RELATIONSHIP AMONG HALAL TRACEABILITY SYSTEM ADOPTION, HALAL INDUSTRY ENVIRONMENTAL FACTORS AND HALAL FOOD SUPPLY CHAIN PERFORMANCE

NORASEKIN BT AB RASHID

GSM 2016 8
RELATIONSHIP AMONG HALAL TRACEABILITY SYSTEM ADOPTION, HALAL INDUSTRY ENVIRONMENTAL FACTORS AND HALAL FOOD SUPPLY CHAIN PERFORMANCE

By

NORASEKIN BT AB RASHID

Thesis Submitted to Graduate School of Management, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

February 2016
COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs, and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright© Universiti Putra Malaysia
DEDICATION

To my beloved family:
Lokman Hakimi Bin Lot
Liz Dania Eryna Binti Lokman Hakimi
Luqman Darwisy Izzrizq Bin Lokman Hakimi
Liz Dalisa Idzaara Binti Lokman Hakimi

Thank you for the love and laughter, which are so accommodating. I hope this journey inspires us to be more organized and well prepared for balanced prosperity in this world and hereafter.

To my parents:
Haji Ab Rashid Bin Hussin
Hajjah Mek Som Binti Hj Che Mat

To my parents in law:
Haji Lot Bin Omar
Hajjah Wan Azizah Binti Wan Ismail

Your entire support has always made me strong and raised my enthusiasms in completing this study.
Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

RELATIONSHIP AMONG HALAL TRACEABILITY SYSTEM ADOPTION, HALAL INDUSTRY ENVIRONMENTAL FACTORS AND HALAL FOOD SUPPLY CHAIN PERFORMANCE

By

NORASEKIN BT AB RASHID

February 2016

Chairman : Associate Professor Jamil Bojei, PhD
Faculty : Graduate School of Management, UPM

Halal has become one of the features being discussed especially in food production either in Muslim countries or non-Muslim countries due to the increasing demand from customers worldwide. The increase number of cases on the misuse of Halal logo and questionable status of Halal food has raised many concerns among the Muslim consumers regarding the status of Halal food in Malaysia. The various reports on the issues of fraudulent cases and physical contamination in Halal food also indicate that there are weaknesses in the procedure of determining Halal food.

In this case, food companies must be prepared to implement systematic traceability system to ensure the authenticity of Halal products and comprehend the importance of Halal industry environmental factors in enhancing integrity of Halal food supply chain and performance. Accordingly, the main purpose of this study is to examine the relationship between the Halal traceability system adoption and Halal industry environmental factors on Halal food supply chain integrity and performance.

Using a quantitative research approach, survey questionnaires were distributed to 176 Malaysian Halal food and beverages companies through mail and during Halal exhibition (i.e., MIHAS and HALFEST). Partial Least Squares (PLS) software was applied to examine the direct and mediating effect hypotheses. The results revealed that Halal industry environmental factors have a relationship with Halal traceability system adoption. Moreover Halal traceability system adoption and Halal industry environmental factors were significantly and positively related to the importance of Halal food supply chain integrity. Furthermore, the findings also show that Halal traceability system adoption and Halal food supply chain integrity have significant relationship on Halal food supply chain performance. However, Halal industry environmental factors were not perceived as important in determining the Halal food supply chain performance. The study also found a partial role of Halal food supply chain integrity in mediating the relationship between Halal traceability system adoption and Halal food supply chain performance.
The results will be useful to the Malaysian *Halal* food companies in developing proper strategy to enhance supply chain performance and adopting effective traceability system that can assist those companies in handling *Halal* food products without arousing the *Halal* integrity issues. Policy makers could also benefit from this study by providing advisory services and assistance programs that could help the *Halal* food producers in improving their performance.

The study has successfully filled the gap in literature by empirically establishing the relationship between *Halal* traceability system adoption and *Halal* environmental factors on *Halal* food supply chain integrity and performance. The study has also contributed to the existing body of knowledge in food supply chain by integrating the *Halal* context into current research framework.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

HUBUNGAN DI ANTARA PERLAKSANAAN SISTEM PENGESANAN HALAL, FAKTOR PERSEKITARAN INDUSTRI HALAL DAN PRESTASI RANTAIAN BEKALAN MAKANAN HALAL

Oleh

NORASEKIN BT AB RASHID

Februari 2016

Pengerusi : Profesor Madya Jamil Bojei, PhD
Fakulti : Sekolah Pengajian Siswazah Pengurusan, UPM

Halal telah menjadi salah satu isu yang sering dibincangkan terutama sekali di dalam pengeluaran makanan samada di negara-negara Islam mahupun di negara-negara bukan Islam disebabkan permintaan yang amat tinggi di kalangan pengguna seluruh dunia. Namun begitu, peningkatan kes penyalahgunaan logo Halal dan ketidakpastian status Halal telah menyebabkan pengguna yang beragama Islam musykil dengan status makanan Halal di Malaysia. Pelbagai laporan tentang kes penyalahgunaan serta pencemaran fizikal makanan Halal membuktikan terdapat kelemahan di dalam cara pengesahan makanan Halal.

Maka, syarikat makanan perlu bersedia untuk mengimplmentasi sistem pengesanan yang lebih telus bagi memastikan kesahihan produk Halal dan memahami kepentingan faktor persekitaran industri Halal bagi meningkatkan integriti dan prestasi rantaian makanan Halal. Dengan ini, tujuan utama kajian ini dijalankan adalah untuk menguji hubungan di antara perlaksanaan sistem pengesanan Halal dan faktor persekitaran industri Halal terhadap integriti serta prestasi rantaian makanan Halal.

integriti rantaian bekalan makanan Halal memainkan peranan sebagai pengantara separa terhadap pengaruh penggunaan sistem pengesanan Halal dan prestasi rantaian bekalan makanan Halal.

Keputusan ini amat berguna kepada syarikat-syarikat makanan Halal di Malaysia dalam membangunkan strategi yang tepat untuk meningkatkan prestasi rantaian bekalan dan menggunakan sistem pengesanan yang berkesan bagi membantu mereka dalam mengendaliti produk makanan Halal tanpa membangkitkan isu integriti Halal. Pembuat dasar juga boleh mendapat manfaat daripada kajian ini dengan menyediakan khidmat nasihat dan program bantuan yang boleh membantu pengeluar makanan Halal dalam meningkatkan prestasi mereka.

Kajian ini telah berjaya mengisi jurang ilmu dengan mewujudkan secara empirik pengaruh penggunaan sistem pengesanan Halal dan faktor persekitaran terhadap integriti dan prestasi rantaian bekalan makanan Halal. Kajian ini juga telah menyumbang kepada pengetahuan sedia ada dalam rantaian bekalan makanan dengan mengintegrasikan konteks Halal ke dalam rangka kerja penyelidikan semasa.
ACKNOWLEDGEMENTS

All praises and thanks to Allah. There is neither strength nor power except from Allah, the Exalted, and the Almighty.

I am heartily thankful to my supervisor, Associate Professor Dr Jamil Bojei, whose encouragement, guidance and support from the beginning to the end of this study enabled me to develop an understanding of the subject. His calm attitude helped me all the way. Many thanks also go to Professor Dr Rafikul Islam and Associate Professor Dr Azmawani Abd Rahman, as co-supervisors, for their advices.

My sincere gratitude goes to the directors, managers, executives and staffs in the Halal Food Industries, who supported and facilitated this research by approaching the organisations and teams involved in the questionnaire survey. The opinions and responses from personnel in the Halal Food Industries on the questionnaire are much valued.

It is my pleasure to thank the respondents from all the organisations for their time and responses during the questionnaire survey. Without their cooperation, I could not have obtained the relevant data.

To my husband, daughter and son, your love and understanding are the main internal motivations for this work. I am amazed by your patience in bearing my limited ability to fulfill my academic, motherhood and wifely responsibilities. Although not familiar with this field of study, my husband was always the first person with whom I cried and rejoiced at every milestone of this research. My warmest thoughts also go to my siblings, who are always genuinely happy with my progress.

Last but not least, thanks to all my PhD buddies who inspired me to embrace all the challenges encountered during this process.

I pray that Allah showers all of you with His blessings.

UPM February 16
Norasekin Ab Rashid
I certify that an Examination Committee met on 17th February 2016 to conduct the final examination of Norasekin Bt Ab Rashid on her Doctor of Philosophy thesis entitled “Relationship among Halal Traceability System Adoption, Halal Industry Environmental Factors and Halal Food Supply Chain Performance” in accordance with Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 2008. The Committee recommends that the student be awarded the Doctor of Philosophy degree. Members of the Examination Committee are as follows:

**Yuhanis Binti Abd Aziz, PhD**  
Assoc. Prof.  
Faculty of Economics and Management  
Universiti Putra Malaysia  
(Chairperson)

**Baker Ahmad Alserhan, PhD**  
Assoc. Prof.  
College of Business  
Qatar University  
(External Examiner)

**Abu Bakar Abdul Hamid, PhD**  
Professor  
UTM International Business School  
UTM Kuala Lumpur  
(External Examiner)

**Suhaimi Abd Rahman, PhD**  
Assoc. Prof.  
Faculty of Economics and Management  
Universiti Putra Malaysia  
(Internal Examiner)

---

**PROF. DATUK DR MAD NASIR SHAMSUDIN**  
Deputy Vice Chancellor (Academic & International)  
Universiti Putra Malaysia

Date:

On behalf of,  
Graduate School of Management  
Universiti Putra Malaysia
This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee are as follows:

Jamil Bojei, PhD  
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairman)

Rafikul Islam, PhD  
Professor
Kulliyyah of Economics and Management Sciences
International Islamic University Malaysia
(Committee Member)

Azmawani Abd Rahman, PhD  
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Committee Member)

PROF. DATUK DR MAD NASIR SHAMSUDIN  
Deputy Vice Chancellor (Academic & International)  
Universiti Putra Malaysia

Date:

On behalf of,  
Graduate School of Management  
Universiti Putra Malaysia

vii
Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: ___________________________________ Date: __________________________

Name and Matric No.: Norasekin Bt Ab Rashid / GM02925
Declaration by Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

Chairman of Supervisory Committee

Signature : 
Name : Assoc. Prof. Dr. Jamil Bojei
Faculty : Faculty of Economics and Management, UPM

Member of Supervisory Committee

Signature : 
Name : Assoc. Prof. Dr. Azmawani Abd Rahman
Faculty : Faculty of Economics and Management, UPM

Signature : 
Name : Prof. Dr. Rafikul Islam
Faculty : Kulliyah of Economics and Management Sciences, UIAM
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>v</td>
</tr>
<tr>
<td>APPROVAL</td>
<td>vi</td>
</tr>
<tr>
<td>DECLARATION</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvi</td>
</tr>
<tr>
<td>LIST OF APPENDICES</td>
<td>xvii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xviii</td>
</tr>
</tbody>
</table>

# CHAPTER

1 INTRODUCTION

1.1 An Overview 1

1.2 Background of the Study 1

1.3 Problem Statement 2

1.4 Objectives of the Study 5

1.4.1 General Objective 6

1.4.2 Research Objectives (ROs) 6

1.5 Research Questions (RQs) 6

1.6 Scope of the Study 10

1.7 Significance of the Study 10

1.8 Organization of the Thesis 11

2 OVERVIEW OF HALAL INDUSTRY AND FOOD AND BEVERAGES INDUSTRY IN MALAYSIA

2.1 Introduction 12

2.2 Halal Industry 12

2.3 Processed Food and Beverages Industry in Malaysia 13

2.3.1 The Malaysian Small and Medium Enterprises (SMEs) in Processed Food and Beverages Industry 14

2.4 Development in the Halal Industry 15

2.4.1 Halal Market 16

2.4.2 Challenges and Strategies in the Development of Halal Industry 17

2.5 Chapter Summary 19

3 LITERATURE REVIEW

3.1 An Overview 20

3.2 The Halal Definitions 20

3.2.1 The Concept of Halalan Tayyiban 22

3.3 The Concept of Supply Chain Management 24

3.3.1 Definition of Supply Chain 25

3.3.2 Definition of Supply Chain Management 27

3.3.3 Halal Supply Chain Management 29

3.4 Halal Food Supply Chain 33
4 THEORETICAL FRAMEWORK AND HYPOTHESES

4.1 An Overview

4.2 Development of the Research Hypotheses

4.2.1 Halal Industry Environmental Factors (HIEF) and Halal Traceability System Adoption (HTSA)

4.2.2 Halal Industry Environmental Factors (HIEF) and Halal Food Supply Chain Integrity (HFSCIn)

4.2.3 Halal Industry Environmental Factors (HIEF) and Halal Food Supply Chain Performance (HFSCPer)

4.2.4 Halal Traceability System Adoption (HTSA) and Halal Food Supply Chain Integrity (HFSCIn)

4.2.5 Halal Traceability System Adoption (HTSA) and Halal Food Supply Chain Performance (HFSCPer)

4.2.6 Halal Food Supply Chain Integrity (HFSCIn) and Halal Food Supply Chain Performance (HFSCPer)

4.3 Development of Research Framework

4.4 Theoretical Foundation for the Research Framework Development

4.4.1 The Commitment-Trust Theory

4.4.2 Institutional Theory

4.5 Chapter Summary

5 RESEARCH METHODOLOGY

5.1 An Overview

5.2 Research Paradigm

5.3 Research Process

5.4 Research Design

5.5 Data Collection

5.6 Instrument Development

5.7 Operationalization and Measurement of Constructs

5.7.1 Halal Industry Environmental Factors (HIEF)

5.7.2 Halal Traceability System Adoption (HTSA)

5.7.3 Halal Food Supply Chain Integrity (HFSCIn)

5.7.4 Halal Food Supply Chain Performance (HFSCPer)

5.8 Questionnaire Design
5.8.1 Translation Process
5.8.2 Pre-testing the instrument
5.9 Unit of Analysis
5.10 Sampling Frame
5.11 Respondent Criteria
5.12 Data Analysis
5.12.1 Rules of Thumb for Selecting CB-SEM or PLS-SEM
5.13 Chapter Summary

6 DATA ANALYSIS AND FINDINGS
6.1 An Overview
6.2 Data Analysis: An Overview
6.3 Preliminary Data Analysis
6.3.1 Data Editing, Coding, and Entry
6.3.2 Data Screening
6.3.3 Response Rate
6.3.4 Non-Response Bias
6.3.5 Descriptive Statistics of Respondents
6.3.6 Descriptive Statistics of Firms’ Profiles
6.3.7 Descriptive Statistics of Instrument
6.4 Measurement Model Assessment
6.4.1 Internal Consistency Reliability
6.4.2 Indicator Reliability
6.4.3 Construct Validity
6.4.4 Convergent Validity
6.4.5 Discriminant Validity
6.4.6 Higher-order Construct and Assessment of Second-order Construct
6.5 Structural Model Assessment
6.5.1 Coefficient of Determination (R²)
6.5.2 Cross-validated Redundancy (Q²)
6.5.3 Goodness of Fit (GoF)
6.5.4 Path Coefficient
6.6 Results of Hypotheses Testing
6.7 Mediating Analysis
6.8 Chapter Summary

7 DISCUSSION, IMPLICATIONS AND CONCLUSIONS
7.1 An Overview
7.2 Summary of Main Findings
7.3 Discussions of the Findings
7.4 Significant Implications of the Research
7.4.1 Theoretical Implications
7.4.2 Practitioners Implications
7.4.3 Policy Makers Implications
7.5 Limitations of the Research
7.6 Signposts for Future Research
7.7 Conclusion
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFERENCES</td>
<td>134</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>162</td>
</tr>
<tr>
<td>BIODATA OF STUDENT</td>
<td>196</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Research Objectives, Research Questions, Hypotheses, Dimensions, and Analysis</td>
</tr>
<tr>
<td>3.1</td>
<td>Definitions of Supply Chain</td>
</tr>
<tr>
<td>3.2</td>
<td>Definitions of Supply Chain Management</td>
</tr>
<tr>
<td>3.3</td>
<td>Comparison between Conventional Supply Chain and Halal Supply Chain</td>
</tr>
<tr>
<td>3.4</td>
<td>Definitions of Food Traceability in Food Supply Chain</td>
</tr>
<tr>
<td>3.5</td>
<td>Driving Forces for Food Traceability Adoption</td>
</tr>
<tr>
<td>3.6</td>
<td>Muslim Population by Region</td>
</tr>
<tr>
<td>3.7</td>
<td>Halal Food Market Size 2010</td>
</tr>
<tr>
<td>5.1</td>
<td>The Main Features of Quantitative and Qualitative Paradigm</td>
</tr>
<tr>
<td>5.2</td>
<td>Summary of Two Major Research Paradigms</td>
</tr>
<tr>
<td>5.3</td>
<td>Types of Research Design</td>
</tr>
<tr>
<td>5.4</td>
<td>Measurement and Scaling of HIEF Construct</td>
</tr>
<tr>
<td>5.5</td>
<td>Measurement and Scaling of HTSA Construct</td>
</tr>
<tr>
<td>5.6</td>
<td>Measurement and Scaling of HFSCIn Construct</td>
</tr>
<tr>
<td>5.7</td>
<td>Measurement and Scaling of HFSCPer Construct</td>
</tr>
<tr>
<td>6.1</td>
<td>Summary on the Return Rate of Questionnaires</td>
</tr>
<tr>
<td>6.2</td>
<td>Independent Samples t-test</td>
</tr>
<tr>
<td>6.3</td>
<td>Respondents’ Demographic Information</td>
</tr>
<tr>
<td>6.4</td>
<td>Mean of Quality Criteria among Respondent Position</td>
</tr>
<tr>
<td>6.5</td>
<td>Firms’ Profile Information</td>
</tr>
<tr>
<td>6.6</td>
<td>Descriptive Statistics for All Indicators</td>
</tr>
<tr>
<td>6.7</td>
<td>Result of Reliability Test of First-Order Constructs</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>6.8</td>
<td>Loadings and Cross loadings on First-Order Constructs</td>
</tr>
<tr>
<td>6.9</td>
<td>Result of Measurement Model</td>
</tr>
<tr>
<td>6.10</td>
<td>Discriminant Validity of First-Order Constructs</td>
</tr>
<tr>
<td>6.11</td>
<td>Loadings of First-Order on Second-Order Factors</td>
</tr>
<tr>
<td>6.12</td>
<td>Path Coefficients and Hypothesis Testing</td>
</tr>
<tr>
<td>6.13</td>
<td>Sobel’s Test Results (Z value)</td>
</tr>
<tr>
<td>6.14</td>
<td>Overview of Hypotheses Testing (H1 to H6) Results</td>
</tr>
<tr>
<td>7.1</td>
<td>Summary of the Research Questions and Hypotheses</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Global Market for Potential Halal Products</td>
<td>14</td>
</tr>
<tr>
<td>2.2</td>
<td>The World Halal Food Market Size (2010)</td>
<td>16</td>
</tr>
<tr>
<td>3.1</td>
<td>Conventional Supply Chain Framework</td>
<td>32</td>
</tr>
<tr>
<td>3.2</td>
<td>Halal Supply Chain Framework</td>
<td>32</td>
</tr>
<tr>
<td>3.3</td>
<td>Generic Model of Food Supply Chain</td>
<td>34</td>
</tr>
<tr>
<td>3.4</td>
<td>The Farm to Table Halal Food Supply Chain Concept</td>
<td>35</td>
</tr>
<tr>
<td>3.5</td>
<td>Average Halal Awareness Level among Product Ranges</td>
<td>53</td>
</tr>
<tr>
<td>4.1</td>
<td>Research Framework of the Study</td>
<td>61</td>
</tr>
<tr>
<td>5.1</td>
<td>Flowchart of the Research Process</td>
<td>68</td>
</tr>
<tr>
<td>5.2</td>
<td>Data Collection Phases</td>
<td>73</td>
</tr>
<tr>
<td>6.1</td>
<td>Summary of Data Analysis Procedures</td>
<td>89</td>
</tr>
<tr>
<td>6.2</td>
<td>Result of Structural Model</td>
<td>110</td>
</tr>
<tr>
<td>6.3</td>
<td>$Q^2$: Predictive Relevance</td>
<td>111</td>
</tr>
<tr>
<td>6.4</td>
<td>GoF Index for the Study</td>
<td>112</td>
</tr>
<tr>
<td>6.5</td>
<td>Results of Path Analysis</td>
<td>113</td>
</tr>
<tr>
<td>6.6</td>
<td>Mediation Model</td>
<td>117</td>
</tr>
<tr>
<td>6.7</td>
<td>Mediation Effect of Predictor”s Variable</td>
<td>117</td>
</tr>
<tr>
<td>6.8</td>
<td>Z Value for the Study</td>
<td>118</td>
</tr>
</tbody>
</table>
# LIST OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Questionnaire (English Version)</td>
<td>162</td>
</tr>
<tr>
<td>1B</td>
<td>Questionnaire (Malay Version)</td>
<td>169</td>
</tr>
<tr>
<td>2A</td>
<td>Results of Common Method Variance (CMV) Test</td>
<td>176</td>
</tr>
<tr>
<td>2B</td>
<td>Results of Common Method Variance (CMV) Test</td>
<td>178</td>
</tr>
<tr>
<td>3</td>
<td>Normality Test</td>
<td>179</td>
</tr>
<tr>
<td>4</td>
<td>Screening for Food and Beverages Categories</td>
<td>185</td>
</tr>
<tr>
<td>5</td>
<td>T-Test for Non-Response Bias</td>
<td>186</td>
</tr>
<tr>
<td>6</td>
<td>Descriptive Statistics of Major Constructs</td>
<td>191</td>
</tr>
</tbody>
</table>
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMA</td>
<td>Federal Agriculture Marketing Authority</td>
</tr>
<tr>
<td>FSC</td>
<td>Food supply chain</td>
</tr>
<tr>
<td>FSCM</td>
<td>Food supply chain management</td>
</tr>
<tr>
<td>FTS</td>
<td>Food traceability system</td>
</tr>
<tr>
<td>GHP</td>
<td>Good Hygiene Practice</td>
</tr>
<tr>
<td>GMP</td>
<td>Good Manufacturing Practices</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard analysis and critical control point</td>
</tr>
<tr>
<td>Hadith</td>
<td>Records of the actions and sayings of the Prophet Muhammad (SAW)</td>
</tr>
<tr>
<td>Halal</td>
<td>Lawful, permissible</td>
</tr>
<tr>
<td>Halalan Tayyiban</td>
<td>Dietary concept in Islamic law which refer to permissible and good for consumption or use</td>
</tr>
<tr>
<td>HALFEST</td>
<td>Halal Fiesta Malaysia</td>
</tr>
<tr>
<td>Haram</td>
<td>Unlawful, prohibited</td>
</tr>
<tr>
<td>HDC</td>
<td>Halal Industry Development Corporation</td>
</tr>
<tr>
<td>HFSCIn</td>
<td>Halal food supply chain integrity</td>
</tr>
<tr>
<td>HFSCPer</td>
<td>Halal food supply chain performance</td>
</tr>
<tr>
<td>HIEF</td>
<td>Halal industry environmental factors</td>
</tr>
<tr>
<td>HTSA</td>
<td>Halal traceability system adoption</td>
</tr>
<tr>
<td>IMP3</td>
<td>The 3rd Industrial Master Plan</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standard Organization</td>
</tr>
<tr>
<td>JAKIM</td>
<td>Department of Islamic Development in Malaysia</td>
</tr>
<tr>
<td>KLIFF</td>
<td>Kuala Lumpur Islamic Financial Forum</td>
</tr>
</tbody>
</table>
MAHA  Malaysia Agriculture, Horticulture, and Agrotourism Show
MARDI  Malaysia Agricultural and Development Institute
MATRADE  Malaysia External Trade Development Corporation
MECD  Ministry of Entrepreneurship and Corporation
MIDA  Malaysian Industrial Development Authority
MIHAS  Malaysia International Halal Showcase
MITI  Ministry of International Trade and Industry
MNCs  Multinational Corporations
MOH  Ministry of Health
Quran  The book Muslims believe was revealed by Allah through the Angel Gabriel to Prophet Muhammad SAW, the Prophet of Islam
SC  Supply chain
SCM  Supply chain management
Shariah  Islamic law
SMEs  Small and Medium Enterprises
SME Corp  Small and Medium Enterprises Corporation
Tayyib  Good and pure
WHF  World Halal Forum
WIFE  World Islamic Economic Forum
CHAPTER 1

INTRODUCTION

1.1 An Overview

This chapter introduces the background of the study concerning on *Halal* issues, *Halal* food supply chain integrity, traceability system applied in *Halal* food companies, *Halal* industry environmental factors and the food supply chain performance. This chapter also details out the problem statement, overall objectives, and an overview of the conceptual framework. The discussion on the scope and justification for the significance of the study will also be presented in this chapter including the contribution of this study. The overall organization of the thesis wraps up this chapter.

1.2 Background of the Study

*Halal* issues have been conversed and have gained high attention by the former Prime Minister of Malaysia, Tun Dr. Mahathir Mohamad since early 2003 (Talib, Ali, & Jamaludin, 2008). According to Kettani (2010), the percentage of the world Muslim population has increased steadily from 17 per cent in 1950 and estimated to be 26 per cent by 2020. Quoting the sources from PEW Research Center (2013), the global Muslim population will be approximately 2.2 billion by 2030.

The *Halal* market has burst up and grown at tremendous rate (Zalina, 2008). According to Global Islamic Economy Report (2015), the worldwide spending on *Halal* food and beverages products has increased at 10.8 per cent to reach USD1.29 billion in 2013, corresponding to 17.7 per cent of the global expenditure. This expenditure is expected to grow to USD2.54 billion by 2019, equal to 21.2 per cent of global expenditure (Global Islamic Economy Report, 2015). Amongst the reason contributing to this market growth is due to the increasing value and diversity of the consumer market, combined with strong demographic trends across the world (Anne-Birte, 2007). In addition, the Islamic consumer market is the fastest growing in the world (Alam & Mohamed, 2011). This is because the *Halal* food consumption is one of the principles set by Islam to determine the level of faith and it is also act of worshipping Allah (Ghazali & Md. Sawari, 2014). Furthermore, *Halal* food has becomes as a standard of choice for both Muslims and non-Muslims (Nawai et al., 2007). This revealed that the global *Halal* food demand is increasing rapidly consequently the whole *Halal* food market.

Conversely, the huge demand of *Halal* food products has led to the increase of supply for *Halal* certificate and logo (Nurulhuda et al., 2009). In Malaysia, the Department of Islamic Development Malaysia (JAKIM) is the authority that issued the certification for *Halal* products (Badruldin et al., 2012). JAKIM is entrusted with the responsibility to issue the *Halal* status for local products, foreign manufacturing and processing plants intending to export their *Halal* products to Malaysia (Arif & Sidek, 2015). Generally, Malaysia’s *Halal* certification issued by JAKIM is highly
recognized and recommended in the international market due to its stringent criteria and is regarded as having a strong industrial and commercial set up to produce and market Halal products as well as having strong relationships with the major trading nations of the world, and strong government support (Badruldin, et al., 2012; Muhammad, Isa, & Kifli, 2009).

In addition, the Malaysian Standard entitled “Halal Food: Production, Preparation, Handling and Storage – General Guidelines (Second Revision)” (MS1500:2009) is being used by JAKIM as guidance when issuing the Halal certificate (Arif & Sidek, 2015). This standard was developed in accordance with International Standard Organization (ISO) methodologies and was the first Halal standard to be developed by a Muslim nation (Mukhtar, 2009). To strengthen its application, this standard is recommended to be used together with MS1480 and MS1514. MS1480 is the standard in food safety according to Hazard Analysis and Critical Control Point (HACCP) system, while the MS1514 is the Good Manufacturing Practice (GMP) for food (First Revision). Both standards cover issues of hygiene, sanitation and food safety aspects in the food processing and preparation chain and also consider the permissible sources of Halal food.

Furthermore, with the increase number of non-Muslims dominating the food industry, the status of Halal food has become doubtful (Arif & Sidek, 2015). This has lead to the barriers and misconceptions in producing Halal food. In this respect, many cases of questionable Halal food have been reported in the mass media recently. It seems that several suppliers and manufacturers did not realize the peculiarity in the process of handing Halal food (Arif & Sidek, 2015). The production of Halal food needs a very cautious understanding throughout the supply chain especially if a product has a complex collection of ingredients (i.e., animal or plant source) and processing aids (al-Mazeedi, Regenstein, & Riaz, 2013).

In addition, Muslims want assurance that the products they consume are a true manifestation of Islamic principles, and should be Tayyib, meaning wholesome and good (World Halal Forum, 2009). Thus, the Halal food supply chain integrity subject disembarks. According to Batu and Regenstein (2014), it is critical that Halal food be prepared in accordance with Islamic rules and that product integrity be maintained throughout the supply chain. Consequently, this will increase the importance of perceptive in factors ensuring the Halal food supply chain integrity (Zulfakar, Anuar, & Talib, 2014). Therefore, the adoption of Halal traceability system among Halal food manufacturers should be addressed due to the increasing demands for better Halal food supply chain among customers. This is crucial to diminish and to assure that contamination does not exist throughout the process in handling Halal food which is in accordance to Islamic principle.

1.3 Problem Statement

Halal is a Quranic word meaning lawful, allowed, and legal or that what is permitted by the lawgiver (Allah). Halal is clearly based on values, namely Islamic values (Zakaria & Abdul Talib, 2010). Halal has become one of the features being discussed especially in food production either in Muslim countries or non-Muslim countries due to the increasing demand from customers worldwide (Suhaiza et al.,
2010a; Malihe, Mohd, & Nizaroyani, 2013) and because of the complexity of the Halal food supply chain that includes the aspect of ethics, sustainability and human values (Milestad et al., 2010).

Supply chain management (SCM) in food industry has become an important topic discussed at business schools. From an extensive literature search, it was apparent that most of the recent research done in food supply chain (FSC) focuses on Halal issues such as Halal in supply chain management (Tieman, 2011; Tieman, Jack, & Maznah, 2012), Halal food supply chain (Malihe, Mohd, & Nizaroyani, 2013; Suhaiza et al., 2010a), Halal food supply chain integrity (Zulfakar, Anuar, & Talib, 2014; Zulfakar, Jie, & Chan, 2012) and Halal traceability in Halal food supply chain and Halal food production (Suhaiza et al., 2010b; Zurina & Wan Siti Khadijah, 2012; Siti Zakiah et al., 2011).

There are several issues that made Muslim consumers became aware about the status of Halal products that they consume. Among them are the issues of food ingredient, food cleanliness, Halal food mixing with non-Halal food in storage, distribution activities as well as the issue of poultry and meat slaughtering that does not comply with the Shariah principles (Omar & Jaafar, 2011). In addition, there are various issues and an increasing number of fraudulent cases such as Halal certification and physical contamination (Zulfakar, Jie, & Chan, 2012), Halal foods manufacturers do not comply with the regulations set by the Malaysia authorities (Suhaiza et al., 2010b; Arif & Sidek, 2015), discovery of a dirty bread factory that uses Halal logo (Daros, 2006), the use of Halal logo on food produced from unslaughtered chicken (Berita Harian, 20th February 2008), and the status of catfish which fed with filth or najs and catfish fed with feed derived from pig organs in several ponds at Batu Gajah, Tronoh and Papan, Perak (JAKIM, 2006). Recently, on 23rd May 2014, Muslim consumers in Malaysia were shocked with the report by the Ministry of Health (MOH) that Cadbury Dairy Milk Hazelnut and Cadbury Dairy Milk Roast Almond were tested positive for traces of porcine DNA (New Straits Times, 5th June 2014).

These issues showed that although current Halal standards regulate food production, preparation, handling and storage towards some degree, it does not ensure that the product is Halal at the point of consumption (Tieman, 2006). As a result, Muslim consumers nowadays are not only concerned about their food ingredients whether it is Halal or not but also curious on the whole activities involved along the supply chain. According to Anir, Nizam, and Masliyana (2008), the Malaysian Muslim consumers are very much concerned about the authenticity of Halal food products claimed by food producers. However, according to Bonne and Verbeke (2008), Muslim consumers are lacking of information on supply chain and cannot reassure that no cross-contamination has taken place. Thus, to cope with the growing demand of Halal food, a comprehensive food supply chain approach needs to be adopted with the concept of Halalan Tayyiban.

As argued by Lada, Tanakinjal, and Amin (2009), Alserhan (2010), Ibrahim and Mokhtarudin (2010), Wilson and Liu (2010), and Tieman (2011), Halal needs a supply chain approach, where the value chain and its supply chain should be fully aligned (Christopher, 1998) to fulfill the promise of Halal to the end-customer that the food they consume is a subsequent to the Islamic principles. Furthermore, in
Halal food supply chain, the main goal is not only to ensure the customers satisfaction but also to ensure that the Halal status of the product remains intact throughout the whole process of the supply chain (Bahrudin, Illyas, & Desa, 2011). Since the integrity of Halal food supply chain has become more essential than ever, the identification of Halal food supply chain integrity factors and the Halal traceability system implementation play the most important role to ensure the truthfulness of Halal food production. In accomplishing these objectives, the Halal traceability system has been used to strengthen the Halal food supply chain (Suhaiza et al., 2010b) and to sustain the integrity of Halal product (Siti, Mohd, & Mohamad, 2011; Zulfakar, Anuar, & Talib, 2014). This is to avoid any misconception in the entire Halal food supply chain, hence to attain the Halal acceptance quality that will be recognized by other countries. In addition, Halal has been accepted as quality attribute where Halal refers to nature, origin and processing method of the food product, which entails similarities with organic foods and foods produced by taking animal welfare or sustainability issues into account (Darby & Karni, 1973; Grunert, 2005).

As such, the Halal food supply chain integrity has become an increasing concern (Suhaiza et al., 2010a; Lam & Alhashmi, 2008; Zulfakar, Jie, & Chan, 2012; Zulfakar, Anuar, & Talib, 2014). There are several reasons why the Halal industry is increasingly engaged with the integrity of Halal food chains. First, Halal integrity issues are more likely to occur than before, because of increasing complexity of supply chain (Lam & Alhashmi, 2008) and focus on cost reduction in the logistics industry (Wilson & Liu, 2010). Second, the complexity of today’s supply chain is making integrity issues harder to detect (Zalina, 2008; Talib, Ali, & Jamaludin, 2008; Shafie & Othman, 2004; Abdul, Ismail, Hashim, & Johari, 2009). Third, the consequences of Halal integrity issues in the supply chain have possibly become more costly than before for brand owners and retail chains to repair (Zakaria & Abdul Talib, 2010).

Although numerous studies have been conducted in Halal integrity and food supply chain integrity (Abdul & Hazlinda, 2011; Zulfakar, Anuar, & Talib, 2014; Russly & Nurrulhidayah, 2013; Ali et al., 2014; Zulfakar, Jie, & Chan, 2012; Suhaiza et al., 2010a), none had focused on identification of factors enhancing Halal food supply chain integrity within supply chain partners. According to Malihe et al. (2013), to ensure the integrity of Halal food production, managing its supply chain needs extra attention. Thus, this study aims to identify the factors enhancing Halal food supply chain integrity particularly with regard to supply chain partners such as supplier, manufacturer, control system and customer.

In addition, the integrity of Halal food should be monitored so that customers can satisfy with the authenticity of the Halal products. Therefore, the traceability can be used to trace the Halal status of a particular food product at every stage of the supply chain (Bahrudin, Illyas, & Desa, 2011; Zulfakar, Anuar, & Talib, 2014; Suhaiza et al., 2010b).

According to International Standard Organization - ISO 8402, the general definition of traceability is “the ability to trace the history, application or location of an entity by means of recorded identification” (Bertolini, Bevilacqua, & Massini, 2006;
Canavari et al., 2010; Karlson et al., 2013; Kelepouris, Pramatari, & Doukidis, 2007; Olsen & Aschan, 2010). Suhaiza et al. (2010b) added that traceability in the Halal industry is defined as a communication tool to ensure that information related to Halal food and products is available along the supply chain.

Furthermore, traceability has become a method of providing safer supplies and connecting producers and consumers. According to Zulfakar, Anuar, and Talib, (2014), a comprehensive and reliable traceability system in the Halal food supply chain can increase the Halal transparency and strengthen the Halal integrity. Suhaiza et al. (2010b) added that the Halal traceability system can also be used to strengthen the Halal food supply chain. However, there was no empirical study that focused specifically to show the relationship between Halal traceability system adoption and factors enhancing Halal food supply chain integrity.

Thus, to help bridge this gap in literature, this study attempts to examine to what extent the Halal traceability system adoption is relevant in enhancing the Halal food supply chain integrity particularly within supply chain partners. In addition, it is crucial to develop a more comprehensive conceptual framework of factors enhancing the Halal food supply chain integrity. Hence, this study is considered as a major attempt for contribution to the existing body of knowledge in the Halal food industries.

Furthermore, this study will also try to justify the significance between Halal industry environmental factors, Halal traceability system adoption and Halal food supply chain integrity on Halal food supply chain performance. Environmental factors are the general environment, or sometimes are referred as macroenvironment (Mohamed, Ann, & Yee, 2010), that directly or indirectly influence firms in an industry (Talib & Hamid, 2014). In addition, according to van der Vorst (2000), supply chain performance is the degree to which a supply chain fulfills end user requirements.

However, to optimize the Halal food industries supply chain, new indicators should be included in the performance measurement to ensure that the supply chains are not only efficient but also effective in protecting the Halal integrity and robust in its supply chain executions (Tiemann, van der Vorst, & Maznah, 2012). Therefore, the measurement of the entire supply chain is important because measurement affects decision making and organizations in a Halal food supply chain depend on each other. Whereas, research on performance measurement in supply chain has received much attention, research on measuring performance in the Halal food supply chain has received little attention in the literature. Thus, the knowledge gap will be fulfilled in this study.

1.4 Objectives of the Study

From the above discussion, the objectives of the study have been articulated in the form of general and specific objectives that are linked to the problem statement of this study.
1.4.1 General Objective

In general, this study tries to examine the relationship between the Halal traceability system adoption and Halal industry environmental factors on Halal food supply chain performance through Halal food supply chain integrity. As such, this study also aims to investigate the factors enhancing the Halal food supply chain integrity particularly within supply chain partners. This will be dealt with accordingly in sub section 1.4.2 below.

1.4.1 Research Objectives (ROs)

Specifically, to make the study more explainable, the followings are specific research objectives of the study:

RO1: To examine the relationship between Halal industry environmental factors (HIEF) and Halal traceability system adoption (HTSA).

RO2: To determine the relationship between Halal industry environmental factors (HIEF) and Halal food supply chain integrity (HFSCIn).

RO3: To investigate the relationship between Halal industry environmental factors (HIEF) and Halal food supply chain performance (HFSCPer) through Halal food supply chain integrity (HFSCIn).

RO4: To determine the relationship between Halal traceability system adoption (HTSA) and Halal food supply chain integrity (HFSCIn).

RO5: To examine the relationship between Halal traceability system adoption (HTSA) and Halal food supply chain performance (HFSCPer) through Halal food supply chain integrity (HFSCIn).

RO6: To investigate the relationship between Halal food supply chain integrity (HFSCIn) and Halal food supply chain performance (HFSCPer).

To achieve the stated objectives above, this study proposed several research questions that need to be answered and the development of hypotheses to be discussed in the next session.

1.5 Research Questions (RQs)

The study is directed towards answering several research questions (RQs) concerning the Halal industry environmental factors (HIEF), Halal traceability system adoption (HTSA), Halal food supply chain integrity (HFSCIn), and Halal food supply chain performance (HFSCPer):

RQ1: Does Halal industry environmental factors (HIEF) have a significant relationship towards Halal traceability system adoption (HTSA)?
RQ2: Does *Halal* industry environmental factors (HIEF) have a significant relationship towards *Halal* food supply chain integrity (HFSCIn)?

RQ3: Does *Halal* industry environmental factors (HIEF) have a significant relationship towards *Halal* food supply chain performance (HFSCPer) through *Halal* food supply chain integrity (HFSCIn)?

RQ4: Does *Halal* traceability system adoption (HTSA) has a significant relationship towards *Halal* food supply chain integrity (HFSCIn)?

RQ5: Does *Halal* traceability system adoption (HTSA) has a significant relationship towards *Halal* food supply chain performance (HFSCPer) through *Halal* food supply chain integrity (HFSCIn)?

RQ6: Does *Halal* food supply chain integrity (HFSCIn) has a significant relationship towards *Halal* food supply chain performance (HFSCPer)?

Table 1.1 lists the research questions and hypotheses (from Chapter 4) corresponding to the specific objectives, together with dimensions and analyses to be used.
<table>
<thead>
<tr>
<th>Research Objectives (RO)</th>
<th>Research Questions (RQ)</th>
<th>Hypotheses</th>
<th>Dimensions</th>
<th>Analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO₁: To examine the relationship between Halal industry environmental factors (HIEF) and Halal traceability system adoption (HTSA).</td>
<td>RQ₁: Does HIEF have a significant relationship towards HTSA?</td>
<td>( H₀₁: ) Halal industry environmental factors (HIEF) have a significant relationship on the degree of Halal traceability system adoption (HTSA). | • HIEF</td>
<td>o Political-legal</td>
<td>o Economic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( o HTSA</td>
<td>) Supplier Traceability</td>
</tr>
<tr>
<td>RO₂: To determine the relationship between HIEF and HFSCIn.</td>
<td>RQ₂: Does HIEF have a significant relationship towards HFSCIn?</td>
<td>( H₀₂: ) Halal industry environmental factors (HIEF) have a significant relationship on the importance of Halal food supply chain integrity (HFSCIn). | • HIEF</td>
<td>o Supplier level</td>
<td>o Manufacturer level</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( o HFSCIn</td>
<td>) Effectiveness perspectives</td>
</tr>
<tr>
<td>RO₃: To investigate the relationship between HIEF and HFSCIn through HFSCPer.</td>
<td>RQ₃: Does HIEF have a significant relationship towards HFSCPer through HFSCIn?</td>
<td>( H₀₃: ) Halal industry environmental factors (HIEF) have a significant relationship on the Halal food supply chain performance (HFSCPer). ( H₀₄: ) Halal industry environmental factors (HIEF) have a direct relationship on Halal food supply chain performance (HFSCPer) and indirect relationship on HFSCPer through Halal food supply chain integrity (HFSCIn). | • HIEF</td>
<td>o Supplier level</td>
<td>o Manufacturer level</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o HFSCPer</td>
<td>o Effectiveness perspectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o HFSCIn</td>
<td>o Supplier level</td>
</tr>
<tr>
<td>RO</td>
<td>RQ</td>
<td>H</td>
<td>PLS-SEM Analysis</td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>RO: To determine the relationship between HTSA and Halal food supply chain integrity (HFSCIn).</td>
<td>RQ: Does HTSA has a significant relationship towards HFSCIn?</td>
<td>H: Halal traceability system adoption (HTSA) has a significant relationship on the importance of Halal food supply chain integrity (HFSCIn).</td>
<td>HTSA, HFSCIn</td>
<td></td>
</tr>
<tr>
<td>RO: To examine the relationship between HTSA and Halal food supply chain performance (HFSCPer) through HFSCIn.</td>
<td>RQ: Does HTSA has a significant relationship towards HFSCPer through HFSCIn?</td>
<td>H: Halal traceability system adoption (HTSA) has a significant relationship on the Halal food supply chain performance (HFSCPer). H: Halal traceability system adoption (HTSA) has a direct relationship on Halal food supply chain performance (HFSCPer) and indirect relationship on HFSCPer through Halal food supply chain integrity (HFSCIn).</td>
<td>HTSA, HFSCPer, Efficiency Perspectives, Process quality, Waste, Robustness, HFSCIn</td>
<td></td>
</tr>
<tr>
<td>RO: To investigate the relationship between HFSCIn and HFSCPer.</td>
<td>RQ: Does HFSCIn has a significant relationship towards HFSCPer?</td>
<td>H: Halal food supply chain integrity (HFSCIn) has a significant relationship on Halal food supply chain performance (HFSCPer).</td>
<td>HFSCIn, HFSCPer</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Factors enhancing the Halal food supply chain integrity have been divided into supplier level, manufacturer level, control system level and customer level. Additional dimensions involved are Halal industry environment factors, Halal traceability system adoption, and Halal food supply chain performance that covered the whole research objectives and research questions. *Please refer Chapter 4 for the development of research hypotheses in this study.
1.8 Organization of the Thesis

This section outlines the organization of the whole thesis and contents for each chapter.

Chapter one is the introduction of the thesis. It explains the background of the study, problem statement, objectives of the study, research questions and the significance of the study. This chapter ends up with the overall organization of the thesis to make the research process clearer.

Chapter two deals with the overview, discussion and explanation pertaining to the food industry particularly on the Halal processed food industry in Malaysia. This chapter also reveals the discussion on challenges and strategies in the development of Halal industry.

Chapter three reviews the pertinent literature relating to the research undertaken. This chapter begins with an extensive discussion of the definition of Halal and followed by the literature relevant to the supply chain management in general and finally focused on the Halal food traceability, Halal industry environmental factors, Halal food supply chain integrity, and Halal food supply chain performance.

Chapter four of this thesis explains the conceptual framework for the current study that is in line with the literature study. It also includes explanation of theories underlying the development of proposed research framework for the present study and the development of research hypotheses.

Chapter five discusses the methodology of the study. The discussions are mostly referring to the research paradigm, research design, sampling (design, size and procedure), data collection methods and questionnaire development. The selection of Partial Least Square (PLS) method as data analysis tool will be discussed in detail.

Chapter six provides quantitative data analysis of current study which includes preliminary analysis, measurement model assessment, structural model assessment and mediating analysis.

Chapter seven, which is the final chapter of the thesis, concludes the findings drawn from quantitative studies. This chapter also highlights the implications of the study for academics, practitioners, and policy makers, besides identify its limitations and future research avenues. All chapters are interconnected in order to meet the objectives of the study and contribute to the body of knowledge and practical applications for the industry of interest.
REFERENCES


TITLE OF THESIS / PROJECT REPORT:
RELATIONSHIP AMONG HALAL TRACEABILITY SYSTEM ADOPTION HALAL INDUSTRY ENVIRONMENTAL FACTORS AND HALAL FOOD SUPPLY CHAIN PERFORMANCE

NAME OF STUDENT: NORASEKIN BT AB RASHID

I acknowledge that the copyright and other intellectual property in the thesis/project report belonged to Universiti Putra Malaysia and I agree to allow this thesis/project report to be placed at the library under the following terms:

1. This thesis/project report is the property of Universiti Putra Malaysia.

2. The library of Universiti Putra Malaysia has the right to make copies for educational purposes only.

3. The library of Universiti Putra Malaysia is allowed to make copies of this thesis for academic exchange.

I declare that this thesis is classified as:

*Please tick (√)

☐ CONFIDENTIAL (Contain confidential information under Official Secret Act 1972).

☐ RESTRICTED (Contains restricted information as specified by the organization/institution where research was done).

☐ OPEN ACCESS I agree that my thesis/project report to be published as hard copy or online open access.

This thesis is submitted for:

☐ PATENT Embargo from ___________ until ___________ (date) (date)

Approved by:

(Signature of Student) (Signature of Chairman of Supervisory Committee)

New IC No/ Passport No.: Name:

Date: Date:

[Note: If the thesis is CONFIDENTIAL or RESTRICTED, please attach with the letter from the organization/institution with period and reasons for confidentially or restricted.]