuttavuthisit, K. (2010). If you can't beat them, let them join: The development of strategies to foster consumers' co-creative practices. *Business Horizons, 53*(3), 315-324. doi:10.1016/j.bushor.2010.01.005

Nuttavuthisit, K., & Thøgersen, J. (2015). The Importance of Consumer Trust for the Emergence of a Market for Green Products: The Case of Organic Food. *Journal of Business Ethics, 140*(2), 323-337.

Oraman, Y. (2014). An Analytic Study of Organic Food Industry as Part of Healthy Eating Habit in Turkey: Market Growth, Challenges and Prospects. *Procedia - Social and Behavioral Sciences, 150*, 1030-1039.

Parkhe, A. (1998). Understanding Trust in International Alliances. *Journal of World Business, 33*(3), 219-240.

Pavlou, P. A., & Gefen, D. (2004). Building Effective Online Marketplaces with Institution-Based Trust. *Information Systems Research, 15*(1), 37-59. doi:10.1287/isre.1040.0015

Pichyangkul, C., Nuttavuthisit, K., & Israsena, P. (2012). Co-creation at the Front-end: A Systematic Process for Radical Innovation. *International Journal of Innovation, Management and Technology, 3*(2).

Porter, M. E. (1989). How competitive forces shape strategy. In *Readings in strategic management* (pp. 133-143): Springer.

Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing, 18*(3), 5-14.

PricewaterhouseCoopers. (2017). *20 years inside the mind of the CEO. What's next?* . Retrieved from

Randall, W. S., Gravier, M., J., & Prybutok, V. R. (2011). Connection, trust, and commitment: dimensions of co-creation? *Journal of Strategic Marketing, 19*(1), 3-24.

ResearchAndMarkets. (2020). *Global Organic Food Market Set to Cross $220 Billion by 2024 - Comprehensive Industry Analysis Report*. Retrieved from

Roitner-Schobesberger, B., Darnhofer, I., Somsook, S., & Vogl, C. R. (2008). Consumer perceptions of organic foods in Bangkok, Thailand. *Food Policy, 33*(2), 112-121.

Rotter, J. B. (1967). A New Scale for the Measurement of Interpersonal Trust. *Journal of Personality and Social Psychology, 35*(4).

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so Different after All - A Cross-Discipline View. *Academy of Management Review, 23*(3), 393-404.

Sako, M. (1997). *Does Trust Improve Business Performance?* : Oxford University Press.

Sassatelli, R., & Scott, A. (2001). Novel Food, New Markets And Trust Regimes: Responses to the erosion of consumers' confidence in Austria, Italy and the UK. *European Societies, 3*(2), 213-244. doi:10.1080/146166901200543339

Schiefer, G., & Deiters, J. (2013). *Transparency for Sustainability in the Food Chain: Challenges and Research Needs-EFFoST Critical Reviews #2*.

Schlenker, B. R., Helm, B., & Tedeschi, J. T. (1973). The effects of personality and situational variables on behavioral trust. *Journal of Personality and Social Psychology, 25*(3), 419-427. doi:10.1037/h0034088

Schneider, F., Stolze, M., Kriege-Steffen, A., Lohscheidt, J., & Boland, H. (2009). How Can Consumer Trust in Organic Products be Enhanced? *Ethical Futures: Bioscience and Food Horizon*, 271-276.

Seebacher, S., & Schüritz, R. (2017). *Blockchain Technology as an Enabler of Service Systems: A Structured Literature Review*: Springer International Publishing.

Sentangsedtee. (2019). มูลค่าตลาดโลกพุ่ง 3.55 ล้านล้านบาท ดันไทยเป็นผู้นำ “เกษตรอินทรีย์”ในอาเซียน. *Matichon Online*.

Seyfang, G. (2006). Ecological citizenship and sustainable consumption: Examining local organic food networks. *Journal of Rural Studies, 22*(4), 383-395. doi:10.1016/j.jrurstud.2006.01.003

Steffen, A., & Doppler, S. (2019). Building consumer trust and satisfaction through sustainable business practices with organic supermarkets: The case of Alnatura. In J. Byrom & D. Medway (Eds.), *Case Studies in Food Retailing and Distribution* (pp. 205-228): Woodhead Publishing.

Suvanto, H. (2012). Constructing a Typology of Trust in Asymmetrical Food Business Relationships. *British Food Journal, 114*(7), 926-943.

TechSciResearch. (2017). Global Organic Food Market [Press release]

ThaiHealth. (2017). แผนหลัก สสส. *2561-2563 : Thaihealth Master Plan 2018-2020*.

ThaiPAN. (2016). *Report on the results of random sampling of pesticide residues in vegetables and fruits No. 2/2016*. Retrieved from

ThaiPAN. (2020). Sacred Fruit - Every orange is found to have exceed residual standard.

Thøgersen, J. (2010). Country Differences in Sustainable Consumption: The Case of Organic Food. *Journal of Macromarketing, 30*(2), 171-185.

Torjusen, H., Sangstad, L., Jensen, K. O. D., & Kjærnes, U. (2004). *European Consumers' conceptions of organic food - a review of available research*. Retrieved from National Institute for Consumer Research:

Trienekens, J., Wognum, N., Beulens, A., & Van der Vorst, J. (2012). Transparency in complex dynamic food supply chains. *Advanced Engineering Informatics, 26*, 55–65. doi:10.1016/j.aei.2011.07.007

Tung, S. J., Shih, C. C., Wei, S., & Chen, Y. H. (2012). Attitudinal inconsistency toward organic food in relation to purchasing intention and behavior. *British Food Journal, 114*(7), 997-1015.

van Rijswijk, W., Frewer, L. J., Menozzi, D., & Faioli, G. (2008). Consumer perceptions of traceability: A cross-national comparison of the associated benefits. *Food Quality and Preference, 19*(5), 452-464.

Venkatesh, V., & Davis, D. F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, 46*, 186-204.

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*, 425-478. doi:10.2307/30036540

Verain, M. C. D., Bartels, J., Dagevos, H., Sijtsema, S. J., Onwezen, M. C., & Antonides, G. (2012). Segments of sustainable food consumers: a literature review. *International Journal of Consumer Studies, 36*(2), 123-132. doi:10.1111/j.1470-6431.2011.01082.x

Vidotto, G., Massidda, D., Noventa, S., & Vicentini, M. (2012). Trusting Beliefs - A Functional Measurement Study. *Psicológica, 33*, 575-590.

Wang, C.-C., Lo, S.-K., & Fang, W. (2008). Extending the technology acceptance model to mobile telecommunication innovation: The existence of network externalities. *7*(2), 101-110. doi:10.1002/cb.240

Wang, R. Y., Si, Z., Ng, C. N., & Scott, S. (2015). The transformation of trust in China's alternative food networks: disruption, reconstruction, and development. *20*(2).

Williams, J. D., Han, S.-L., & Qualls, W. J. (1998). A Conceptual Model and Study of Cross-Cultural Business Relationships. *Journal of Business Research, 42*, 135-143.

Wilson, D. T. (1995). *An Integrated Model of Buyer-Seller Relationships*. Retrieved from The Pennsylvania State University:

Wognum, P. M., Bremmers, H., Trienekens, J. H., van der Vorst, J. G. A. J., & Bloemhof, J. M. (2011). Systems for sustainability and transparency of food supply chains – Current status and challenges. *Advanced Engineering Informatics, 25*(1), 65-76. doi:10.1016/j.aei.2010.06.001

Wright, A., & De Filippi, P. (2015). Decentralized Blockchain Technology and the Rise of Lex Cryptographia. *SSRN Electronic Journal*. doi:10.2139/ssrn.2580664

Yamane, T. (1967). *Statistics an Introductory Analysis* (2nd Edition ed.): New York, Harper and Row.

Yee, W., Yeung, R., & Morris, J. (2005). Food safety: Building consumer trust in livestock farmers for potential purchase behaviour. *British Food Journal, 107*, 841-854. doi:10.1108/00070700510629788

Young, L. C., & Wilkinson, I. F. (1989). The Role of Trust and Co-operation in Marketing Channels: A Preliminary Study. *European Journal of Marketing, 23*(2), 109-122.

Zaheer, A., McEvily, B., & Perrone, V. (1998). Does Trust Matter? Exploring the Effects of Interorganizational and Interpersonal Trust on Performance. *Organization Science*, *9*(2), 141-159.
Zand, D. E. (1972). Trust and managerial problem solving. 229-239.
Zanoli, R., & Naspetti, S. (2002). Consumer Motivations in the Purchase of Organic Food. *British Food Journal*, *104*(8), 643-653.

Appendices

Appendix 1 Details research methodology

Research questions	Phase/Process details		Population	Methodology	Outputs
1. What are the determinants of consumer trust in organic food? And how each determinant relates to consumer trust and trust related behaviors in organic food?	Phase 1 – Exploration the conceptual framework and determinant of trust.	Step 1 – Reviewed, studied, analyzed, and synthesized literatures related to organic food consumption, trust, consumer trust, transparency and traceability.	Studied the literatures, case studies, and relevant researches.	• Desk research • Systematic literature review	• Research conceptual framework • Determinants of trust • Relevant trust related technology
		Step 2 – 2.1. Explored consumer profile, their consumption behavior, factors which impact their trust. 2.2. Quantified their current trust level and the impact of trust building factors on consumer trust.	• Target 319 questionnaires • Target population: current and potential organic food consumers	• Drafted survey • Review survey quality • Convenient sampling • Distributed survey through online source, Sookjai day, Sookjai weekend market, and Patom cafè	• Current consumer trust in organic food products • Impacts of trust building factors on consumer trust
2. What are the key requirements for	Phase 2 – Exploration of platform requirements through	Step 3 – Explored and understand trust building	• 21 participants	• Screened participant via	Innovative trust-building platform requirements

innovative trust-building platform?	a trust building co-creative workshop	process, requirements as the input for designing platform	• Target populations: active key stakeholders in organic food supply chain i.e. farmers, experts in organic food principles, business consumers, and end consumers	telephone interview • Drafted workshop protocol • Consulted the protocol details with design thinking tool's expert • Ran trust building co-creative workshop by dividing participants into 5 small groups (6 persons per group) with different roles in organic food supply chain • Analyzed and synthesized all outputs from workshop	
3. How does the organic food innovative trust	Phase 3 – Development of an innovative trust-	Step 4 – Set up cross functional team	Diverse team members with different expertise	• Set up cross team and discuss on the	Innovative trust-building platform

building platform look like? What is the technical performance evaluation of the platform?	building platform and evaluation of its technical performance		i.e. blockchain technology expert, platform developer, and user experience designer	objectives and project details	
		Step 5 – Tested technical performance of innovative trust-building platform	Technical performance test with developers	• Drafted technical performance test protocol • Run the test step by step • Reported errors • Adjusted the system • Rerun the test	Technical feasibility results
4. How consumers response to the innovative trust building platform?	Phase 4 – Consumer acceptance testing of the innovative trust-building platform	Step 6 – Tested concept and performance of innovative trust-building platform	• First testing session with 3 business and 2 end consumers • Second testing session with 6 active business and end consumers	First session – focus group • Prepared QR code • Explained the basis of blockchain technology to participants • Shown use case • Asked participants to scan QR code	Concept acceptance results, impact of platform on consumer trust, survey validation

				• Group discussion on overall usage, information, and trust Second session – Survey follow by interviewing on overall experiences (survey and platform content) and trust after using platform	
		Step 7 – Explored consumer acceptance in innovative trust building platform	• 128 participants • Current and potential organic food consumers	• Draft survey based on TAM model and trust measurement scale by McKnight et al. (2002) • Distribute survey via online sources* **Only online source distribution due to COVID19 situation.*	Consumer acceptance based on TAM theory
5. How does consumer trust develop through the facilitation of	Phase 5 – Trust related behavioral outcomes	Step 8 – 8.1. Understand factors that impact their trust.	Similar to Step 7	Similar to Step 7	Consumer trust development

the innovative trust building platform? Are transparency and traceability that embedded in the innovative trust building platform have positive effects on consumer trust in organic food?		8.2. Quantified their trust development			
6. What are the potential commercialization strategies for the organic food innovative trust building platform?	Phase 6 – Development of a commercialization strategy	Step 9 – Develop commercialization strategy that will benefit to organic food sector as a whole	Sampran Model and their affiliation	• Analyzed the values of innovative trust building platform • Evaluated the technology exploitation options • Selected the best option and drafted commercialization strategy	Commercialization strategy

Appendix 2 Sources of Trust Survey

การศึกษาความเชื่อมั่นของผู้บริโภคในห่วงโซ่อาหารอินทรีย์ (ออร์แกนิค)

คำชี้แจง

แบบสำรวจนี้เป็นการศึกษาความเชื่อมั่นของผู้บริโภคในห่วงโซ่อาหารอินทรีย์ เพื่อเป็นแนวทางการออกแบบและพัฒนาเครื่องมือออนไลน์ที่ส่งเสริมให้เกิดความเชื่อมั่นและความไว้วางใจในผลิตภัณฑ์อาหารอินทรีย์ประเภทผักและผลไม้จึงขอความร่วมมือในการตอบแบบสำรวจให้ตรงกับความเป็นจริงของตัวท่าน

แบบสอบถามนี้แบ่งออกเป็น 5 ส่วน ได้แก่

ส่วนที่ 1 ข้อมูลทั่วไป

ส่วนที่ 2 ข้อมูลเกี่ยวกับพฤติกรรมการซื้ออาหารอินทรีย์

ส่วนที่ 3 ข้อมูลเกี่ยวกับปัจจัยในการเข้ามามีส่วนร่วมในกิจกรรมทางสังคม

ส่วนที่ 4 ข้อมูลเกี่ยวกับความคิดเห็นต่อความสามารถในการดำเนินการที่ส่งผลต่อความเชื่อมั่นในห่วงโซ่อาหารอินทรีย์ในปัจจุบัน

ส่วนที่ 5 ข้อมูลเกี่ยวกับความเชื่อมั่นในอาหารอินทรีย์

ส่วนที่ 1 ข้อมูลทั่วไป

โปรดเขียนเครื่องหมาย ✓ ลงใน ❑ หรือเติมข้อความในช่องว่างที่ให้ ให้ตรงกับความเป็นจริงของตัวท่าน

1. เพศ
   - ❑ หญิง ❑ ชาย ❑ อื่นๆ (ระบุ)_____
2. อายุ
   - ❑ อายุน้อยกว่า 20 ปี ❑ อายุ 20-29 ปี ❑ อายุ 30-39 ปี
   - ❑ อายุ 40-49 ปี ❑ อายุ 50-59 ปี ❑ อายุตั้งแต่ 60 ปีขึ้นไป
3. คุณอาศัยอยู่ที่ไหน
   - ❑ กรุงเทพมหานคร ❑ อื่นๆ (ระบุ)_____
4. ระดับการศึกษาสูงสุด
   - ❑ ประถมศึกษา ❑ มัธยมศึกษา ❑ ปริญญาตรี
   - ❑ ปริญญาโทและสูงกว่า ❑ อื่นๆ (ระบุ) _____
5. อาชีพหลักในปัจจุบัน
   - ❑ ข้าราชการ ❑ พนักงานเอกชน ❑ เจ้าของกิจการ
   - ❑ ค้าขาย ❑ แม่บ้าน พ่อบ้าน ❑ อื่นๆ (ระบุ)_____
6. รายได้ของครัวเรือนต่อเดือน (บาท)
   - ❑ น้อยกว่า 30,000 ❑ 30,000 – 60,000 ❑ 60,001 – 90,000
   - ❑ 90,001 – 120,000 ❑ 120,001 – 150,000 ❑ มากกว่า 150,000
7. สมาชิกในครอบครัว
   - ❑ อาศัยอยู่คนเดียว (ไปที่ข้อ 10)
   - ❑ อาศัยอยู่กับครอบครัว (ระบุจำนวนสมาชิกโดยไม่นับรวมตัวเอง _____ คน) (ไปที่ข้อ 8)

8. สมาชิกในครอบครัว มีเด็กที่อายุน้อยกว่า 12 ปี

❑ ไม่มี

❑ มี (ระบุจำนวน _____คน)

9. สมาชิกในครอบครัว มีผู้สูงอายุที่อายุมากกว่า 60 ปี

❑ ไม่มี

❑ มี (ระบุจำนวน _____คน)

10. สมาชิกในครอบครัว มีคนป่วยที่ต้องการการดูแล หรือตัวท่านเองมีโรคประจำตัวที่ต้องดูแล

❑ ไม่มี

❑ มี (ระบุโรค _____)

ส่วนที่ 2 ข้อมูลเกี่ยวกับพฤติกรรมการซื้ออาหารอินทรีย์

โปรดเขียนเครื่องหมาย ✓ ลงใน ❑ หรือเติมข้อความในช่องว่างที่ให้ ให้ตรงกับความเป็นจริงของตัวท่าน

11. คุณซื้ออาหารอินทรีย์บ่อยแค่ไหน

❑ หนึ่งครั้งต่อสัปดาห์ ❑ หนึ่งครั้งต่อสองสัปดาห์ ❑ หนึ่งครั้งต่อเดือน

❑ อื่นๆ (ระบุ) _____ ❑ ไม่เคยซื้อ (ไปที่ข้อ 18)

12. คุณคิดว่าข้อความใดที่ระบุถึงความเป็นเกษตรอินทรีย์ (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ มาตรฐานปลอดภัยจากสารพิษ ผักอนามัย ผักปลอดสารพิษ เหมือนกันกับมาตรฐานเกษตรอินทรีย์

❑ พืชไฮโดรโปนิค (ปลูกผักในน้ำ) คือเกษตรอินทรีย์แบบหนึ่ง

❑ เกษตรอินทรีย์ และออร์แกนิค เป็นชนิดเดียวกัน

❑ เกษตรทฤษฎีใหม่และเกษตรพอเพียงเป็นเกษตรอินทรีย์แบบหนึ่ง

❑ เกษตรอินทรีย์ต้องไม่มีสารเคมีและมลพิษใดๆปนเปื้อน

❑ ไม่มีข้อความใดข้างต้นระบุถึงความเป็นเกษตรอินทรีย์

13. ปัจจัยใดที่มีผลต่อการบริโภคอาหารอินทรีย์ (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ดีต่อสุขภาพ ❑ ดีต่อสิ่งแวดล้อม ❑ ปลอดภัย ไม่มีสารเคมีตกค้าง

❑ กระแสนิยม ❑ บริโภคตามคนใกล้ชิด ❑ อื่นๆ (ระบุ)_____

14. คุณซื้ออาหารอินทรีย์ประเภทไหน (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ผัก ❑ ผลไม้ ❑ ไข่ ❑ ข้าว ❑ อื่นๆ (ระบุ)_____

15. ช่องทางไหนที่คุณใช้ในการซื้อหรือเข้าถึงอาหารอินทรีย์ (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ซุปเปอร์มาร์เก็ต (ระบุ _____) ❑ ร้านค้าขนาดเล็ก (ระบุ _____)

❑ ตลาดนัดสีเขียว (ระบุ _____) ❑ ออนไลน์ (ระบุ_____)

❑ สมาชิก (ระบุ _____) ❑ ร้านอาหาร (ระบุ_____)

❑ โรงแรม (ระบุ _____) ❑ อื่นๆ (ระบุ)_____

16. ปัจจัยใดที่มีผลต่อการเลือกซื้ออาหารอินทรีย์ (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ราคา ❑ รู้จักผู้ขาย/ผู้ผลิต ❑ รสชาติ

❑ ความสด ❑ สินค้ามีความหลากหลาย ❑ ความสะดวกในการซื้อ

❑ ตรารับรองมาตรฐานอินทรีย์ ❑ อื่นๆ (ระบุ)_____

17. คุณมีประสบการณ์ที่เกี่ยวข้องกับการบริโภคอาหารอินทรีย์อย่างไร โปรดระบุ

❑ ประสบการณ์ที่ดี _____

❑ ประสบการณ์ที่ไม่ดี _____

ส่วนที่ 3 ข้อมูลเกี่ยวกับปัจจัยในการเข้ามามีส่วนร่วมในกิจกรรมทางสังคม

โปรดเขียนเครื่องหมาย ✓ ลงใน ❑ หรือ ( ) หรือเติมข้อความในช่องว่างที่ให้ ให้ตรงกับความเป็นจริงของตัวท่าน

18. ระบุระดับเครือข่ายที่คุณเคยเข้าไปมีส่วนร่วมในกิจกรรมทางสังคม (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ระดับเครือข่ายผู้บริโภค ❑ ระดับเครือข่ายชุมชน ❑ ระดับเครือข่ายองค์กร

❑ อื่นๆ (ระบุ) _____ ❑ ไม่เคยเข้าร่วมกิจกรรมทางสังคม (ไปที่ข้อ 22)

19. ระบุประเภทเครือข่ายที่คุณเคยเข้าไปมีส่วนร่วมในกิจกรรมทางสังคม (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ประเภทเครือข่ายการศึกษา ❑ ประเภทเครือข่ายจิตอาสา❑ ประเภทเครือข่ายการพัฒนาชุมชม

❑ ประเภทเครือข่ายด้านผู้สูงอายุ ❑ ประเภทเครือข่ายด้านสิ่งแวดล้อม ❑ อื่นๆ (ระบุ)_____

20. ระบุประเภทช่องทางที่คุณเคยเข้าไปมีส่วนร่วมในกิจกรรมทางสังคม (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ช่องทางออนไลน์

( ) Facebook ( ) Line/WhatsApp ( ) กระดานข่าว (Bulletin boards)

( ) บอร์ดคำอภิปราย (Forums) ( ) LinkedIn ( ) เว็บไซต์ (Websites)

( ) ห้องสนทนาออนไลน์ (Chat room)( ) อื่นๆ (ระบุ) _____

❑ ช่องทางตรง เช่น ห้องสัมมนา (Workshop) หรือ ศูนย์รวมชุมชน (Community center) เป็นต้น

❑ อื่นๆ (ระบุ)_____

21. ระบุประเภทกิจกรรมที่คุณเข้าไปมีส่วนร่วม (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ การสัมมนา ❑ การระดมแลกเปลี่ยนความคิด ❑ การอบรมเสริมสร้างทักษะ

❑ การแข่งขัน ❑ อื่นๆ (ระบุ)_____

22. เหตุผลสำคัญที่ทำให้คุณเข้าไปมีส่วนร่วมในกิจกรรมดังกล่าว (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก) (ไปที่ข้อ 23)

❑ เพื่อความบันเทิง ❑ เพื่อได้รับรู้ข่าวสาร ❑ เพื่อเพิ่มพูนความรู้

❑ เพื่อการติดต่อกับเพื่อนและคนรู้จัก❑ เพื่อขอความช่วยเหลือ❑เพื่อใช้ในการตัดสินใจซื้อผลิตภัณฑ์

❑ เพื่อสร้างความเปลี่ยนแปลง ❑ เพื่อเพิ่มความเชื่อมั่นในผลิตภัณฑ์หรือแบรนด์

❑ เพื่อให้สามารถแสดงประสบการณ์หรือข้อร้องเรียนเกี่ยวกับผลิตภัณฑ์หรือแบรนด์

❑ อื่นๆ (ระบุ) _____

23. เหตุผลที่คุณไม่เข้าร่วมในกิจกรรมเหล่านั้น (สามารถเลือกได้มากกว่าหนึ่งตัวเลือก)

❑ ฉันไม่มั่นใจในกิจกรรม ❑ ฉันไม่รู้จักคนที่เข้าร่วม ❑ ฉันไม่มีเวลา

❑ ฉันไม่คิดว่ากิจกรรมจะมีประโยชน์ต่อตัวเอง ❑ ฉันไม่รู้ว่าเข้าร่วมแล้วจะได้ประโยชน์อะไร

❑ ฉันเป็นผู้บริโภคอยู่แล้ว ไม่คิดว่าจำเป็นที่ต้องเข้ามามีส่วนร่วม

❑ ฉันไม่เชื่อว่าการเข้ามามีส่วนร่วมจะสร้างให้เกิดการเปลี่ยนแปลง

❑ อื่นๆ (ระบุ)_____

ส่วนที่ 4 ข้อมูลเกี่ยวกับความคิดเห็นต่อความสามารถในการดำเนินการที่ส่งผลต่อความเชื่อมั่นในห่วงโซ่อาหารอินทรีย์ในปัจจุบัน

<u>คำอธิบาย</u> ท่านมีความคิดเห็นอย่างไรต่อความสามารถในการดำเนินการของผู้มีส่วนเกี่ยวข้องในห่วงโซ่อาหารอินทรีย์ใน ปัจจุบัน

โปรดเขียนเครื่องหมาย ✓ ลงในช่องด้านขวาที่ตรงต่อความคิดเห็นของท่านมากที่สุดเพียงข้อเดียว และโปรดตอบทุกข้อคำถาม โดยแต่ละข้อคำตอบมีความหมาย ดังนี้

เห็นด้วยมากที่สุด หมายถึง มีความคิดเห็นตรงกับข้อความนั้นอย่างมากที่สุด

เห็นด้วยอย่างยิ่ง หมายถึง มีความคิดเห็นตรงกับข้อความนั้นอย่างยิ่ง

เห็นด้วย หมายถึง มีความคิดเห็นตรงกับข้อความนั้นมาก

ไม่แน่ใจ/เฉยๆ หมายถึง มีความคิดเห็นตรงกับข้อความนั้นในระดับปกติ

ไม่เห็นด้วย หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อย

ไม่เห็นด้วยอย่างยิ่ง หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อยที่สุด

ไม่เห็นด้วยมากที่สุด หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อยมากที่สุดหรือความคิดเห็นไม่ตรงกับข้อความนั้น

ท่านมีความคิดเห็นอย่างไรกับข้อความต่อไปนี้	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)
ปัจจัยด้านการควบคุม							
24. หน่วยงานที่ออกตรารับรองมาตรฐานอินทรีย์มีคุณสมบัติเพียงพอในการรับรองอาหารอินทรีย์							
25. อาหารอินทรีย์มีการควบคุมและตรวจสอบมาตรฐานที่เข้มงวดจากหน่วยงานที่เกี่ยวข้อง							
26. การควบคุมของกลุ่มเกษตรกรด้วยกันเองมีความ เพียงพอที่จะรับรองความเป็นอาหารอินทรีย์							
ปัจจัยด้านความสามารถ และชื่อเสียง							
27. เกษตรกรมีการนำความรู้และเทคนิคใหม่มาใช้ใน การทำเกษตรอินทรีย์							
28. บุคลากรที่ทำงานส่งเสริมเกษตรอินทรีย์มีความรู้ ความเข้าใจในการทำเกษตรอินทรีย์อย่างแท้จริง							
29. เกษตรกร ผู้กระจายสินค้า และผู้ขายมีระบบการ จัดการที่ดีในการแบ่งแยกอาหารอินทรีย์จากอาหารปลอดภัยประเภทอื่นๆ							
30. โดยภาพรวม บุคลากรในห่วงโซ่อาหารอินทรีย์มีความสามารถและมีความเชี่ยวชาญในการส่งต่ออาหารที่ปลอดภัยจากสารเคมีสู่ผู้บริโภค							
ปัจจัยด้านคุณลักษณะ หรือบุคลิกภาพ							
31. เกษตรกร ผู้ขาย และบุคคลอื่นๆในห่วงโซ่อาหาร อินทรีย์มีจริยธรรม และจรรณยาบรรณที่ดีต่อผู้บริโภค							
32. เกษตรกร และผู้ขายมีความซื่อสัตย์และจริงใจต่อผู้บริโภคโดยยึดถือหลักปฏิบัติตามมาตรฐานเกษตรอินทรีย์							
ท่านมีความคิดเห็นอย่างไรกับข้อความต่อไปนี้	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)
33. บุคลากรในห่วงโซ่อาหารอินทรีย์ อาทิ เกษตรกร ผู้ขาย หน่วยงานรับรองมาตรฐานต่างๆ ยึดถือความปลอดภัย และความเป็นอยู่ที่ดีของผู้บริโภค							
ปัจจัยด้านการสื่อสาร							
34. ข้อมูลที่ได้จากฉลากหรือตรารับรองสามารถสื่อสารว่าอาหารนั้นมีคุณลักษณะตามมาตรฐานอาหารอินทรีย์							

35. การสื่อสารกับเกษตรกร ผู้ขายและบุคคลอื่นในห่วงโซ่อาหารอินทรีย์อย่างสม่ำเสมอสามารถส่งเสริมการเข้าถึงข้อมูลของอาหารอินทรีย์							
36. การสื่อสารให้ได้รับรู้ถึงแหล่งที่มาของอาหารอินทรีย์สามารถแสดงถึงความโปร่งใสของกระบวนการ							
ปัจจัยด้านปฏิสัมพันธ์แบบมีส่วนร่วมทางสังคม							
37. การได้เข้าไปมีส่วนร่วมในกิจกรรมที่เกี่ยวกับวิถีอินทรีย์สามารถส่งเสริมความสัมพันธ์ที่ดี							
38. การได้เข้าไปรู้จักเกษตรกร ผู้ขาย หรือบุคคลอื่นๆในห่วงโซ่อาหารอินทรีย์ผ่านเครือข่ายทางสังคมสามารถส่งเสริมสภาพแวดล้อมที่เป็นกันเอง							
39. การได้รู้จักกับคนที่มีความสนใจในวิถีอินทรีย์ และได้มีการแลกเปลี่ยน พูดคุย สามารถสร้างเครือข่ายความสัมพันธ์ที่ดี							

ส่วนที่ 5 ข้อมูลเกี่ยวกับความเชื่อมั่นในอาหารอินทรีย์

<u>คำอธิบาย</u> ท่านมีความคิดเห็นอย่างไรต่อความน่าไว้วางใจของอาหารอินทรีย์ในปัจจุบัน รวมไปถึงความเต็มใจในการบริโภคอาหารอินทรีย์ในสถานการณ์ต่างๆ

โปรดเขียนเครื่องหมาย ✓ ลงในช่องด้านขวาที่ตรงต่อความคิดเห็นของท่านมากที่สุดเพียงข้อเดียว และโปรดตอบทุกข้อคำถาม โดยแต่ละข้อคำตอบมีความหมาย ดังนี้

เห็นด้วยมากที่สุด หมายถึง มีความคิดเห็นตรงกับข้อความนั้นอย่างมากที่สุด

เห็นด้วยอย่างยิ่ง หมายถึง มีความคิดเห็นตรงกับข้อความนั้นอย่างยิ่ง

เห็นด้วย หมายถึง มีความคิดเห็นตรงกับข้อความนั้นมาก

ไม่แน่ใจ/เฉยๆ หมายถึง มีความคิดเห็นตรงกับข้อความนั้นในระดับปกติ

ไม่เห็นด้วย หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อย

ไม่เห็นด้วยอย่างยิ่ง หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อยที่สุด

ไม่เห็นด้วยมากที่สุด หมายถึง มีความคิดเห็นตรงกับข้อความนั้นน้อยมากที่สุดหรือความคิดเห็นไม่ตรงกับข้อความนั้น

ท่านมีความคิดเห็นอย่างไรกับข้อความต่อไปนี้	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)
40. ฉันเชื่อมั่นว่าอาหารอินทรีย์มีความปลอดภัย และปราศจากสารเคมีตกค้างตามที่กล่าวไว้							
41. ฉันเชื่อมั่นว่าอาหารอินทรีย์ได้คุณภาพตามมาตรฐานเกษตรอินทรีย์ที่กำหนด							
42. ฉันเชื่อมั่นว่าอาหารอินทรีย์ดีต่อสุขภาพ มีคุณค่าทางโภชนาการ และทำให้มีคุณภาพชีวิตที่ดีขึ้น							
43. ฉันเชื่อมั่นว่าอาหารอินทรีย์สะท้อนถึงความใส่ใจและจริงใจของเกษตรกรที่อยากให้ผู้บริโภคได้บริโภคอาหารที่มีความปลอดภัย							
44. ฉันเชื่อมั่นว่าอาหารอินทรีย์มีการควบคุมและตรวจสอบคุณภาพ							
45. ฉันเชื่อมั่นว่าอาหารอินทรีย์ผลิตขึ้นจากความซื่อสัตย์ของบุคลากรในห่วงโซ่อาหาร							
46. แม้ฉันเห็นข่าวอาหารอินทรีย์ปนเปื้อน ฉันยังคงมีความเต็มใจเลือกบริโภคอาหารอินทรีย์							
47. แม้อาจมีกรณีการเอาอาหารอื่นที่ไม่ใช่อาหารอินทรีย์มาปะปน ฉันยังคงเลือกซื้ออาหารอินทรีย์							
48. แม้การทำงานของหน่วยงานที่ออกตรารับรองอาจขาดความเข้มงวด รัดกุม ฉันยังคงเลือกซื้ออาหารอินทรีย์							
49. แม้อาหารอินทรีย์มีราคาสูงกว่าอาหารประเภทอื่นมาก ฉันยังคงเต็มใจเลือกบริโภคอาหารอินทรีย์							
50. แม้อาหารอินทรีย์ขาดความหลากหลาย หรือเป็นผลผลิตที่ฉันไม่คุ้นเคย ฉันยังคงเลือกบริโภคอาหารอินทรีย์							
51. แม้อาหารอินทรีย์จะหาซื้อยาก ฉันยังคงเต็มใจเลือกบริโภคอาหารอินทรีย์							
52. โดยภาพรวม ฉันมีความเชื่อมั่นในผลิตภัณฑ์อาหารอินทรีย์							

☺ ขอขอบคุณในความร่วมมือตอบแบบสอบถาม ☺

Appendix 3 Trust building co-creative workshop participants' profile

The participants consisted of farmers, experts, businesses, and consumers. Farmers were mainly the network from Sampran Model. Businesses and consumers were the active consumers who were actively supported the organic food principles.

Group 1

Participant	Profile
Consumer #1	Housewife, active consumers from Sookjai market
Consumer #2	Writer, active consumers from Sookjai market, home-grown produce
Expert #1	Social enterprise building network in organic food supply chain (Food for Friend)
Expert #2	Consultant for community development
Farmer #1	Farmer's leader of Bang Chang group, Sampran Model

Group 2

Participant	Profile
Consumer #3	Housewife, active consumers from Sookjai market
Consumer #4	Housewife, active consumers from Sookjai market
Business #1	Mitrphol, community development
Business #2	TOPS food retails
Expert #3	Sampran Model officer
Farmer #2	Farmer's member of Bang Chang group, Sampran Model

Group 3

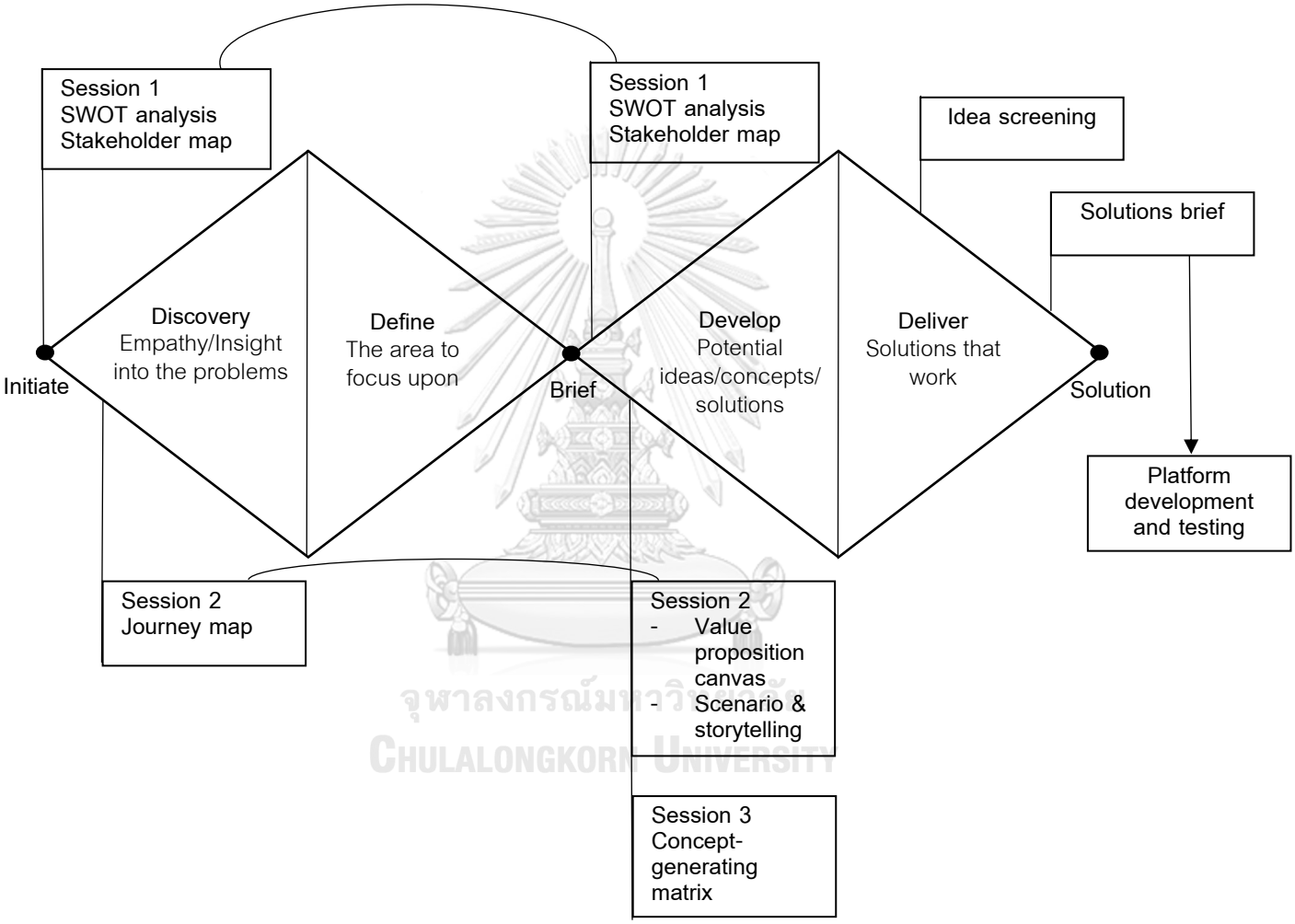
Participant	Profile
Consumer #5	Active consumers from Food for Friend
Business #3	Sukosol Hotel
Consumer #6	Active consumers and farmers from Pook Pin To Kao
Expert #4	Sampran Model officer
Farmer #3	Farmer's member of Bang Chang group, Sampran Model

Group 4

Participant	Profile
Consumer #7	Active consumers from Pook Pin To Kao
Business #4	Seefah restaurant
Expert #5	Sampran Model officer
Farmer #4	Farmer's member of Ratchaburi group, Sampran Model
Farmer #5	Farmer's member of Bang Chang group, Sampran Model

Appendix 4 Double diamond design process for trust building co-creative workshop (adapted from Design Council, 2015)

The workshop is designed according to the double diamond design process with support of co-creation tools and techniques. The tools and techniques are selected based on their contribution to five aspects of trust (5Cs).



Appendix 5 Co-creation techniques and their relationship with 5Cs aspect of trust

Different co-creation techniques are used to support the co-creation activities between farmers, consumers, and other relevant stakeholders, as well as to enhance the trust development during the activities. The techniques are selected based on their deliverable contributions. The details of how each technique lead to the five aspects of trust (i.e. 5Cs – control/rule of law, competence, characteristics, communication, and community/social interaction are summarized in the below table.

Co-creation tools and techniques	5Cs aspect of trust					Workshop	
	C1	C2	C3	C4	C5	Pros	Cons
SWOT analysis	✓	✓		✓		• Getting to know the roles and/or competence of each other • Able to spot the weakness of control system • Identify challenges and reveal opportunities • Provide direction for solutions brainstorming	• Difficulty in sharing his/her roles in detail • Not everyone is willing to share their information and/or experiences • Facilitator has a great impact in motivating participants to share information
Journey map, value proposition canvas, scenario & story telling	✓	✓	✓	✓	✓	• Understand the consumer experiences related to organic food products • Reveal relationships between their experiences and 5Cs • Able to do consumer (segment) profile based on their experiences • Sharing experiences enhances the understanding on how one perceives the personality traits/characteristics	• Difficulty in listing all consumer's activities happening in the context of organic food products

						of the others during their relationships	
Stakeholder map together with descriptive value web				✓	✓	• Capture current organic food chain conditions (control system, relationships and value flow between entities) • Promote shared understanding • Reveal relationship and interaction	• Hardly reach the agreement on the common ground of current system • Complication of current systems • Not all relevant stakeholder is included
Concept-generating matrix	✓	✓	✓	✓	✓	• Exploring concepts facilitates the communication and social interaction between different stakeholders in the value chain. • Experience related activities and trust enhanced aspects are included in the two sets of factors for structuring the idea/concept generation • Brainstorming is indirectly allowed one to perceive the competence and characteristics of the others during throwing the ideas	• Required the skills for idea generation and understanding of the two sets of factors • Challenges/difficulty for some participants • Cannot generate the ideas in some intersections of the matrix

Note: C1 refers to control/rule of law, C2 refers to competence, C3 refers to characteristics, C4 refers to communication, and C5 refers to community/social interaction.

Appendix 6 Trust building co-creative workshop Protocol

Participants – All group of relevant actors in organic food chain i.e. active consumers (i.e. green and potential green consumers), farmers (e.g. group leaders and young farmers), community representatives (both from farmers and consumers side), non-governmental organization (NGO), distributors, retailers (e.g. restaurants, hotels, and green shops), entrepreneur/SMEs, and other relevant stakeholders.

Basic screening criteria – participants require to have the ability to contribute during workshop. Participants especially consumers should have the basic understanding of organic agriculture.

Sampling – participants are selected from Sampran Model as well as their network and connection. The sample size is estimated to be around 30 persons. Each group consists 6 – 8 persons from different group of actors.

Briefing for workshop protocol:

I การคัดกรอง Active consumers – การสัมภาษณ์ผู้บริโภคโดยไม่นัดหมายล่วงหน้า

สวัสดีค่ะ เรามีคำถามสั้นๆ ถามท่านเกี่ยวกับอาหารออร์แกนิค/อินทรีย์ค่ะ ใช้เวลาประมาณ 5 นาทีค่ะ

ไม่ทราบว่าเคยได้ยินหรือรู้จักอาหารออร์แกนิค/อินทรีย์ไหมคะ ❑ เคยได้ยิน/รู้จัก ❑ ไม่เคยได้ยิน/ไม่รู้จัก

ไม่ทราบว่าเคยบริโภคอาหารออร์แกนิค/อินทรีย์ไหมคะ ❑ เคย ❑ ไม่เคย

เรามีผัก และผลไม้ให้ท่านเลือก รบกวนช่วยเลือกถุงที่ท่านคิดว่าเป็นผลิตภัณฑ์ออร์แกนิค/อินทรีย์ค่ะ

ข้อความต่อไปนี้หมายถึงอาหารออร์แกนิคหรือไม่		ใช่	ไม่ใช่	ไม่แน่ใจ
1.	เกษตรอินทรีย์และออร์แกนิคเป็นชนิดเดียวกัน			
2.	มาตรฐานปลอดภัยจากสารพิษ ผักอนามัย ผักปลอดสารพิษ เหมือนกันกับเกษตรอินทรีย์			
3.	พืชไฮโดรโปนิกส์ (ปลูกผักในน้ำ) คือ ออร์แกนิคแบบหนึ่ง			
4.	โลโก้ Q เป็นโลโก้รับรองมาตรฐานเกษตรอินทรีย์			
5.	ออร์แกนิคให้ใช้ปุ๋ยอินทรีย์ร่วมกับการใช้ปุ๋ยเคมีได้ โดยใช้ปุ๋ยเคมีเท่าที่จำเป็น			
6.	ออร์แกนิคให้ใช้ยาฆ่าแมลงที่เป็นสารเคมี แต่ต้องระวังอย่าให้ตกค้างในผลผลิตในระดับที่อาจเป็นอันตรายต่อผู้บริโภค			
7.	เกษตรอินทรีย์ต้องไม่มีสารเคมีและมลพิษใดๆปนเปื้อน			
8.	เกษตรอินทรีย์ไม่ใช่ GMOs (ถูกดัดแปลง/ตัดต่อพันธุกรรม)			
9.	ผลิตภัณฑ์แปรรูปออร์แกนิค ไม่ให้ใช้สารเคมีสังเคราะห์ในการปรุงแต่งอาหาร			

ในกรณีที่ตอบผิด – ขอบคุณที่สละเวลาตอบคำถามนะคะ

เกณฑ์การคัดกรองออก

- ถ้าตอบว่าไม่รู้จักหรือไม่เคยบริโภคอาหารออร์แกนิค/อินทรีย์
- ถ้าตอบคำถามข้อที่ 1,2,3 และ 7 ผิด

ในกรณีที่ผ่านคำถามคัดกรอง – ให้ถามคำถามต่อดังนี้

ขอบคุณที่สละเวลาตอบคำถามนะคะ เราจะมีการจัดกิจกรรม Workshop จะเน้นการสนับสนุนการสร้างปฏิสัมพันธ์ และการสร้างเครือข่ายทางสังคม (Organic community) กับเกษตรกร ผู้ประกอบการ ผู้บริโภค และบุคคลอื่นๆในห่วงโซ่อาหารอินทรีย์ค่ะ ไม่ทราบว่าท่านสะดวกมาร่วมกิจกรรมกับทางเราไหมค่ะ สำหรับท่านที่เข้าร่วมกิจกรรมกับเรา

เราขอถามรายละเอียดหน่อยนะคะ รบกวนขอชื่อ และเบอร์ติดต่อกลับด้วยค่ะ ทางเราจะมีการติดต่อไปเพื่อถามคำถามท่านและเป็นการเตรียมความพร้อมให้ท่านก่อนวันกิจกรรมนะคะ

II Intercept questions

A สำหรับถามผู้บริโภคที่จะเข้าร่วมกิจกรรม

สวัสดีค่ะ เราโทรมาจาก xxx เรื่องกิจกรรม Workshop ที่จะมีการจัดขึ้นในวันที่ xxx ค่ะ อย่าลืมวันนัดของเรานะคะ เราอยากจะสอบถามท่านสักนิด เพื่อเป็นการสร้างความเข้าใจร่วมกันและเตรียมตัวท่านก่อนวันงานจริงค่ะ จะขอรบกวนสัก 10 นาทีนะคะ เราต้องขออนุญาตบันทึกเสียงระหว่างการสัมภาษณ์เพราะเราอาจจะจดไม่ทันนะคะ

- ปกติคุณซื้ออาหารออร์แกนิคที่ไหนคะ
- อะไรคือจุดเปลี่ยนที่ทำให้หันมาสนใจอาหารออร์แกนิคคะ
- คำว่าออร์แกนิคในความคิดของคุณ หมายความว่าอะไรคะ
- ในภาพรวมคุณมีความเชื่อมั่นในผลิตภัณฑ์อาหารออร์แกนิคขนาดไหนคะ
- คุณทราบได้ยังไงคะว่าของอันไหนเป็นของออร์แกนิค หรือไม่เป็น
- ถ้าพูดถึงออร์แกนิค 3 คำที่คุณนึกถึงคือคำว่าอะไรบ้างคะ
- คุณเคยเข้าไปมีส่วนร่วมในกิจกรรมกับทาง *ตัวอย่าง* หรือกิจกรรมทางสังคมอื่นๆมาก่อนรึเปล่าคะ
- เล่าให้เราฟังหน่อยได้ไหมคะว่าคุณเข้าไปมีส่วนร่วมในกิจกรรมอะไร และทำไมคุณถึงสนใจเข้าร่วมคะ
- พอจะมีรูปภาพหรือวีดีโอที่สามารถแชร์กับเราได้ไหมคะ (รบกวนส่งให้เราทางอีเมลล์ได้ไหมคะ)
- ในวันกิจกรรมเราจะมีการแบ่งกิจกรรมเป็นสี่ส่วนใหญ่ๆค่ะ โดยทางเราอยากรบกวนให้ท่านเตรียมตัวเตรียมการบ้านมาสักนิดค่ะ
    - เราอยากให้ท่านในฐานะ xxx นึกถึงจุดอ่อน จุดแข็งของตัวท่านในฐานะ xxx
    - เราอยากให้ท่านเตรียมอุปกรณ์ หรือรูปภาพที่เกี่ยวข้องกับประสบการณ์ท่าน ต่ออาหารออร์แกนิคสักนิดค่ะ จะได้มาแชร์ แบ่งปันกันท่านอื่นๆในวันงานค่ะ
- คุณมีคำถามอะไรอยากถามพวกเราไหมคะ

ขอบคุณมากค่ะ แล้วพบกันในวันงานค่ะ

B สำหรับถามบุคคลอื่นๆในห่วงโซ่อาหารออร์แกนิคที่จะเข้าร่วมกิจกรรม

สวัสดีค่ะ เราโทรมา เรื่องกิจรรม Workshop ที่จะมีการจัดขึ้น อย่าลืมวันนัดของเรานะคะ เราอยากจะสอบถามท่านสักนิด เพื่อเป็นการสร้างความเข้าใจร่วมกันและเตรียมตัวท่านก่อนวันงานจริงค่ะ จะขอรบกวนสัก 10 นาทีนะคะ เราต้องขออนุญาตบันทึกเสียงระหว่างการสัมภาษณ์เพราะเราอาจจะจดไม่ทันนะคะ

- เล่าให้เราฟังสักนิดได้ไหมคะว่าคุณมีหน้าที่เกี่ยวข้องยังไงกับอาหารออร์แกนิค
- อะไรคือจุดเปลี่ยนที่ทำให้หันมาสนใจคะ
- คำว่าออร์แกนิคในความคิดของคุณ หมายความว่าอะไรคะ
- ถ้าพูดถึงออร์แกนิค 3 คำที่คุณนึกถึงคือคำว่าอะไรบ้างคะ
- ในภาพรวมคุณคิดว่าในฐานะที่คุณเป็นบุคคลสำคัญ คุณจะช่วยสร้างความเชื่อมั่นในผลิตภัณฑ์อาหารออร์แกนิคให้กับผู้บริโภคยังไงคะ
- คุณเคยเข้าไปมีส่วนร่วมในกิจกรรมกับทาง *ตัวอย่าง* หรือกิจกรรมทางสังคมอื่นๆมาก่อนรึเปล่าคะ
- เล่าให้เราฟังหน่อยได้ไหมคะว่าคุณเข้าไปมีส่วนร่วมในกิจกรรมอะไร และทำไมคุณถึงได้สนใจเข้าร่วมคะ
- พอจะมีรูปภาพหรือวีดีโอที่สามารถแชร์กับเราได้ไหมคะ (ถ้ามี รบกวน/สะดวกส่งให้เราทางอีเมลล์ได้ไหมคะ)
- ในวันกิจกรรมเราจะมีการแบ่งกิจกรรมเป็นสี่ส่วนใหญ่ๆค่ะ โดยทางเราอยากรบกวนให้คุณเตรียมตัวทำการบ้านมาสักนิดค่ะ
    - เราอยากให้คุณนึกถึงจุดอ่อน จุดแข็งของ ในภาพกว้างๆค่ะ
    - เราอยากให้คุณเตรียมอุปกรณ์ หรือรูปภาพที่เกี่ยวข้องกับประสบการณ์ที่คุณมีต่ออาหารออร์แกนิคสักนิดค่ะ จะได้มาแชร์ แบ่งปันกับผู้เข้าร่วมท่านอื่นๆในวันงานค่ะ
- คุณมีคำถามอะไรอยากถามพวกเราไหมคะ

ขอบคุณมากค่ะ แล้วพบกันในวันงานค่ะ

III รายละเอียดของ Workshop

สถานที่ สถาบันบัณฑิตบริหารธุรกิจศศินทร์

วันที่ กุมภาพันธ์ 2561

เวลา	กิจกรรม	รายละเอียด
8.00 – 8.30	เตรียมงาน และสรุปรายละเอียดของกิจกรรม	• จัด Flip chart และอุปกรณ์การเขียนให้ทุกกลุ่ม (ปากกาสี, Post-it, A4)
8.30 – 8.55	ลงทะเบียน	• เซ็นต์ชื่อ กรอกรายละเอียดให้ครบ • แจ้งชื่อกลุ่ม นั่งตามกลุ่ม
9.00 – 9.02	ขอขอบคุณทุกท่านที่สละเวลามาร่วมกิจกรรมด้วยกันในวันนี้ค่ะ ก่อนที่จะถึงงานวันนี้ ได้มีการติดต่อ พูดคุยกับหลายๆท่าน ทำให้รับรู้ได้ถึงพลัง และความตั้งใจที่จะขับเคลื่อนวงการอาหารอินทรีย์ของทุกท่านค่ะ ทุกๆเสียงทุกๆความคิดเห็นของทุกท่านในวันนี้จะนำไปประกอบการออกแบบเครื่องมือสร้างการมีส่วนร่วมของผู้บริโภคในการเรียนรู้ติดตามการผลิตอาหารอินทรีย์ ทั้งนี้เพื่อสร้างความเชื่อมั่นให้กับผู้บริโภค ซึ่งในที่นี้ทุกๆท่านก็คือผู้บริโภคที่อยู่ในห่วงโซ่อาหารอินทรีย์ ทุกๆความคิดเห็นของท่านในวันนี้จึงมีความสำคัญมากต่อการสร้างความยั่งยืนให้เกิดขึ้นในห่วงโซ่อาหารอินทรีย์ค่ะ	
9.00 – 9.20	กิจกรรม 1 กิจกรรม Check-in	• แนะนำตัวเองและสิ่งที่คุณทำอยู่ในปัจจุบันภายในกลุ่ม (5 นาที ต่อกลุ่ม) • ตั้งชื่อกลุ่ม (3 นาที) • ตัวแทนของแต่ละกลุ่มยืนขึ้นมาพรีเซ้นต์ (2 นาที ต่อกลุ่ม)
9.20 – 9.30	กำหนดการ เป้าหมาย และกติกาการอยู่ร่วมกัน	• แจกแจงรายละเอียดกิจกรรม และลักษณะการดำเนินกิจกรรม • แจกแจงเป้าหมายของกิจกรรม 3 ข้อ • บอกถึงกติการการอยู่ร่วมกัน & แนะนำทีมพี่เลี้ยง
KNOW CONTEXT & FRAME INSIGHTS		
9.30 – 10.10	กิจกรรม 2 กิจกรรมเรียนรู้ เข้าใจ และเชื่อมโยง (CVCA & SWOT) (35 นาที) **อธิบายพร้อมยกตัวอย่างแผนผังเวลาอธิบาย**	• อธิบายรายละเอียดและแสดงตัวอย่าง (5 นาที) • ช่วงประดิดประต่อ (15 นาที) ○ เขียนผู้มีส่วนเกี่ยวข้องลงใน **Post-it สีเขียว** ○ ใช้ปากกาลากเส้นเชื่อมโยงความสัมพันธ์ ○ วิเคราะห์แต่ละเส้นความสัมพันธ์ที่ได้โยงไว้ ว่ามีความสัมพันธ์/การปฏิสัมพันธ์เป็นอย่างไร (อาจเป็นกิจกรรมที่เกิดขึ้นระหว่างความสัมพันธ์ อาจจะเป็นที่จับต้องได้และจับต้องไม่ได้ เช่น เงิน หรือข้อมูล) และ**เขียนรายละเอียดสั้นๆลงบนเส้น**ที่ลากไว้

		• ช่วงเปิดใจ (15 นาที) ○ สมาชิคในกลุ่มแต่ละท่านเขียนถึงจุดแข็งและจุดอ่อนของแต่ละบุคคลในแผนผัง (ผู้มีส่วนได้ส่วนเสีย) ลงใน **Post-it สีเหลือง** (เขียน5 นาที) ○ พูดคุย และประกอบลงในแผนผังความสัมพันธ์ (10 นาที)
10.10 – 11.00	<u>กิจกรรม 2</u> กิจกรรมเรียนรู้ เข้าใจ และเชื่อมโยง (CVCA & SWOT) (ต่อ) (40 นาที)	• ช่วงตีให้แตก (10 นาที) เขียนบทวิเคราะห์ใน Flip chart ○ วิเคราะห์ใครคือ**ผู้เล่นคนสำคัญ** ○ วิเคราะห์**อะไรคือคุณค่าที่เกิดขึ้น**ในแต่ละความสัมพันธ์ (Insights) à **Post-it สีชมพู** ○ วิเคราะห์ถึง**ความสมดุลของการกิจกรรม**ที่เกิดขึ้นในแต่ละความสัมพันธ์ (Balance of value flow) ว่ามีหรือไม่ หรือมี**จุดที่ขาดความสมดุล** เช่น A เสียเงินไป แต่ A ไม่ได้กลับมาคุ้มค่ากับที่ลงทุนไป • ช่วงเติมเต็มให้สมบูรณ์ (15 นาที) ○ วิเคราะห์ถึงความเป็นไปได้ในการทำให้เกิดสมดุล เช่น เพิ่มหรือลดผู้เล่น หรือการเชื่อมโยงความสัมพันธ์เส้นใหม่ รวมไปถึงสถานการณ์ภายนอกที่จะเป็นโอกาสในการส่งเสริมความสมดุล (ให้ใช้ Post-it สีที่ต่างจากแผนผังเดิม) ○ **คุณค่า**ในที่นี้อาจรวมถึง (someone's benefit, gain, joy, satisfaction, pain relief, help, excitement, peace of mind,…) ○ มองภาพรวมถึง Insights ที่เกิดขึ้น เช่นเรื่องที่น่าสนใจ คุณค่า ที่เห็นที่อยู่เบื้องหลัง โดยเฉพาะเรื่องที่เกี่ยวกับความเชื่อมั่นในแผนผังของท่าน และเขียนลง **Post-it สีชมพู** • พรีเซ้นต์ (12 นาที) ○ ตัวแทนกลุ่มนำเสนอแผนผังของกลุ่มที่ได้รวมถึงบทวิเคราะห์ (3 นาที ต่อกลุ่ม)
11.00 – 11.10	พัก	
11.10 – 12.30	<u>กิจกรรม 3</u> กิจกรรมเส้นทางสู่อาหารอินทรีย์ (Experience map & Story telling) (70 นาที) **แสดง Template** **อธิบายพร้อมยกตัวอย่างเส้นทางเวลาอธิบาย**	• อธิบายรายละเอียดและแสดงตัวอย่าง (5 นาที) • ช่วงเล่าเรื่อง (15 นาที) ○ 7 นาที - ผู้บริโภคเล่าเรื่องประสบการณ์ของตัวเองที่เกี่ยวข้องกับอาหารออร์แกนิค เช่นประสบการณ์เข้าร่วมกิจกรรมต่างๆ ประสบการณ์การซื้อ ประสบการณ์การบริโภค ○ 8 นาที - สมาชิคในกลุ่มเขียนรายละเอียดลงใน Flip chart ตาม Template ระหว่างที่ผู้บริโภคเล่าเรื่อง (ช่อง 1,2) • ช่วงวิเคราะห์ (15 นาที) ○ ช่วยกันวิเคราะห์ความพึงพอใจและประสบการณ์ในแต่ละช่วงของกิจกรรม และเขียนลงในข้อ 3 – 4 ○ ใช้คำถามประเภททำไม (Why) และอย่างไร (How) ในการวิเคราะห์ถึงประสบการณ์ที่เกิดขึ้น

		• ช่วงสร้างสรรค์ (15 นาที) ○ 10 นาที - ให้ช่วยกันสร้างสรรค์ไอเดีย โดยให้เขียนลงใน Post-it และพูดให้คนอื่นๆฟัง และอาจจะทำการสร้างสรรค์ไอเดียต่อ และแปะลงในช่องที่ 5 ○ มองภาพรวมถึง Insights ที่เกิดขึ้น เช่นเรื่องที่น่าสนใจ คุณค่า ที่เห็นที่อยู่เบื้องหลัง โดยเฉพาะเรื่องที่เกี่ยวกับความเชื่อมั่นในแผนผังของท่าน และเขียนลง Post-it สีชมพู • พรีเซ้นต์ (20 นาที) ให้เวลา 5 นาทีต่อกลุ่ม • อธิบายถึงหลักการโหวต 5 นาที ○ โดยทุกท่านจะมีคนละ 15 คะแนน (5 สติกเกอร์ ต่อหลักการ) ○ **สีเขียว ผู้บริโภค สีดำ ผู้ประกอบการ สีฟ้า เกษตรกร** ○ ให้ทำการพิจารณาจาก 3 หลักการ ▪ คุณค่าสำหรับผู้บริโภค (Value to consumers) ▪ คุณค่าสำหรับห่วงโซ่อาหารอินทรีย์ (Value to business) ▪ ความพร้อม และความเป็นไปได้ในการทำ (Readiness)
12.30 – 13.30	พักกลางวัน	• ให้ทำการโหวตไอเดียที่ถูกใจ
EXPLORE CONCEPTS		
13.30 – 13.35	สรุป กิจกกรรมช่วงเช้า (Direction and Strategy for afternoon sessions)	• เพื่อให้เกิดความเข้าใจร่วมกันถึงเส้นทางและแนวทางที่จะใช้ในกระบวนการสังเคราะห์ และต่อยอดกระบวนการคิด
13.35 – 15.00	<u>กิจกรรม 4</u> กิจกรรมช่วยกันคิด ช่วยกันสร้างสรรค์ (Ideation game) (70 นาที) **แสดงตาราง**	• อธิบายรายละเอียดและแสดงตัวอย่าง (5 นาที) **<u>บริบท</u>** หลักการการมีส่วนร่วม และความโปร่งใส นำไปสู่ความเชื่อมั่นบนพื้นฐานองค์ความรู้ของวิถีอินทรีย์ (Life to Life) **ส่วนที่ 1 (70 นาที)** • ช่วงทบทวนและสรุป Insight (20 นาที) ○ กลับไปทบทวนดู **Post-it สีชมพู** ในกิจกรรมที่ผ่านมา และดูว่าจะเห็น Insights อะไรเพิ่มเติมไหม (8 นาที) ○ ทำการจัดหมวดหมู่ Insights ที่มีลักษณะใกล้กัน และตั้งชื่อให้แต่ละกลุ่มใน Flip chart (5 นาที) ○ เลือก Insights ที่คิดว่าน่าสนใจมา 2 กลุ่ม (4 นาที) ○ เขียน Template พร้อมทั้งแปะ Insights ที่เลือกมาตามลำดับ (3 นาที) <u>รอบที่ 1</u> • ช่วงป้อนข้อมูล (5 นาที) – การมีส่วนร่วม (หลักการ PGS)

		• ช่วงระดมไอเดีย (20 นาที) ○ **Post-it สีเขียว** สำหรับเกษตรกร **Post-it สีเหลือง** สำหรับผู้ประกอบการ **Post-it ส้ม** สำหรับผู้บริโภค ○ 5 นาที ในการคิดไอเดียให้ออกมาได้มากที่สุด (เขียนหนึ่งไอเดียต่อหนึ่ง Post-it) ○ ส่ง Post-it ไป**ทางขวา** ○ 5 นาที ในการต่อยอดไอเดีย และเขียนลง Post-it ที่ได้มาด้วยปากกาคนละสี ○ 10 นาที แชร์ไอเดียในมือท่านกับกลุ่ม และแปะลงในช่องนั้นๆใน Flip chart <u>รอบที่ 2</u> • ช่วงป้อนข้อมูล (5 นาที) – ความโปร่งใส (หลักการ Blockchain) • ช่วงระดมไอเดีย (20 นาที) ○ 5 นาที ในการคิดไอเดียให้ออกมาได้มากที่สุด (เขียนหนึ่งไอเดียต่อหนึ่ง Post-it) ○ ส่ง Post-it ไป**ทางซ้าย** ○ 5 นาที ในการต่อยอดไอเดีย และเขียนลง Post-it ที่ได้มาด้วยปากกาคนละสี ○ 10 นาที แชร์ไอเดียในมือท่านกับกลุ่ม และแปะลงในช่องนั้นๆใน Flip chart
15.00 – 16.10	<u>กิจกรรม 4</u> กิจกรรมช่วยกันคิด ช่วยกันสร้างสรรค์ (Ideation game) (ต่อ) (65 นาที) **แสดง Template**	**ส่วนที่ 2 (65 นาที)** • ช่วงเขียนคอนเซ็ปต์ (20 นาที) ○ ให้เลือกไอเดีย หรือทำการผสมผสานไอเดียในช่วงแรก ออกมาเป็นคอนเซ็ปต์ ต่อหนึ่งหลักการ (ทั้งหมด 2 คอนเซ็ปต์) ○ เขียนรายละเอียดลงใน Flip chart (ชื่อไอเดีย วาดรูป/ร่าง รายละเอียด) • ช่วงขายคอนเซ็ปต์ (45 นาที) ○ 5 นาที ต่อกลุ่ม (2.5นาที/concept) ○ 2 นาที ให้ทั้งห้องทำตัวเป็น Coach ในการพูดถึงจุดที่ชื่นชอบ (I Like…) (1นาที/concept) ○ 2 นาที ให้ทั้งห้อง พูดถึงจุดที่สามารถเติมเต็มให้ดีขึ้น (I Wish…, What if….) (1นาที/concept)
16.10 – 16.30	<u>กิจกรรม 5</u> กิจกรรม Check-out	คนละ 1 นาที • ท่านได้อะไรจากกระบวนการร่วมออกแบบการสร้างความเชื่อมั่นในวันนี้ • ท่านจะนำอะไรติดตัวไปหรือจะเริ่มทำอะไรในวันพรุ่งนี้ ที่จะสามารถช่วยกันสร้างให้เกิดความเชื่อมั่นในอาหารออร์แกนิคค่ะ
16.30 – 16.35	ขอขอบคุณทุกท่านมากๆค่ะ ที่สละเวลามาทำกิจกรรมร่วมกันในวันนี้ เราจะอัพเดทท่านถึงการดำเนินการของเราให้ท่านทราบเป็นระยะๆค่ะ และเราหวังว่าพวกเราทุกคนจะเป็นส่วนหนึ่งที่สามารถสร้างความยั่งยืนให้กับห่วงโซ่อาหารอินทรีย์ในประเทศไทยค่ะ	

1. เปิด

ขอบคุณมากนะคะที่มาร่วมกิจกรรมกับเราในวันนี้ โดยกิจกรรมในวันนี้มีแนวทางเพื่อให้ทุกท่านที่อยู่ในห่วงโซ่อาหารออร์แกนิคได้มาพบปะ แลกเปลี่ยน และทำกิจกรรมร่วมกันค่ะ

ก่อนอื่นขอเริ่มจากการแนะนำทีมงานที่จะคอยช่วยเหลือและอำนวยความสะดวกทุกท่านตลอดกิจกรรมนะคะ เอาละค่ะ เราจะขอเริ่มจากกิจกรรมแรกนะคะ

2. กิจกรรม Check-in & เข้ากลุ่ม

ขอให้ทุกท่านแนะนำตัวเองและสิ่งที่คุณทำอยู่ในปัจจุบันค่ะ สั้นๆค่ะ คนละไม่เกิน 1 นาที

เราจะทำการแบ่งกลุ่มออกเป็น 4 กลุ่ม โดยแต่ละกลุ่มจะมีการคละกันของคนจากแต่ละภาคส่วนค่ะ

ขอให้ทุกท่านแยกย้ายเข้ากลุ่มนะคะ และเราอยากให้แต่ละกลุ่มตั้งชื่อกลุ่มของตัวเองให้มีความเกี่ยวข้องกับห่วงโซ่อาหารอินทรีย์ และเขียนลงใน Flip chart ค่ะ

3. กิจกรรมแรก เราขอเรียกว่ากิจกรรมเรียนรู้ เข้าใจ และเชื่อมโยง (Stakeholder map and SWOT analysis)

ในกิจกรรมนี้เราขอให้ทุกท่านใช้อุปกรณ์ที่อยู่ในกลุ่มของท่านเขียนแผนผังของผู้มีส่วนร่วมที่แสดงถึงภาพรวมของความสัมพันธ์ของผู้มีส่วนร่วม (อาจเป็นรายบุคคล รายกลุ่ม เครื่อข่าย หรือองค์กร เป็นต้น) ในห่วงโซ่อาหารอินทรีย์ รวมถึงผู้ได้รับผลประโยชน์ ผู้ที่ได้รับผลกระทบ หรือผู้มีอิทธิพลในการตัดสินใจ

<u>Part 1</u>

- เริ่มต้นเราขอให้แต่ละกลุ่มเริ่มจากการช่วยกันคิด และรวบรวมรายชื่อผู้มีส่วนร่วมหรือเกี่ยวข้องในห่วงโซ่อาหารอินทรีย์ และเขียนแผนผังโดยใช้ปากกาสีแดงลากเส้นเชื่อมโยงความสัมพันธ์ของผู้มีส่วนร่วมวิเคราะห์ว่ากลุ่มเหล่านี้มีความสัมพันธ์กันอย่างไร และกลุ่มเหล่านี้ปฏิสัมพันธ์กันเช่นใด โดยให้เวลาในช่วงนี้ 30 นาที
- หลังจากนั้นให้แต่ละท่านพูดถึงบทบาทของตัวเองที่เกี่ยวข้องกับห่วงโซ่อาหารอินทรีย์ รวมไปถึงให้ท่านพูดถึงจุดแข็งและจุดอ่อนในฐานะตัวแทนของกลุ่มของท่าน เช่นในฐานะของผู้บริโภค หรือในฐานะเกษตรกรเป็นต้น โดยให้เวลาคนละ 10 นาที

<u>Part 2</u>

- หลังจากนั้นให้แต่ละกลุ่มช่วยกันประกอบจุดแข็ง หรือคุณค่าของบุคคลแต่ละภาคส่วนของห่วงโซ่อาหารอินทรีย์ลงในแผนผังความสัมพันธ์ (ให้วิเคราะห์ถึงคุณค่าที่เกิดขึ้นในแต่ละความสัมพันธ์) รวมไปถึงจะเปลี่ยนจุดอ่อนให้เป็นจุดแข็งและช่วยเพิ่ม/กระตุ้นคุณค่าในความสัมพันธ์ได้อย่างไร โดยเขียนรายละเอียดสั้นๆลงใน Post-it และแปะลงบนแผนผังในแต่ละความสัมพันธ์ให้เหมาะสม โดยให้เวลาในช่วงนี้ 30 นาที
- หลังจากนั้นเราขอให้ตัวแทนกลุ่มนำเสนอแผนผังของกลุ่มที่ได้รวมถึงบทวิเคราะห์ ภายในเวลา 10 นาที
- หลังจากนั้นเราจะให้ทุกกลุ่มช่วยกันวิเคราะห์ถึงสถานการณ์ภายนอกที่จะเป็นโอกาส หรือเป็นอุปสรรคต่อความสัมพันธ์ที่เกิดขึ้น รวมไปถึงควรมีการเพิ่มหรือลดผู้มีส่วนร่วม หรือควรมีการเพิ่มความเชื่อมโยงของคุณค่าระหว่างผู้มีส่วนร่วมอย่างไรบ้าง โดยให้เวลาในช่วงนี้กลุ่มละ 10 นาทีในการวิเคราะห์แผนผังของแต่ละกลุ่มที่ขึ้นมานำเสนอ โดยให้เขียนสรุปลงในตาราง

	ทางบวก	ทางลบ
สถานการณ์ภายใน	จุดแข็ง (Strengths)	จุดอ่อน (Weaknesses)
สถานการณ์ภายนอก	โอกาส (Opportunities)	อุปสรรค (Threats)

จุดแข็ง หมายถึง ความสามารถและสถานการณ์ภายในห่วงโซ่อาหารอินทรีย์ หรือองค์กรของท่านที่เป็นบวก ซึ่งสามารถนำมาใช้เป็นประโยชน์ในการทำงานเพื่อบรรลุวัตถุประสงค์ในการสร้างความเชื่อมั่นได้ดี

จุดอ่อน หมายถึง สถานการณ์ภายในห่วงโซ่อาหารอินทรีย์ หรือองค์กรของท่านที่เป็นลบและด้อยความสามารถซึ่งไม่สามารถนำมาใช้เป็นประโยชน์ในการทำงานเพื่อบรรลุวัตถุประสงค์ในการสร้างความเชื่อมั่นได้ดี

โอกาส หมายถึง ปัจจัยและสถานการณ์ภายนอกที่เอื้ออำนวยให้การทำงานของบุคลากรในห่วงโซ่อาหารอินทรีย์ให้บรรลุวัตถุประสงค์ หรือหมายถึง สภาพแวดล้อมภายนอกที่เป็นประโยชน์ต่อการสร้างความเชื่อมั่นได้ดี

อุปสรรค หมายถึง ปัจจัยและสถานการณ์ภายนอกที่ขัดขวางการทำงานของบุคลากรในห่วงโซ่อาหารอินทรีย์ไม่ให้บรรลุวัตถุประสงค์ หรือหมายถึงสภาพแวดล้อมภายนอกที่เป็นปัญหาต่อห่วงโซ่อาหารอินทรีย์ในการสร้างความเชื่อมั่น

4. กิจกรรมที่สอง เราขอเรียกว่ากิจกรรมเส้นทางสู่อาหารออร์แกนิค (Consumers journey map, value proposition canvas, scenario & storytelling)

Show VDO or other materials provided by consumers and give examples in table format (real cases from intercept interview)

ตัวอย่าง: Process of purchasing

		หาข้อมูล	หาทางซื้อ	ตัดสินใจ	สั่งซื้อ	ได้รับ
A. กิจกรรมที่เกิดขึ้น (Tasks)		คุยกับเพื่อน	เช็คแหล่งขาย	อ่านรีวิว	ออนไลน์	จัดเก็บและบริโภค
B. จุดที่เกิดปฏิสัมพันธ์ (Points of interaction – Touchpoints)		โทรศัพท์	อินเตอร์เนต	อินเตอร์เนต	Line	ทำอาหาร
C. คนที่ติดต่อโดยตรง (Onstage contact person – Line of visibility)		เพื่อน				Lineman
D. คนที่ติดต่อทางอ้อม (Offstage contact person – Line of internal interaction)			เจ้าของ webpage	เจ้าของ webpage	เจ้าของ Page สั่งซื้อจากเกษตรกร	
E. ความพึงพอใจ/ความรู้สึก (Emotions)	+2					
	+1					
	0					
	-1					
	-2					
F. โอกาสที่จะนำไปสู่การพัฒนา (Who, How, etc.)						

ในกิจกรรมนี้เราขอให้ผู้บริโภคที่อยู่ในแต่ละกลุ่มเล่าเรื่องประสบการณ์ของตัวเองภายใน 15 นาที จะเป็นอะไรก็ได้ค่ะ แต่ขอให้เกี่ยวข้องกับออร์แกนิค เช่นประสบการณ์เข้าร่วมกิจกรรม ประสบการณ์การซื้อ ประสบการณ์การบริโภค เป็นต้น โดยขอให้ท่านเริ่มต้นเล่ากิจกรรมที่เกิดขึ้น และให้สมาชิคในกลุ่มเขียนรายละเอียดลงในตาราง เช่น ตัวอย่าง หลังจากเล่าจบแล้วขอให้สมาชิคในกลุ่มรวมถึงผู้ที่เล่าประสบการณ์ช่วยกันร้อยเรียงเรื่องราวที่ได้ยินและเขียนลงในตารางที่อยู่หน้าท่าน โดยให้เวลา 20 นาที ให้ท่านใส่ข้อมูลกิจกรรมที่เกิดขึ้นและความรู้สึกด้านความพึงพอใจ หรือจุดที่ผู้เล่ามีปัญหาหรือไม่พอใจ ในแต่ละช่วงของประสบการณ์ในแต่ละช่วงค่ะ (A – E) ถ้าท่านมีคำถาม ขอให้เรียกเจ้าหน้าที่เราได้ตลอดค่ะ

หลังจากได้มีการร้อยเรียงประสบการณ์ลงในแผนผังประสบการณ์ ขอให้สมาชิคในกลุ่มช่วยกันคิดไอเดียในการที่จะสร้างโอกาสในการพัฒนาความรู้สึกที่เป็นบวกให้ดียิ่งขึ้น และพัฒนาความรู้สึกที่เป็นลบที่เกิดขึ้นจากประสบการณ์ดังกล่าวให้กลับมาในทางบวกมากขึ้น (F) โดยมีเวลาให้ระดมความคิดในช่วงนี้ 20 นาที จากนั้นจะขอให้แต่ละกลุ่มนำเสนอ โดยเริ่มจากเล่าแผนผังประสบการณ์ ต่อด้วยไอเดียที่คิด ภายในเวลา 10 นาที หลังจากนั้นเราจะมีเวทีวิจารณ์โดยมีเวลาให้ประมาณ 10นาที และเราจะให้ผู้บริโภคในแต่ละกลุ่มมาร่วมตัดสินว่าไอเดียไหนโดนใจมากที่สุด

ขอให้ทุกท่านกลับเข้ามานั่งเป็นวงกลมเหมือนเดิมนะค่ะ

5. กิจกรรมสุดท้าย เราขอเรียกว่ากิจกรรมช่วยกันคิด ช่วยกันสร้างสรรค์ (Concept-generating matrix)

กิจกรรมนี้เราต้องการให้ทุกท่านมีส่วนร่วมและเป็นส่วนหนึ่งในการพัฒนานวัตกรรมกระบวนการสร้างความเชื่อมั่น โดยเราจะให้โจทย์ทุกท่าน ในการช่วยกันระดมความคิดหรือไอเดียที่ท่านคิดว่าเหมาะสมกับโจทย์นั้นๆ ไม่ต้องเครียดหรือคิดมากนะค่ะ ทุกความคิดมีความหมายค่ะ ไม่มีผิดไม่มีถูกค่ะ

(ยกตัวอย่างที่น่าสนใจ เช่นกิจกรรมการปฏิสัมพันธ์ ที่ส่งเสริมเรื่องการรับรู้ถึงความสามารถ โดยหารูปภาพหรือวีดีโอมาใส่ในแต่ละคอนเซ็ปต์)

<u>คำอธิบาย</u>

เราจะมีกระดาษ Post-it แจกทุกท่านนะค่ะ เราจะให้โจทย์ท่านและทุกท่านเขียนคำตอบลงในกระดาษ มีเวลา 8 นาทีต่อหนึ่งโจทย์ค่ะ หนึ่งไอเดียต่อหนึ่งกระดาษ เขียนกี่ไอเดียก็ได้นะค่ะ เขียนสั้นๆกระชับๆ อย่างที่บอกค่ะไม่มีผิดไม่มีถูก ขอแค่ให้เป็นสิ่งที่ออกมาจากความคิดของท่านค่ะ โดยที่เราจะให้ท่านลุกขึ้นมาแปะคำตอบทีละท่าน ขอเริ่มจากวนจากทางขาวไปซ้ายค่ะ ขอให้ท่านนำมาแปะไว้ที่บอร์ดข้างหน้าตามช่องที่กำหนดและอ่านคำตอบให้ทุกคนได้ยินด้วยนะค่ะ คำตอบอาจจะมีการซ้ำกันก็ไม่เป็นไรนะค่ะ เคล็ดลับค่ะทุกท่านสามารถคิดไอเดียต่อยอดจากที่ได้ยินจากท่านอื่นๆได้ค่ะ

เอาล่ะค่ะ

คอนเซ็ปต์ 1 – การสื่อสารเพื่อให้เกิดหรือรับรู้ถึงมาตรฐานเกษตรอินทรีย์ หรือการควบคุมดูแลของหน่วยงานที่ออกตรารับรองหรือบุคคลที่เกี่ยวข้องกับการควบคุมดูแลมาตรฐาน

คอนเซ็ปต์ 2 – การสื่อสารเพื่อให้เกิดหรือรับรู้ถึงความสามารถและการมีชื่อเสียงของบุคคลที่อยู่ในห่วงโซ่อาหารอินทรีย์ เช่นเกษตรกร หรือสถานที่ ที่มีการซื้อขายอาหารอินทรีย์ เป็นต้น

คอนเซ็ปต์ 3 – การสื่อสารเพื่อให้เกิดหรือรับรู้ถึงบุคลิกของคนในห่วงโซ่อาหารอินทรีย์ เช่นเกษตรกร ผู้บริโภค หน่วยงานต่างๆ เป็นต้น

คอนเซ็ปต์ 4 – การปฏิสัมพันธ์เพื่อให้เกิดหรือรับรู้ถึงมาตรฐานเกษตรอินทรีย์ หรือการควบคุมดูแลของหน่วยงานที่ออกตรารับรองหรือบุคคลที่เกี่ยวข้องกับการควบคุมดูแลมาตรฐาน

คอนเซ็ปต์ 5 – การปฏิสัมพันธ์เพื่อให้เกิดหรือรับรู้ถึงความสามารถและการมีชื่อเสียงของบุคคลที่อยู่ในห่วงโซ่อาหารอินทรีย์ เช่นเกษตรกร หรือสถานที่ ที่มีการซื้อขายอาหารอินทรีย์ เป็นต้น

คอนเซ็ปต์ 6 – การปฏิสัมพันธ์เพื่อให้เกิดหรือรับรู้ถึงบุคลิกของคนในห่วงโซ่อาหารอินทรีย์ เช่นเกษตรกร ผู้บริโภค หน่วยงานต่างๆ เป็นต้น

	การควบคุม (Control/Rule of law)	ความสามารถและการมีชื่อเสียงที่ดี (Competence& Reputation)	บุคลิก(Characteristic/Personal traits)
การสื่อสาร (Communication)			
การมีปฏิสัมพันธ์ (Community/Social interaction)	เข้าไปมีส่วนร่วมในการตรวจสถานที่กับทางร้านค้าออนไลน์	เข้าไปมีส่วนร่วมใน Farm visit กับทางโรงแรม	

กิจกรรมปิด

ขอขอบคุณทุกท่านมากๆนะค่ะ ที่สละเวลามาทำกิจกรรมร่วมกันในวันนี้ ก่อนที่ทุกท่านจะแยกย้ายกลับเราขอทำกิจกรรมสุดท้ายค่ะ

กิจกรรม Check-out ค่ะ

ขอให้ท่านพูดสั้นๆคนละ 1 นาที ว่าท่านได้อะไรจากกิจกรรมในวันนี้ และท่านจะนำอะไรติดตัวไปค่ะ

อีกครั้งค่ะ ขอบคุณทุกท่านมากๆค่ะ เราจะอัพเดททท่านถึงการดำเนินการของเราเป็นระยะๆค่ะ

Appendix 7 Thai Organic Platform (TOP)

The research project “New business model developed on a digital platform to foster trust and expand market channels for organic food” has been initiated to further the Sampran Model, Inclusive Business Model, via the use of Thai Organic Platform, a software development supported by the National Innovation Agency (NIA). The project is intended to engage wider learning leading to adoption of the new business practices amongst key stakeholders, i.e. farmers, businesses, and consumers, that can help foster trust as well as expand market channels while advancing the new business model throughout the organic value chain. The conduct of action research over one year has led to the new development of management systems which includes the stakeholder analysis, the organic farming, the E-Commerce, the customer engagement (both business and consumer), and the verification system. Research results also yield the advancement of new business model, inclusive business model, which consists of the identification of collective impact, the organizing of partnership network, and the strategy of collaborating shared value to build trust from the stakeholder participation and data transparency, to expand market channels by enhancing the local economy, and to uplift the stakeholders to become collective leaders.

Outcome of the research project contributes to advancement of theories in management systems and new business model towards sustainability. Moreover, the new knowledge has benefited the expansion of organic food and agriculture sector in Thailand by creating groups of farmers who can utilize the digital platform in managing their farming processes. Additionally, data recorded by the farmers with support of the blockchain technology can demonstrate the traceability and assure better trust in their organic products. The Thai Organic Platform’s E-commerce, both Business to Business (B2B) and Business to Consumer (B2C), has created new market channels for farmers to sell directly to businesses and consumers, increasing their income opportunities, stimulating the local economy, and empowering farmers to become small and medium agriculture enterprises (SMAEs). Furthermore, the customer engagement system has involved businesses and consumers to learn and participate in activities and movements to support driving of the organic society in which all can attain a balanced life in good health, economy, society, and environment.

Appendix 8 Focus group participants' profile

There were 5 participants who attended the focus group session at Patom cafè. In addition, the session included 2 observers and also the platform developers. The two observers included professor from Sasin School of Management and TOCA's team member. The participants' profiles were included as the following;

Participant	Profile
Business #1	Procurement from Sukosol Hotel
Business #2	Sustainable marketeer from Sukosol Hotel
Business #3	Catering service at Sampran Riverside Hotel
Business #4	Manager at Patom cafè
Consumer #1	SCB's lawyer who is a regular customer from Sampran Model. He has an interest in organic food principles and an intention to support farmer.

Appendix 9 Trust Development Model Survey

การศึกษาความเชื่อมั่นของผู้บริโภคในห่วงโซ่อาหารอินทรีย์ (ออร์แกนิค)

คำชี้แจง

Thai Organic Platform เป็นเวทีที่จัดขึ้นภายใต้การบริหารของสมาคมผู้บริโภคอินทรีย์ โดยมีเป้าหมายที่จะเชื่อมโยงเกษตรกร ผู้ประกอบการ และผู้บริโภค บนความโปร่งใสของข้อมูลที่สามารถตรวจสอบย้อนกลับได้ผ่านเทคโนโลยีบล็อกเชน

แบบสอบถามเพื่อสำรวจความคิดเห็นหลังจากทดลองใช้ระบบ Thai Organic Platform แบ่งออกเป็น 4 ส่วน ได้แก่

ส่วนที่ 1 วีดีโอสั้นแนะนำเทคโนโลยีบล็อกเชน

ส่วนที่ 2 แบบสอบถามการสื่อสารผ่านเทคโนโลยีบล็อกเชน

ส่วนที่ 3 แบบสอบถามความเชื่อมั่นในสินค้าเกษตรอินทรีย์

ส่วนที่ 4 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

ข้อมูลที่ได้จะนำไปเป็นแนวทางพัฒนาระบบ Thai Organic Platform เพื่อส่งเสริมให้เกิดสังคมอินทรีย์ที่มีความเชื่อมั่นและความไว้วางใจ ทั้งนี้ข้อมูลส่วนตัวของท่านจะไม่ถูกเปิดเผย

จึงขอความร่วมมือในการตอบแบบสอบถามให้ตรงกับความเป็นจริงของตัวท่าน

กรุณากดที่ลิ้งค์เพื่อเข้าดูรายละเอียดสินค้าอินทรีย์ผ่านบล็อกเชน และทำการประเมินความคิดเห็นในเรื่องการสื่อสารบนหน้าเวปไซต์

คลิกที่นี่ >> https://top-traceback.mulberrysoft.com/#/product?lot_no=358&havset_id=2572

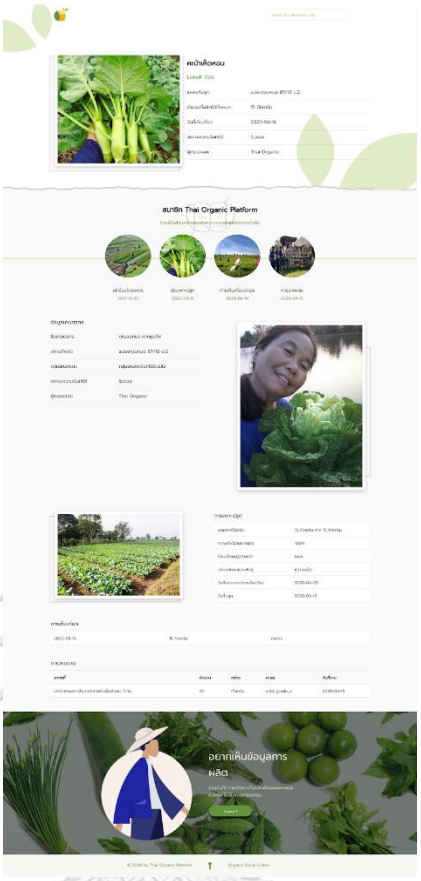
ส่วนที่ 1 การนำเทคโนโลยีบล็อกเชนมาใช้ในการตรวจสอบย้อนกลับ

วีดีโอสั้นอธิบายเทคโนโลยีบล๊อกเชน สำหรับบุคคลทั่วไป

ส่วนที่ 2 การสื่อสารผ่านเทคโนโลยีบล็อกเชนของ Thai Organic Platform

Thai Organic Platform เป็นเวทีที่จัดขึ้นภายใต้การบริหารของสมาคมผู้บริโภคอินทรีย์ โดยมีเป้าหมายที่จะเชื่อมโยงเกษตรกร ผู้ประกอบการ และผู้บริโภค บนความโปร่งใสของข้อมูลที่สามารถตรวจสอบย้อนกลับได้ ผ่านเทคโนโลยีบล็อกเชน

ภาพรวมเวปไซต์แสดงข้อมูลสินค้าบนบล๊อกเชน



1. เวปไซต์โดยรวมใช้งานได้ง่าย

	1	2	3	4	5	6	7
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑เห็นด้วยมากที่สุด

2. การหาข้อมูลที่สนใจทำได้ง่าย

	1	2	3	4	5	6	7
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑เห็นด้วยมากที่สุด

3. ไม่ต้องอาศัยความพยายามมากในการเข้าใช้เวปไซต์

	1	2	3	4	5	6	7
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑เห็นด้วยมากที่สุด

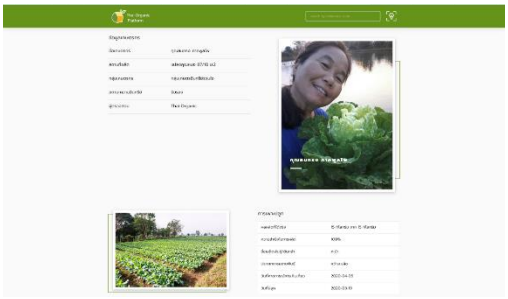
4. ภาพลักษณ์ของหน้าเว็ปไซต์เข้าใจง่าย

	1	2	3	4	5	6	7
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑เห็นด้วยมากที่สุด

5. ข้อมูลที่แสดงในเวปไซต์มีการแสดงรายละเอียดของเกษตรกรอย่างชัดเจน

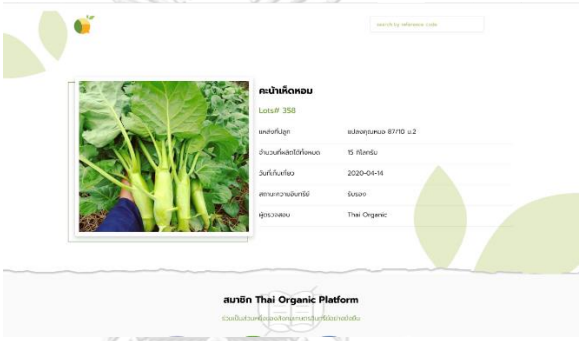
	1	2	3	4	5	6	7
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑เห็นด้วยมากที่สุด

6. การมีรูปภาพเกษตรกร แปลง และผลผลิตอินทรีย์ประกอบทำให้ดูน่าสนใจ



	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

7. ข้อมูลถูกจัดเรียงตามความสำคัญอย่างเป็นระบบ



	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

8. การมีรูปภาพจริงของแปลง และผลผลิตอินทรีย์ประกอบทำให้มีความมั่นใจมากขึ้น

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

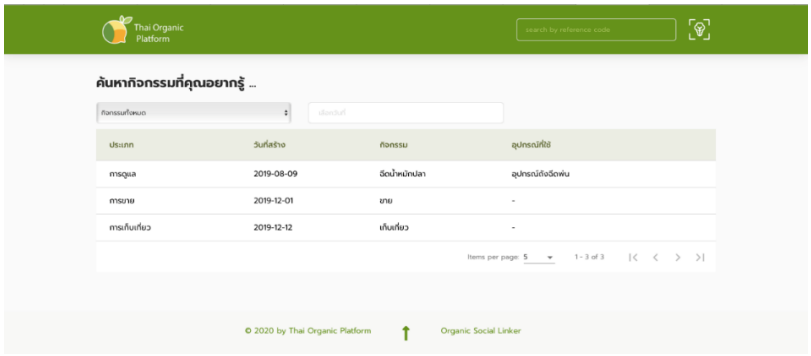
9. ข้อมูลในหน้าเวปไซต์เพิ่มความมั่นใจในความปลอดภัยของอาหารอินทรีย์

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

10. ข้อมูลในหน้าเวปไซต์เพียงพอต่อการแสดงว่าสินค้าเป็นอินทรีย์จริง

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

11. ตารางการแสดงข้อมูลอย่างระเอียดที่เกษตรกรบันทึกทำให้เข้าใจเส้นทางอาหารอินทรีย์



	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

12. ข้อมูลในหน้าเวปไซต์มีประโยชน์ต่อการเข้าถึงวิถีอินทรีย์

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

13. การแสดงข้อมูลในรูปแบบเส้นเวลา (Timeline) ทำให้เข้าใจรายละเอียดของเส้นทางอาหารอินทรีย์

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

14. การเข้ามาใช้เวปไซต์ช่วยทำให้ตัดสินใจซื้อได้ง่ายขึ้น

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

15. การเข้ามาใช้เวปไซต์ช่วยลดความกังวลในคุณภาพของสินค้า

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

16. โดยรวมท่านคิดว่าเวปไซต์มีประโยชน์อย่างมาก

1	2	3	4	5	6	7

ไม่เห็นด้วยมากที่สุด ❑ ❑ ❑ ❑ ❑ ❑ ❑เห็นด้วยมากที่สุด

17. ท่านคิดว่าท่านอยากจะลองเข้ามาอ่านข้อมูลเส้นทางอาหารอินทรีย์ในเวปไซต์

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

18. ถ้ามีเวปไซต์ที่ทำให้ท่านสามารถเข้าถึงข้อมูลเส้นทางอาหารอินทรีย์ได้ ท่านคิดว่าท่านอยากจะลองใช้

	1	2	3	4	5	6	7	
ไม่เห็นด้วยมากที่สุด	❑	❑	❑	❑	❑	❑	❑	เห็นด้วยมากที่สุด

19. ข้อเสนอแนะเพิ่มเติมในการใช้งานและการสื่อสารของข้อมูล _____

ส่วนที่ 3 ความเชื่อมั่นในสินค้าเกษตรอินทรีย์

Thai Organic Platform เป็นเวทีที่จัดขึ้นภายใต้การบริหารของสมาคมผู้บริโภคอินทรีย์ โดยมีเป้าหมายที่จะเชื่อมโยงเกษตรกร ผู้ประกอบการ และผู้บริโภค บนความโปร่งใสของข้อมูลที่สามารถตรวจสอบย้อนกลับได้ผ่านเทคโนโลยีบล็อกเชน

กรุณาประเมินปัจจัยที่ส่งผลให้ท่านเกิดความเชื่อมั่นในสินค้าอินทรีย์	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)
20. เห็นสินค้าจริง							
21. ได้รู้จัก และเห็นหน้าเกษตรกรผ่านเวปไซต์							
22. เห็นรูปภาพแปลง ผลผลิต และกระบวนการทำงานของเกษตรกร เช่น การเพาะปลูก ดูแล ตรวจสอบ							
23. ได้พูดคุยกับลูกค้าท่านอื่นๆ							
24. เห็นตรารับรองจากหน่วยงานที่เกี่ยวข้อง							
25. เห็นข้อมูลการทำงานของเกษตรกรที่สามารถทำการตรวจสอบย้อนกลับได้							
26. รู้จัก หรือพูดคุยกับเกษตรกรโดยตรง							
27. เห็นโลโก้สินค้าอินทรีย์จากองค์กรที่รู้จัก							

28. คุณเชื่อมั่นในสินค้าในระบบ Thai Organic Platform หรือไม่

1	2	3	4	5	6	7

ไม่เห็นด้วยมากที่สุด ❑ ❑ ❑ ❑ ❑ ❑ ❑เห็นด้วยมากที่สุด

29. หากคุณเชื่อมั่นในสินค้าในระบบ Thai Organic Platform คุณเชื่อในสิ่งใด (เลือกได้มากกว่าหนึ่งข้อ)

❑ เชื่อมั่นในตัวเกษตรกรที่ทำการบันทึกกิจกรรมการเพาะปลูกด้วยตนเอง

❑ เชื่อมั่นในกลุ่มเกษตรกรที่มีระบบการตรวจสอบรับรองแบบมีส่วนร่วมของสมาชิกในกลุ่มเกษตร

❑ เชื่อมั่นในตัว Thai Organic Platform ที่มีการบริหารโดยสมาคมผู้บริโภคอินทรีย์

❑ เชื่อมั่นในข้อมูลที่ถูกจัดเก็บอย่างเป็นระบบและไม่สามารถแก้ไขได้ ผ่านการใช้เทคโนโลยีบล็อกเชน

❑ อื่นๆ (ระบุ) _____

กรุณาประเมินปัจจัยที่ทำให้คุณเชื่อมั่นสินค้าในระบบ Thai Organic Platform	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)
30. เวปไซต์ Thai Organic Platform มีความน่าเชื่อถือในวงการอาหารอินทรีย์							
31. เวปไซต์ Thai Organic Platform เป็นเวปไซต์ที่มีชื่อเสียง							
32. สามพรานโมเดลเป็นที่น่าเชื่อถือในวงการอาหารอินทรีย์							
33. ตลาดสุขใจเป็นตลาดอินทรีย์ที่มีชื่อเสียง							
34. การนำเทคโนโลยีบล็อกเชนเข้ามาช่วยจัดเก็บข้อมูลที่ทำให้สามารถตรวจสอบย้อนกลับ และมีที่มาที่ไป							
35. เทคโนโลยีบล็อกเชนเข้ามาช่วยให้ท่านได้รับข้อมูลที่โปร่งใส โดยข้อมูลที่ถูกจัดเก็บแล้วไม่สามารถเปลี่ยนแปลงรายละเอียดได้							
36. สินค้าในเวปไซต์ได้มีการตรวจสอบรับรองแบบมีส่วนร่วมของสมาชิกในกลุ่มเกษตรกร							
37. ข้อมูลสินค้าในเวปไซค์มีความเพียงพอในการรับรองความเป็นอินทรีย์							
38. เวปไซต์มีประสิทธิภาพในการให้ข้อมูลเส้นทางอาหารอินทรีย์							

39. เกษตรกรที่ขายสินค้าบนเวปไซต์มีความรู้ในการทำเกษตรอินทรีย์							
40. ข้อมูลในเวปไซต์ให้คำแนะนำถึงวิถีอินทรีย์ได้เป็นอย่างดี							
41. เวปไซต์เป็นแหล่งรวมข้อมูลและความรู้เกี่ยวกับสินค้าอินทรีย์							
42. เกษตรกรที่ขายสินค้าบนเวปไซต์มีความซื่อตรงในการให้ข้อมูลที่เป็นจริง							
43. เวปไซต์เห็นประโยชน์ของผู้บริโภคเป็นสำคัญ							
44. เกษตรกรที่ขายสินค้าบนเว็ปไซต์มีความตั้งใจที่จะส่งต่ออาหารอินทรีย์ให้ท่าน							
45. ข้อมูลและคำแนะนำบนเวปไซค์เป็นประโยชน์ต่อการบริโภค							
46. ข้อมูลที่แสดงในเวปไซต์ทำให้ท่านสามารถเข้าถึงและเข้าใจเกษตรกร							
47. ข้อมูลที่แสดงในเวปไซต์มีรายละเอียดที่น่าเชื่อถือ							
48. ข้อมูลบนเวปไซต์สามารถสื่อสารว่าสินค้ามีคุณลักษณะตามมาตรฐานอาหารอินทรีย์							
49. ข้อมูลที่กรอกโดยเกษตรกรบนเวปไซต์ทำให้สามารถเข้าใจถึงการทำงานของเกษตรกรอินทรีย์							
50. การเป็นสมาชิคสมาคมผู้บริโภคอินทรีย์ทำให้มีส่วนร่วมในการขับเคลื่อนสังคมอินทรีย์และเข้าถึงวิถีอินทรีย์มากขึ้น							
51. การเข้ามารับรู้ข้อมูลในเวปไซต์ทำให้รู้จักสังคมเกษตรอินทรีย์มากขึ้น							

กรุณาประเมินความน่าเชื่อถือในแต่ละสถานการณ์	ระดับของความคิดเห็น						
	ไม่เห็นด้วยมากที่สุด (1)	ไม่เห็นด้วยอย่างยิ่ง (2)	ไม่เห็นด้วย (3)	ไม่แน่ใจ/เฉยๆ (4)	เห็นด้วย (5)	เห็นด้วยอย่างยิ่ง (6)	เห็นด้วยมากที่สุด (7)

52. เมื่อต้องการรู้ข้อมูลอาหารอินทรีย์ ท่านเลือกที่จะหาข้อมูลในเวปไซต์ที่กรอกโดยเกษตรกร							
53. ท่านสามารถไว้ใจเกษตรกรในการให้ข้อมูลที่เป็นจริง							
54. ท่านสามารถใช้ข้อมูลในเวปไซต์ในสถานการณ์ที่ขาดความเชื่อมั่นในอาหารอินทรีย์ได้เสมอ							
55. ข้อมูลในเวปไซต์ทำให้ท่านมั่นใจที่จะซื้อสินค้า							
56. เมื่อท่านมองหาสินค้าอินทรีย์ ท่านจะอ่านข้อมูลในเวปไซต์ก่อนทำการซื้อสินค้า							
57. ท่านเต็มใจที่จะเข้ามามีส่วนร่วมในการเขียนคำติชม ให้คะแนนรีวิวบนเวปไซต์							
58. ท่านสนใจที่จะเข้าร่วมทำกิจกรรมเพื่อร่วมขับเคลื่อนสังคมอินทรีย์							

59. ข้อเสนอแนะเพิ่มเติมในการสร้างความเชื่อมั่นในสินค้าอินทรีย์ _____

60. ข้อใดเป็นปัจจัยที่ทำให้คุณ "เลิก" ซื้อสินค้าอินทรีย์ (เลือกได้มากกว่าหนึ่งข้อ)

- ❑ พบสินค้าที่ไม่เป็นอินทรีย์จริง
- ❑ สินค้ามีราคาแพง
- ❑ สินค้าไม่มีความหลากหลาย
- ❑ หาซื้อสินค้ายาก ไม่รู้ว่าจะซื้อได้ที่ไหน
- ❑ ข้อมูลที่ได้รับไม่มีความเพียงพอ
- ❑ ข้อมูลที่ได้รับขาดความโปร่งใส
- ❑ พบว่าข้อมูลที่แสดงในหน้าเวปไซต์ ไม่เป็นความจริง
- ❑ เกษตรกรขาดความสามารถ
- ❑ ขาดการปฏิสัมพันธ์โดยตรงกับเกษตรกร
- ❑ อื่นๆ (ระบุ) _____

VITA

NAME	Miss Supranee Tangnatthanakrit
DATE OF BIRTH	20 September 1985
PLACE OF BIRTH	Bangkok
INSTITUTIONS ATTENDED	BSc Food science and technology, Mahidol University International College, Thailand MSc Food technology, Food innovation and management specialization, Wageningen University, The Netherlands PhD, Technopreneurship and innovation management program, Graduate School, Chulalongkorn University
HOME ADDRESS	286/65 Soi Pattana, Suriwong road, Bangrak district, Bangkok, Thailand 10500
PUBLICATION	Factors affecting consumer trust in organic food market Thailand (Abstract in conference proceeding, ISPIM Innovation Conference 2019) Trust building factors and their impact on consumers – The case of organic food market in Thailand (International Journal of Innovation, Creativity and Change)