



UNIVERSITI PUTRA MALAYSIA

**FACTORS INFLUENCING SUSTAINABLE PRACTICES ADOPTION
AMONG FOOD AND BEVERAGE SMEs IN PENINSULAR MALAYSIA**

UMI NADIRAH MAT YUSUF

FP 2019 46



**FACTORS INFLUENCING SUSTAINABLE PRACTICES ADOPTION AMONG
FOOD AND BEVERAGE SMEs IN PENINSULAR MALAYSIA**

By

UMI NADIRAH MAT YUSUF

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirement for the Degree of Master of Science**

April 2019

COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artworks, 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



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in Fulfilment of the requirements for the degree of Master of Science

FACTORS INFLUENCING SUSTAINABLE PRACTICES ADOPTION AMONG FOOD AND BEVERAGE SMEs IN PENINSULAR MALAYSIA

By

UMI NADIRAH MAT YUSUF

April 2019

Chairman : Associate Professor Nolila Mohd Nawi, PhD
Faculty : Agriculture

SMEs in manufacturing sector has a crucial role in contributing to Malaysian economy specifically, the food and beverages sector in fulfilling the increasing demand for food in Malaysia. However, there is a rising concern regarding issues on the environmental degradation caused by the aforementioned sector. Sustainable manufacturing practices have been identified as an approach to minimize the effect of manufacturing activities towards environmental degradation.

Thus, the specific objectives of this study were to examine the sustainable manufacturing practices undertaken by the SMEs manufacturers; to identify the association between business profile of SMEs manufacturers and the adoption of sustainable manufacturing practices; to determine the factors that motivate SMEs manufacturers to adopt sustainable manufacturing practices and to predict the most influential factors influencing the SMEs manufacturers towards the adoption of sustainable manufacturing practices.

A total of 378 food and beverages SMEs were selected as respondents and the questionnaires were distributed. Only 375 of the questionnaires were used for analysis, while three questionnaires were discarded due to the incomplete information. The data was analysed using several statistical analyses, namely descriptive analysis, mean ranking analysis, Chi-Square analysis, factor analysis, and logistic regression analysis.

Based on the descriptive analysis, majority of the food and beverages SMEs participated in this research have annual sales turnover between RM300000 to RM15 Millions, which are categorized as small SMEs. Mean ranking analysis showed that most of the SMEs reasoned they have never received summons on environmental problems as the basis to not adopt sustainable practices. Chi-square analysis was conducted to investigate the

association between business profile of food and beverages SME's and the adoption of sustainable practices. The result showed that adoption of sustainable practices has positive significant association with region of SMEs.

The factor analysis revealed four main factors that influenced the adoption of sustainable practices, namely knowledge, economic benefit, stakeholder demand, and financial incentives. Finally, the logistic regression analysis indicated that knowledge, annual sales turnover, and region were the most influential factors that influenced the adoption of sustainable practices among food and beverages SMEs. Based on the findings from the present study, it is highly recommended to involve related agencies to improve the adoption of sustainable practices by providing training programmes to extend the knowledge on sustainable practices among food and beverages SMEs.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Master Sains

**FAKTOR MEMPENGARUHI PENERAPAN AMALAN PEMBUATAN LESTARI
DALAM KALANGAN PENGILANG MAKANAN DAN MINUMAN
PERUSAHAAN KECIL DAN SEDERHANA**

Oleh

UMI NADIRAH MAT YUSUF

April 2019

Pengerusi : Profesor Madya Nolila Mohd Nawi, PhD
Fakulti : Pertanian

Sektor pembuatan Perusahaan Kecil Sederhana (PKS) memainkan peranan yang penting dalam pembangunan ekonomi Malaysia dan sektor pembuatan makanan dan minuman PKS khususnya dalam memenuhi permintaan makanan yang semakin meningkat di Malaysia. Walau bagaimanapun, terdapat kebimbangan yang meningkat mengenai isu kemusnahan alam sekitar kesan daripada pertumbuhan sektor ini. Amalan pembuatan lestari dilihat sebagai salah satu cara untuk meminimumkan kesan aktiviti pembuatan terhadap kemusnahan alam sekitar.

Oleh itu, objektif khusus kajian ini adalah untuk mengkaji amalan pembuatan lestari yang dikendalikan oleh pengilang PKS; untuk mengenal pasti hubungan antara profil pemilik syarikat PKS dengan penerapan amalan pembuatan lestari; untuk menentukan faktor-faktor yang mendorong penerapan amalan pembuatan lestari oleh para pengusaha PKS dan untuk meramalkan faktor-faktor yang mempengaruhi pengeluaran PKS untuk menerapkan amalan pembuatan lestari.

Sejumlah 378 pengusaha makanan dan minuman PKS dipilih sebagai responden dan soalan kaji selidik telah diagihkan kepada PKS yang terpilih. Hanya 375 soalan kaji selidik yang digunakan untuk dianalisis manakala tiga telah dikecualikan oleh kerana data tidak lengkap. Data dianalisis dengan menggunakan beberapa analisis statistik seperti analisis deskriptif, analisis purata kedudukan (mean ranking analysis), analisis Khi kuasa dua, analisis faktor, dan analisis regrasi logistik.

Berdasarkan analisis deskriptif, majoriti pengeluaran makanan dan minuman PKS yang mengambil bahagian dalam penyelidikan mempunyai perolehan jualan tahunan diantara RM300000 ke RM15 juta . Hasil analisis purata kedudukan menunjukkan bahawa

kebanyakan wakil syarikat PKS menyatakan bahawa alasan untuk tidak mengamalkan amalan pembuatan lestari adalah kerana mereka tidak pernah menerima saman berkaitan isu alam sekitar. Analisis (Chi-square) telah dijalankan untuk menyiasat perkaitan antara profil syarikat PKS dan penerapan amalan pembuatan lestari. Keputusan analisa menunjukkan bahawa penerapan amalan pembuatan lestari mempunyai hubungan positif yang signifikan dengan lokasi sesebuah PKS.

Analisis faktor menunjukkan terdapat empat faktor yang mempengaruhi penerapan amalan pembuatan lestari adalah tahap pengetahuan, faedah ekonomi, keputusan pihak berkepentingan, dan insentif kewangan. Akhir sekali,, analisis regresi logistik menunjukkan bahawa tahap pengetahuan, lokasi sesebuah PKS dan jumlah perolehan tahunan adalah faktor utama yang paling berpengaruh dalam mempengaruhi penerapan amalan pembuatan lestari dalam kalangan pengusaha makanan dan minuman PKS. Oleh yang demikian, peranan agensi yang berkaitan dalam meningkatkan penggunaan amalan pembuatan lestari amat disyorkan. Adalah disyorkan bahawa agensi yang berkaitan harus menyediakan program latihan untuk meningkatkan tahap pengetahuan dan kesedaran pemilik syarikat/pekerja syarikat/wakil syarikat) tentang amalan pembuatan lestari dalam kalangan pengusaha makanan dan minuman PKS.

ACKNOWLEDGEMENT

Firstly, Alhamdulillah all praise to Allah for giving me the strength, patience, determination, and ability to complete this thesis.

I would like to express my sincere appreciation to my thesis supervisor, Associate Professor Dr Nolila Mohd Nawi for all her support, patient, guidance, advice, encouragement, and immense knowledge throughout the preparation and completion of the thesis. The same volume of gratitude also express to my thesis co-supervisors Associate Professor Dr Nitty Hirawaty Kamarulzaman and Associate Professor Dr Norsida Man for their great assistance and guidelines on the thesis. I especially thank them for their critical remarks, valuable comments and suggestions through writing this master thesis.

Most importantly, none of this could have happened without my lovely parents, Mat Yusuf Dollah and Norlidar Rifin for their constant support, understanding, unconditional love and experienced all of the ups and downs throughout completing my master thesis. Special thanks to my husband Mohammad Nazim and my in laws family for always being there for me and keep encouraging me with motivational words to overcome the stress and distraction in my study.

Last but not least, my acknowledgement also goes to all my friends Nora Azura, Siti Farhana, Munifah, Nur Adibah, Nursyuhada, Siti Aishah, and others to whom I greatly indebted to who helped directly and indirectly throughout the progress of completing my master thesis. Thank you so much.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of of the Supervisory Committee were as follows:

Nolila Mohd Nawi, PhD

Associate Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Nitty Hirawaty Kamarulzaman, PhD

Associate Professor
Faculty of Agriculture
University Putra Malaysia
(Member)

Norsida Man, PhD

Associate Professor
Faculty of Agriculture
University Putra Malaysia
(Member)

ROBIAH BINTI YUNUS, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

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 other 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: Umi Nadirah binti Mat Yusuf (GS45963)

Declaration by Members of 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) are adhered to.

Signature: _____

Name of Chairman of

Supervisory Committee: Assoc. Prof. Dr. Nolila Mohd Nawi,

Signature: _____

Name of Member of

Supervisory Committee: Assoc. Prof. Dr. Nitty Hirawaty Kamarulzaman

Signature: _____

Name of Member of

Supervisory Committee: Assoc. Prof. Dr. Norsida Man

TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENTS	v
APPROVAL	vi
DECLARATION	viii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS	xiv
CHAPTER	
1	INTRODUCTION
1.1	Small and Medium Enterprises (SMEs) Development in Malaysia 1
1.2	SMEs Contribution to Economy 3
1.3	Environmental Issues 5
1.4	Overview of Sustainable Manufacturing Practices 6
1.5	Problem Statement 9
1.6	Research Questions 9
1.7	Objectives of the Study 10
1.8	Significance of the Study 10
	1.8.1 10
	1.8.2 10
1.9	Summary 11
2	LITERATURE REVIEW
2.1	Sustainable Manufacturing Practices 12
2.2	Review of Proposed Research Model 13
2.3	Factors Driving the SMEs to Adopt Sustainable Manufacturing Practices 15
	2.3.1 Economic Benefit 16
	2.3.2 Financial Incentives 16
	2.3.3 Stakeholder Demand 17
	2.3.4 Legislation 19
	2.3.5 Knowledge 19
	2.3.6 Business Profile 20
2.5	Summary 21
3	METHODOLOGY
3.1	Conceptual Framework 22
3.2	Data Source 24
3.3	Data Collection 24
	3.3.1 Location of the Research 24
	3.3.2 Selection of Sample and Sample Size 24
	3.3.3 Questionnaire Design 25
3.4	Pilot Study 26

3.5	Data Analysis	27
3.5.1	Descriptive Analysis	27
3.5.2	Chi-Square Analysis	27
3.5.3	Factor Analysis	28
3.5.4	Reliability Test	29
3.5.5	Regression Analysis	30
3.6	Summary	32
4	RESULTS AND DISCUSSION	
4.1	Descriptive Analysis	33
4.1.1	Business Profile of Food and Beverages SMEs	33
4.1.2	Respondent's Socio Demographic Profile	34
4.1.3	SME's Perception and Awareness towards Environmental Issues	36
4.1.4	Sustainable Practices Practice by SMEs	38
4.1.5	Reasons for not Adopting Sustainable Manufacturing Practices among SMEs	41
4.2	Chi-Square Analysis	43
4.3	Factor Analysis	44
4.3.1	Reliability Analysis	45
4.3.2	Measure of Sampling Adequacy and Correlation Matrix Significance	45
4.3.3	Communalities	46
4.3.4	Eigenvalue Criteria	47
4.3.5	Factor Influencing the Adoption of Sustainable Practices among Food and Beverages SMEs	47
4.4	Internal Reliability Test	49
4.5	Logistic Regression Analysis	50
4.6	Summary	52
5	SUMMARY AND CONCLUSION	
5.1	Summary of the Findings	53
5.2	Recommendations	54
5.3	Limitations of the Study	54
5.4	Suggestions for Future Research	54
5.5	Conclusion	55
	REFERENCES	56
	APPENDIX	66
	BIODATA OF STUDENT	82
	LIST OF PUBLICATION	83

LIST OF TABLES

Table		Page
1.1	SME Definition	2
1.2	SME GDP and Overall GDP by Key Economic Activity in 2017 (constant 2010 prices)	3
3.1	Coding Variables to Measure Influencing Factors towards Adoption of Sustainable Practices	32
4.1	Business Profile of SMEs Food and Beverages Manufacturers	33
4.2	Respondent's Socio Demographic Profile	35
4.3	Environmental Issues Give Significant Impact to SMEs in Managing Activities	37
4.4	Status on SMEs That Have Specific Manager Responsible in Managing Environmental Issues	37
4.5	Status on SMEs that Follow Environmental Guideline in Managing Environmental Issues	37
4.6	Warehousing and Information	38
4.7	Packaging and Disposal	39
4.8	Manufacturing Operation	38
4.9	Supplier Selection	40
4.10	Corporate Social Responsibility	40
4.11	Reasons For not Adopting Sustainable Manufacturing Practices among SMEs Food and Beverages Manufacturers	41
4.12	Crosstab Table Analysis	43
4.13	Association between Business Profile and Adoption of Sustainable Manufacturing practices among SMEs	44
4.14	Reliability Statistic Test	45
4.15	KMO and Bartlett's Test	46
4.16	Communalities	46
4.17	Factors Influencing Adoption of Sustainable Manufacturing Practices among SMEs Food and Beverages Manufacturers	47
4.18	Internal Reliability Analysis for Factor	50
4.19	Factors Influenced the Adoption of Sustainable Manufacturing Practices among SMEs Food and Beverages Manufacturers	50

LIST OF FIGURES

Figure		Page
1.1	Components of Value Added of SMEs in the Manufacturing Sector	4
2.1	Drivers for the Adoption of Sustainable Manufacturing Practices	14
2.2	Proposed Research Model of Adoption of Green Practices	15
3.1	Conceptual Framework of Adoption of Sustainable Practices among Food and Beverages SMEs	23



LIST OF ABBREVIATIONS

SME	Small and Medium Enterprises
NSDC	National SME Development Council
GDP	Gross Domestic Products
MOA	Ministry of Agriculture and Agro-Based Industry
MITI	Ministry of International Trade and Industry
IMP	Industrial Malaysian Plan
TQM	Total Quality Management
CSR	Corporate Social Responsibility
TPS	Toyota Production System
GHG	Greenhouse Gas
TBL	Triple Bottom Line
LSC	Lean Supply Chain
GTFS	Green Technology Financing Scheme
EMS	Environmental Management System
F&B	Food and Beverages

CHAPTER 1

INTRODUCTION

This chapter embarks on a description on SMEs development and contribution of SMEs towards the country's economy. It will include the overview of sustainable practices, the impact of daily operation by the food and beverage SME's, problem statement of the study, research objectives, and research questions, followed by significance of the study.

1.1 Small and Medium Enterprises (SMEs) Development in Malaysia.

Malay Peninsula or Malaya, during the fourteenth has been trading variety of commodities anchoring in porcelain and spices for its economy development. While the Malayan economy concentrated mainly on the production of worldwide commodities, palm oil, and tin rubber in the seventeenth century. Commodity based economy has impacted the country positively that it is continued upon achieving independence since 1957 to 1970s. Those years have observed a high involvement of SMEs in Malaysian especially in agricultural and small services like wholesaling, and restaurants retailing and restaurant (Ahmad, 2012).

Strong economic growth in the late 1980s stems from the Malaysian economy's variegation from the mining and agricultural industries to production activities (Aris, 2007). According to Gomez and Jomo (1998), during the late 1980s, Malaysia is known for its success in being one of the world's main exporter of palm oil, tin, tropical 75 timbers, rubber, pepper, and petroleum in accordance to the rapid developing manufacturing sector. The manufacturing sector performs a role in growing Malaysian exports, particularly electrical and electronic products, and becomes the key factor in boosting fast economic growth. The economic transition causes the basis of numerous small and medium-sized firms specifically in the manufacturing industry. However, in the late 1980s, the development plans for SMEs, particularly hub on the domestic oriented market, small scale industries, and the bumiputera commercial and industrial community specifically (NSDC, 2005).

The elements of small and medium-sized enterprise became increasingly noteworthy in the Malaysian economy around mid 1990s. These enterprises have become mediums to generate domestic led investment, stimulate economic expansion, and increase job chances due to the Asian financial crisis in 1997-1998 as well as the globalization force (Aris, 2007). As a conclusion, small and medium-sized enterprises have been converted and reinforced as a instrument for strengthening national capital while establishing useful links in the growth of a wide, competitive production sector globally. SMEs have continuously risen and many operations promoted by the Malaysian government have been included. The companies also participate extensively in service operations instead

of concentrating on manufacturing and agricultural operations and have proved flexible in the evolving company environment (NSDC, 2009/10).

The year 2004 marked the establishment of the National Council for SME Development (NSDC) as another component of the development of Malaysia's SMEs. NSDC is responsible for formulating SME development policies across all economic sector, managing SME programs introduced by associated ministries and agencies, promoting collaboration with the private sector and ensuring the efficient execution of the SME development programs in this nation as a whole. The policies launched by the NSDC include improving access to finance, financial reorganization, consultancy facilities, data, coaching and advertising coordination, and a extensive SME database to monitor SMEs ' advancement across all economic industries. Small and Medium Industries Development Corporation (SMIDEC) was assigned by NSDC in 2007, formally renamed SME Corporation Malaysia in 2009, to draw up general policies and strategies for SMEs and to coordinate programs across all associated ministries and agencies. The government remains to conduct multiple SME development programs through its ministries and organizations in line with the macro objectives set under the SME Masterplan and one of the main objectives of the SME Masterplan is to increase SME productivity levels.

Thus, the aim in 2016 was to remain focus on critical areas such as innovation and technology implementation as well as the development of human resources that will further stimulate SME development in the economy. The programmes also adressed other key issue affecting the operation of SMEs, such as acess to financing and market. In 2017, a sum of RM10.5 billion was invested on implementing 168 SME development programmes, benefiting approximately 600,000 SMEs across all industries. Our SMEs encounter huge competition against those who are in more advanced economies therefore the Government has reestablished the Ministry of Entrepreneur Development in 2018 to help stimulate the growth of SMEs. A revision of the definition was carried out in 2013 and a new definition of SMEs was approved in July 2013 at the 14th NSDC meeting. On 1st January 2014, the new definition of SMEs became effective. The simplified definition as shown in Table 1:1 below.

Table 1.1: SME Definition

	Manufacturing	Services and Other Sectors
Micro	Sales turnover < RM 300000 OR < 5 full-time employees	Sales turnover < RM300000 OR < 5 full-time employees
Small	Sales turnover from RM300000 to < RM15 million OR full-time employees from 5 to < 75	Sales turnover from RM300000 to < RM3 million or full-time employees from 5 to < 30
Medium	Sales turnover from RM15 million to < RM50 million OR full-time employees from 75 to < 200	Sales turnover from RM3 million to < RM20 million OR full-time employees from 30 to < 75

Source: SME Corp, 2014

1.2 SME's Contribution to Economy

Based on data from the Department of Statistics Malaysia, SMEs' real GDP performance has continuously outperformed the overall economy with an average annual growth rate of 6.6% for SMEs compared with 5.2% for the overall GDP in the 2011-2017. This has led to an increase in SMEs' contribution to overall GDP from 32.2% in 2010 to 37.1% in 2017.

Small and medium-sized companies accounted for 37.1% of gross domestic product (GDP), 66.0% of employment and 17.3% of exports in 2017 compared with 2016. The latest statistic in Malaysia is a total enterprise 907,065 enterprises that are active and still in operation and from the total is the enterprise from the category of micro, small, and medium enterprises involved in the service sector (89.2%), manufacturing sector (5.3%), the construction (4.3%), agricultural (1.1%) and quarrying sector (0.1%) (SME Annual Report 2017/2018). The contribution of this industry in the context of economic development of the country is seen highly especially in the production of food products that meet the specifications of the international standard.

The manufacturing industry adds 21.5 per cent to the total GDP of SMEs in 2017, based on Table 1.2 (SME Annual Report 2017/2018).

Table 1.2: SME GDP and Overall GDP by Key Economic Activity in 2017 (constant 2010 prices)

	2017 (Percentage share to Total (%))	
	SME GDP	Overall GDP
Services	59.7	54.5
Manufacturing	21.5	23.0
Agriculture	11.2	8.2
Construction	5.8	4.6
Mining & Quarrying	0.4	8.4
Plus: import duties	1.4	1.4
Total	100.0	100.0

Source: SME Annual Report 2017/2018

On the basis of Figure 1.1, in the manufacturing industry, food, drinks and tobacco accounted for 21.8% of SMEs the total value added. It demonstrates that the food and beverage industry make a significant contribution to the manufacturing sector of SMEs.

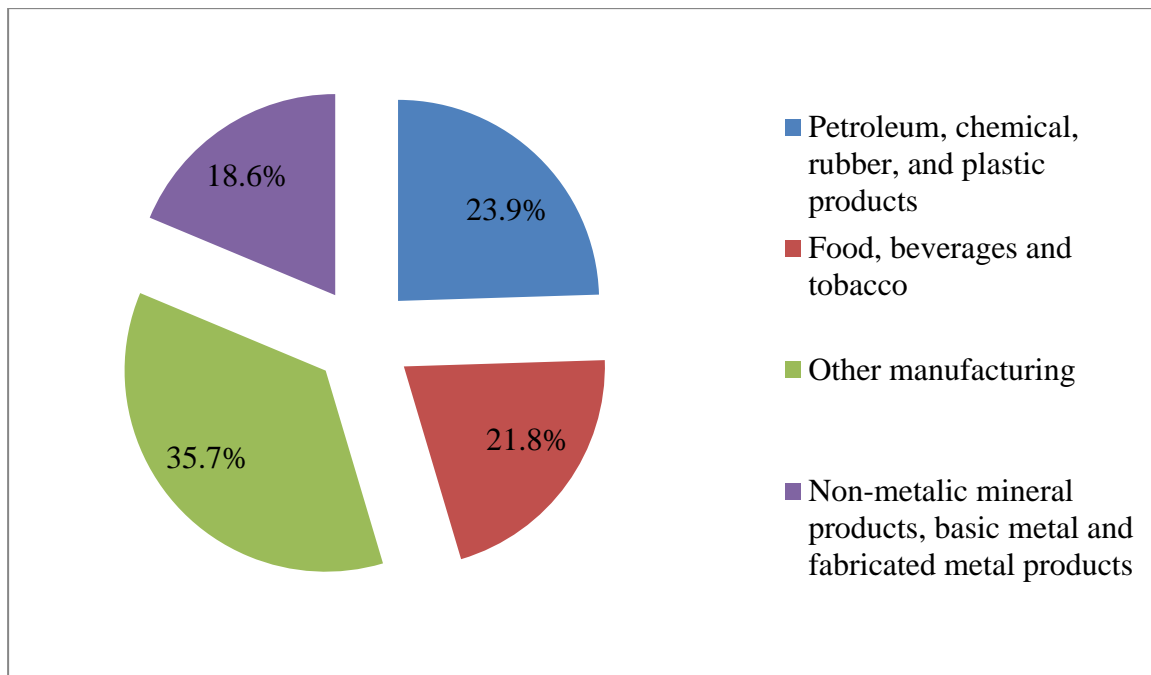


Figure 1.1: Value Added Components of Manufacturing SMEs for 2017

SMEs have opened up employment possibilities, increased income and changed the life of populations and formed the vital construction blocks for bigger companies. As a result, the position of SMEs in a working business system is increasingly being realized globally. Malaysia's SMEs are becoming a main development catalyst to achieve a strong revenue and inclusive country by 2020.

Human population had been increased day by day and it had caused the increasing in the food products productivity. Human need foods to live, thus, manufacturers are forced to increase their production scale as a result from the growing demand of food products. Food industry has developed remarkably in the past two decades from the Malaysian food industry perspectives and is extremely important to the Malaysian economy. Food industry is crucial for Malaysia's development because it contributes greatly to Malaysian trade. The food production sector accounts for about 10% of the manufacturing industry in Malaysia and Malaysian Investment Development Authority (2014) disclosed that Malaysia produced approximately RM14.2 billion food products in 2013 and shipped them to over 200 nations worldwide. To date, in 2017, processed food has contributed RM21.1 billion and shipped out to more than 200 countries, while the value of imported processed food is RM20.7 billion (Malaysian Investment Development Authority, 2018).

The food commodities sub-sector is projected to expand at an average rate of 7.6 percent per year owing to enhanced of the production effectiveness as stated by the Ministry of Agriculture and Agri-Based Industry (MOA). For that reason, Malaysian food processing industry will be encourage and boost up so that it become crucial element of the agro-based industry. In the Third Industrial Malaysian Plan 2006-2020 (IMP3), the Ministry of International Trade and Industry (MITI) granted a total of RM24.6 billion to aid the food and beverage production sector.

1.3 Environmental Issues

Basic resources like land, water and energy are going to be utilized by the SME's micro, small, medium or large and in any industry that includes manufacturing, agriculture or even services (Nik Wan, Asar, Mohamed Zain, 2017). Thus, smaller size is not a reason for SMEs to disregard their effects either on the social issues or on the ecological issues. Out-dated technologies, lack of efficiency in raw material management and lack of awareness with legislation as well as pollution control facilities are still used by most of the SMEs these days (Condon, 2004; Feil, de Quevedo, & Schreiber, 2015).

Papargyropoulou, Wright, Lozano, Steinberger, Padfield & Ujang (2016) added it is inevitable that the edible food waste are disposed to landfill despite the growing realization and interest towards minimizing the food waste initiatives. Food waste anaerobic digestion in landfill generates methane that is twenty-one times more powerful than carbon dioxide. Hussin (2015) also stated that, as the amount of landfill produced continues to grow alongside cities' limitations on handling it, food packaging strongly linked to this sector requires comprehensive systematic waste management.

Hussin (2015) explained that, sample surveys in United States estimate that processed food moves over more than 1,300 miles, while fresh produce travels lengthy distances. Consequently, an immense quantity of greenhouse gas (GHG) produced along the way is the outcome of the use of massive quantities of fossil particularly by imported food. Furthermore, the approximately 11% of the worldwide food system's GHG emissions are due to the food's transportation. Related to both climate change and sustainability of the food production and distribution system, food miles and CO₂ emissions' argument are growing mainly in developed world economies. Exporting and importation in business activities for food producing will come along a high price; in distinction with a number of environmental activist who presume it as detrimental to environment, harm regional economies, and hinder several aspects of communities such as induced noise and accidental rate. As a consequence, food processing and production were accused of being one of the main contributors to disrupting the sustainability of the ecosystem.

Papargyropoulou, Lozano, Steinberger, Wright, & Ujang (2014) added that land, air, and water contamination from food's manufacturing processes, and rapid increase of greenhouse gas (GHG) emission from within the decomposition of organic waste and the food supply chain are the effects from the food production and consumption. Besides, Searchinger, Hanson, Ranganathan, Lipinski, Watie, Winterbottom, Dinshaw, & Heimlich (2013) revealed that GHG releases from food production and consumption are predicted to proceed to grow in light of the exponential growth of the human population. In addition, increase in the complexity of worldwide food supply chains is the result from the increase of consumers' demand on seasonal and more varied food products. (Padfield, Papargyropoulou, & Preece, 2012).

Result from research study on food, greenhouse gas emission and the changing climate by Garnett & Garnett (2008) disputed that worldwide environmental degradation was caused by food production and consumption. According to Hillary (2000), the estimated collective communal of small and medium-sized companies (SMEs) manufacturing operations towards the ecosystem, which is noteworthy and could exceed the overall environmental impact of large companies was disputed despite the fact that many prior research focused on the environmental impact of large companies. In short, the fact that greater consideration need to be considered to the SMEs industries in the environmental management and social literatures may be debated.

A MARDI research revealed an alarming statistic that 15,000 tons of food is wasted every day. Food waste in Malaysia has hit a critical point, as statistics from the Solid Waste Management and Public Cleansing Corporation (SWCorp) report that 55% of solid waste disposed in landfills consists of food. Malaysians allegedly have at least 3,000 metric tons of food per day that is still eligible for consumption, with the quantity increasing during the festive times (The Star 2018). In addition, food represented between 31% and 45% of the 36,000 tons of waste produced annually by Malaysians. The treatment procedure for all the food waste and the transportation to treatment plants needs more fuel for transportation. The process of producing, packaging and transporting food waste involves built-in energy expenses equivalent to at nearly 15 million tons of carbon dioxide annually (Latip, Sharkawi, Sharifuddin, & Mohamed, 2018).

As a result of the above mentioned, the important stakeholders of the manufacturing industry are becoming more responsible to the environment with respects to the products and the process. These people comprise of regulatory policy makers, shareholders, customers, and employees on the manufacturing organizations (Gomez, 2008; Rusinko, 2007). Sustainable practices were therefore required and seen as a primary source of improved company performance by many manufacturing firms in many countries around the globe, including the Asia-Pacific region, the United Kingdom and the United States (Anis, & Nurul, 2012; Seidel, Shahbazpour, & Seidel, 2007).

1.4 Overview of Sustainable Manufacturing Practices

Research from Carley, Jasinowski, Glassley, Strahan, Attari, & Shackelford (2014) revealed that scholars, industry, governments, and trade associations used many different definitions of sustainable manufacturing. Over time, the definition of sustainable manufacturing has evolved as more studies are conducted and develop a better understanding on sustainable manufacturing concept. There are two independent element yet related in sustainable manufacturing. It included the products that use minimum material or energy resources when it being produced, and minimize the environmental impacts along their life cycle stage. There are four main concepts of sustainable practices namely Total Quality Management (TQM), and Corporate Social Responsibility (CSR) lean and green practices. It includes operations in reducing waste, and at the same time focused on ethical commitment (Carley *et al.*, 2014).

Another study by Miller, Pawloski, & Stanridge (2010) added that lean manufacturing which is synonymous with The Toyota Production System (TPS) began in Japan after World War II. Eliminating waste, which results in greater efficiencies, is the idea behind TPS and “lean”. The waste involves overproduction, human capital, inventory, movement, correction, over-processing and storage. Lean manufacturing strategies enhanced business efficiency by improving manufacturing productivity by decreasing set-up times and work in process inventory that improve throughput times (Tu *et al.*, 2006). Moreover, Lopes, Freitas & Saousa (2015) stated that increasing flexibility in production and reducing lead times are the outcome of lean practices being adopted by Portuguese food and beverage firms.

Research conducted by Rusinko (2007) on green manufacturing found to imply environmentally safe, the word “green” is frequently used. The Green Party first developed this ideology in Australia in the early 1970s. Specifically, it seeks to eradicate or minimize waste that has a negative impact on the atmosphere, “green” production, sometimes referred to as sustainable production. Such disposal products are hazardous to the environment and natural resources. In addition to the end product, green production also involves the awareness of the life cycle of a product. This implies that the elements and equipment produced and used along the supply chain are sort, toxicity, and emissions of products used at every stage along the supply chain are intentional when a item is produced.

Carley *et al.* (2014) disclosed that the usually quoted and mentioned “Triple Bottom Line” or simply “people, planet, profits” is included in many businesses’ sustainable attempts. Study on the implementation of TQM in the food industry in Germany shows positive effects on the achievement of the business through the adoption of methods (Morath & Doluschitz, 2009). The TQM of W. Edwards Deming is also essential for sustainable production. It enables a business to produce more sustainably by being more effective and using less natural resources; however, in the name of sustainability, most firms will not risk their product's worth (Morath & Doluschitz, 2009).

The concept of corporate social responsibility is above and beyond the organizations’ production of quality products and the company's bottom line which is to have morality and ethics to employees, suppliers, customers, and local community The phrase “corporate social responsibility” has been used by business since at least 1960s (Carley *et al.*, 2014). Besides, Collins, Roper, & Lawrence (2010) agreed that ‘corporate’ duties and how a business handles its staff and their communities are part of social responsibility. Littig, & Griebler (2005) added that social accountability relies on integrating procedures and strategies that are aware of social effects in business day-to-day activities. Included in social responsibility practices are those related to fundamental needs and quality of life, volunteers, integration into social networks and gender equity, labour practices and human rights (Lankoski, 2008), training employees in sustainability, sustainable education, and outreach (Rusinko, 2007).

The result from research study on the concept of sustainable manufacturing by Moldavska & Welo (2017) concluded that all of the principles which are lean, green,

TQM, and CSR are employed in today's sustainable manufacturing. Results from sustainable production strategies were reduced energy and water, waste reduction, and awareness of the impacts of manufacturing processes on workers and local communities. To sum up, we define sustainable production as using less power and resources to generate a product that is just as effective and of the same quality as a replacement product.

Guide, Harrison, & Van Wassenhove (2003) clarified that, among other attempts, sustainability initiatives are driven by government engagement to greenhouse gas (GHG) emission decrease. Many of the firms' owner attempts to implement similar initiatives given the equilibrium between the three dimensions known as economics, nature and social issues differ significantly across businesses. Some argue that achieving this equilibrium in the commercial globe is highly difficult and say, "In some instances, sustainable solutions will never be lucrative, regardless of how smart or creative the business model is."

The majority of small and medium-sized enterprises claim some awareness, but many of them still absence knowledge of the meaning of sustainable production. If they do not understand the significance of the word, the producers will experience an issue in applying the methods. Companies think that government plays an important part in promoting producers to embrace sustainable production methods, but there is little public stress in the Caribbean for producers to pursue sustainable activities. The majority of companies think that the government can provide economic rewards in the form of tax cuts and green plans in an attempt to motivate producers to implement sustainability procedures in their manufacturing operations (Millar & Russell, 2011).

In a research of 304 UK producers, the customer's pressure, laws and regulation are disclosed as the main internal drivers for the implementation of sustainable manufacturing techniques (Millar & Russell, 2011). In other hand, a study of 811 Small and medium sized enterprises in New Zealand revealed that they do not confront with any outside force to implement sustainable strategies (Lawrence, Collins, Pavlovich, & Arunachalam, 2006). It demonstrates that local companies still adopt sustainable manufacturing methods, even in the lack of rigorous legislative requirements. Sustainable manufacturing practices are aimed to optimize production efficiency while minimizing environmental impact. The implementation of sustainable manufacturing practices among companies has been enlarged these days. Hence, firms are able to get better access to international markets, enhance business profile, consumer perception and corporate reputation as well as increasing the manufacturing capacity (Adebambo, Ashari, & Nordin, 2015).

1.5 Problem Statement

From Malaysian food and beverages industry points of view, the industry has developed fundamentally and plays a part in Malaysian economy. The sector accounted for 21.8% of total value-added of SMEs in manufacturing sector. Due to the expanding of human populace, the demand for food is also increasing causing the food and beverages

manufacturers to increase their production volume. Despite the contribution of the food and beverage industry to the Malaysian economy, this sector's growth has led in severe economic effects such as greenhouse gas emissions and solid waste generation (Latip, Sharkawi, Sharifuddin, Mohamed, 2018). Within the food production supply chain, the focus is highlighted to the greenhouse gas emission as the consequence of large energy usage, chlorofluorocarbon from food refrigeration and embedded emission once food is wasted. One way to address the environmental impacts in the food and beverage sector is to increase adoption of sustainable practices in the production phase (Salim & Padfield, 2017).

Implementing sustainable methods in manufacturing activities promotes the development of manufactured item that use a minimum amount of material / energy resources and have minimal environmental impacts throughout their life cycle stages. In addition, the exercise promotes sustainable procedures, manufacturing technologies and supply chains to maintain substance / energy reserves and minimize environmental impacts. Besides that, the pressure also comes from the government, policy makers and consumer for food and beverages manufacturers to engage in sustainable practices. This concern has necessitated the need to implement sustainable manufacturing practices which is aim at reducing the negative impact of manufacturing sector focusing on food and beverages industries daily operation on the environment.

While sustainable practices are practiced and extensively researched in developed countries, its advocacy and implementation in developing countries is still in its infancy. (Abdul Rashid, Sakundarini, Ariffin & Ramayah, 2017). Therefore, this study seeks at providing insights into drivers of sustainable practices in developing countries, particularly in Malaysia concentrating on food and beverages SMEs.

1.6 Research Questions

- i. What are the sustainable practices undertaken by the SMEs in manufacturing sector focusing on food and beverages industries?
- ii. Is there any association between business profile of food and beverages SME's and the adoption level of sustainable practices?
- iii. What are the factors that influence the food and beverages SME's towards the adoption of sustainable practices?

1.7 Objectives of the Study

The general objective of this study is to study the adoption of sustainable practices among SMEs in manufacturing sector focusing on food and beverages industries in Peninsular Malaysia. The specific objectives are:-

- i. To examine the sustainable practices undertaken by the food and beverages SME's.
- ii. To identify the association between business profile of food and beverages SME's and the adoption of sustainable practices.
- iii. To determine the factors that motivate food and beverages SME's for adopting the sustainable practices.
- iv. To predict the most influential factors influencing the food and beverages SME's towards the adoption of sustainable practices.

1.8 Significance of the Study

In terms of sustainable practices studies in Malaysia, most of the researchers basically conducted a research regarding on sustainable practices but not many are focusing on sustainable practices among food and beverages SME's.

1.8.1 Food and Beverage SME's

Food and Beverage SMEs sector need to acknowledge that their daily operation give significant impact on the environmental degradation. Hence, it is important for them to minimize this impact by adopting this sustainable practice. As the in Food and Beverages SMEs sector acknowledge that their daily operation give significant impact to the environmental degradation, they will properly adopt the sustainable practices in daily operation to minimize the impact.

The result can guide Food and Beverage SMEs sector in getting better understanding on the sustainable practices and the benefits of properly adopt the practices in their daily operation.

1.8.2 Government and Policy Makers

Lack of financial and management resources are the barriers of SMEs to embrace sustainability, therefore it is advisable for the government to supply financial aid and other incentives to business to allow them to overcome the challenges and issues which benefits can be gained from their environmentally friendly operation.

The result from this research can guide the policy makers to create new policy regarding the need to have a proper policy highlighting the importance of in Food and Beverages SMEs sector to properly adopt the sustainable practices as to minimize their impact of daily operation to the environmental degradation. This new policy can ensure that the Food and Beverage SMEs sector to strictly obey the new policy.

1.9 Summary

This chapter provide details of the background of the research on brief information regarding SMEs in Malaysia, environmental issues that arise cause by the SMEs manufacturing sector focusing on food and beverages industries daily operation in Malaysia and the other parts of countries as well, and also information on the adoption sustainable manufacturing practices in Malaysia and around the world. Besides, it explains the problem statement which shall be answered in research questions and objectives of the study.



REFERENCES

- Abu Talib, N. (2007). Commercialization and its discontents, 423. Retrieved from <https://dspace.stir.ac.uk/handle/1893/390>
- Abdul Rashid, S. H., Sakundarini, N., Ariffin, R., & Ramayah, T. (2017). Drivers for the adoption of sustainable manufacturing practices: A Malaysia perspective. *International Journal of Precision Engineering and Marketing*, 18(11), 1619-1631.
- Abdullah, M., & Zailani, S. (2016). Barriers to green innovation initiatives among manufacturers : the Malaysian case. *Review of Managerial Science*, 10(4): 683–709. <https://doi.org/10.1007/s11846-015-0173-9>
- Aboelmaged, M. (2018). The drivers of sustainable manufacturing practices in Egyptian SMEs and their impact on competitive capabilities: A PLS-SEM model. *Journal of Cleaner Production*, 175: 207–221. <https://doi.org/10.1016/j.jclepro.2017.12.053>
- Achanga, P., Shehab, E., Roy, R., & Nelder, G. (2006). Critical success factors for lean implementation within SMEs. *Journal of Manufacturing Technology Management* (Vol. 17). <https://doi.org/10.1108/17410380610662889>
- Adebambo, H. O., Ashari, H., & Nordin, N. (2015). An empirical study on the influence of sustainable environmental manufacturing practice on firm performance. *Journal of Sustainability Science and Management*, 10(2), 42–51.
- Ahmad Tarmizi, H., Kamarulzaman, N.H., Abd Latiff, I., Abd Rahman, A. (2004). Factors behind third-party logistic providers readiness towards halal-logistic. *International Journal of Supply Chain Management*, 3(2): 53-62.
- Ahmad K (2012). ‘The Use of Management Accounting Practices in Malaysian SMEs’, Unpublished Doctoral’s dissertation, University of Exeter, United Kingdom.
- Anis, F. M. & Nurul, F. H. (2012). The development of sustainable manufacturing practices and sustainable performance in Malaysian automotive industry. *Journal of Economics and Sustainable Development*, 3(7): 130–138.
- Aris N M (2007), “SMEs: Building blocks for economic growth”. *Journal of Department of Statistics, Malaysia*, 1(2): 1-14.
- Banerjee, S.B., Iyer, E.S., & Kashyap, R. K. (2003). Corporate Environmentalism: Antecedents and Influence of Industry Type. *Journal of Marketing*, 67(2), 106–122.
- Bansal, P. and K. Roth: (2000). ‘Why companies go green: A model of ecological responsiveness’. *Academy of Management Journal* 43(4): 717–736. <https://journals.aom.org/doi/abs/10.5465/1556363>
- Bhaskaran, S. (2006). Incremental innovation and business performance: Small and medium-size food enterprises in a concentrated industry environment. *Journal of Small Business Management*, 44(1), 64–80. <https://doi.org/10.1111/j.1540-627X.2006.00154.x>
- Bourlakis, M., Maglaras, G., Aktas, E., Gallear, D., & Fotopoulos, C. (2014). Firm size and sustainable performance in food supply chains: Insights from Greek SMEs.

- Bradford J, and F. E. (2008). Local authorities, climate change and small and medium enterprises: identifying effective policy instruments to reduce energy use and carbon emissions. *Corporate Social Responsibility and Environment Management*, 15(3): 156–172.
- Carley, S., Jasinowski, J., Glassley, G., Strahan, P., Attari, S. & Shackelford, S. (2014). Success Paths to Sustainable Manufacturing, (October), 5–29.
- Chao, P. (2001). The moderating effects of country of assembly, country of assembly, country of parts, and country of design on hybrid product evaluations. *Journal of Advertising*, 30(4): 67-81.
- Child, D. (2006). *The essentials of factor analysis*. (3rd ed.). New York, NY: Continuum International Publishing Group.
- Clement, K., & Hansen, M. (2003). Financial incentives to improve environmental performance: A review of nordic public sector support for SMEs. *European Environment*, 13(1): 34–47. <https://doi.org/10.1002/eet.308>
- Coakes, S. J., Steed, L., & Ong, C. (2010). *SPSS: Analysis without Anguish*. Milton, Qld: John Wiley & Sons Australia Ltd.
- Courtney, M. G. R., & Gordon, M. (2013). Determining the number of factors to retain in EFA: Using the SPSS R-Menu v2. 0 to make more judicious estimations. *Practical Assessment, Research & Evaluation*, 18(8), 1-14.
- Collins, E., Roper, J., & Lawrence, S. (2009). Sustainability practices: Trends in New Zealand businesses. *Business Strategy and the Environment*, 18: 1–16.
- Condon, L. (2004). Sustainability and small to medium sized enterprises-How to engage them. *Australian Journal of Environmental Education*, 20(1), 57–67.
- De Bruijn, T. & Lulofs, K. (2001). Promoting environmental management in Dutch SMEs: Policy Implementation in Networks. In Proceeding " Voluntary, Collaborative and Information-Based Policies: Lessons and Next Steps for Environmental and Energy Policy in The United States and Europe. 10th-11th May, 2001, at Harvard University.
- D'Souza, C & Peretiakko, R. (2002). The nexus between industrialization and environment. *Environment Management and Health*, 13(1), 80–97.
- Dües, C. M., Tan, K. H., & Lim, M. (2013). Green as the new Lean: How to use Lean practices as a catalyst to greening your supply chain. *Journal of Cleaner Production*, 40, 93–100. <https://doi.org/10.1016/j.jclepro.2011.12.023>
- Easterby-smith, M., Lyles, M. A., & Tsang, E. W. K. (2008). Inter-organizational knowledge transfer : Current themes and future prospects. *Journal of Management Studies*, 45(4): 677–690. <https://doi.org/10.1111/j.1467-6486.2008.00773>
- Feil, A. A., de Quevedo, D. M., & Schreiber, D. (2015). Selection and identification of the indicators for quickly measuring sustainability in micro and small furniture

- industries. *Sustainable Production and Consumption*, 3(June), 34–44. <https://doi.org/10.1016/j.spc.2015.08.006>
- Field, A. (2009). *Discovering Statistics using SPSS*. New Delhi: Sage publications.
- Friedman, A.L., Miles, S., & Adams, C. (2000). Small and medium sized enterprises and the environment: Evaluation of a specific initiative aimed at small and medium enterprises, *Journal of Small Business and Enterprise Development*, 7(4): 325–342.
- Garnett, T., & Garnett, T. (2008). Cooking up a Storm: Food, greenhouse gas emissions and our changing climate. *International Journal of Climate Change Strategies and Management*, 1(2): 211–217. <https://doi.org/10.1108/ijccsm.2009.41401bae.006>
- Gandhi, N. S., Thanki, S. J., & Thakkar, J. J. (2018). Ranking of drivers for integrated lean-green manufacturing for Indian manufacturing SMEs. *Journal of Cleaner Production*, 171: 675–689. <https://doi.org/10.1016/j.jclepro.2017.10.041>
- George, D., & Mallery, M. (2003). Using SPSS for Windows step by step: a simple guide and reference.
- Ghazilla, R. A. R., Sakundarini, N., Abdul-Rashid, S. H., Ayub, N. S., Olugu, E. U., & Musa, S. N. (2015). Drivers and barriers analysis for green manufacturing practices in Malaysian smes: A preliminary findings. *Procedia CIRP*, 26, 658–663. <https://doi.org/10.1016/j.procir.2015.02.085>
- Gomez, E. T., & Jomo, K. S. (1998). *Malaysia's Political Economy: Politics, Patronages, and Profits*. (2nd ed). United Kingdom, UK: Cambridge University Press.
- Guide, V. D. R., Harrison, T. P., & Van Wassenhove, L. N. (2003). The challenge of closed-loop supply chains. *Interfaces*, 33(6): 3–6.
- Gunningham, N., & Sinclair, D. (1997). *ACEL final report: Barriers and motivators to the adoption of cleaner production practices*: Canberra, 1997. Retrieved from Australian Center for Environmental Law website: <http://www.bvsde.paho.org/bvsacd/cd25/acel.pdf>.
- Hair, J. F., Black, W.C., Babin, B.J. & Anderson, R.E. (2010). *Multivariate data analysis*. (7th ed). Prentice Hall, Upper Saddle River, NJ: Prentice Hall.
- Hair, J.F., Bush, R.P., & Ortinau, D.J. (2006). *Marketing Research: Within a changing information environment*. Boston, MA: McGraw-Hill/Irwin.
- Hameed, A., Universiti, O., Ashari, H., Utara, U., Norani, N., & Utara, U. (2014). Driving Factors of Sustainable Environmental Manufacturing. *Journal of Technology and Operation Management*, 9(2), 7–16.
- Henriques, I., & Sadorsky, P. (2007). Environmental technical and administrative innovations in the Canadian manufacturing industry. *Business Strategy and the Environment*, 16(2): 119–132. <https://doi.org/10.1002/bse.475>
- Hillary, R. (1999). Evaluation of study reports on the barriers, opportunities and drivers for small and medium enterprises in the adoption of environmental management systems: United Kingdom, 1999. Retrieved from the Department of Trade and

Industry website: <https://www.worldcat.org/title/evaluation-of-study-reports-on-the-barriers-opportunities-and-drivers-for-small-and-medium-sized-enterprises-in-the-adoption-of-environmental-management-systems/oclc/59499736>

- Hillary, R. (Ed.). (2000). *ISO 14001: Case studies and practical experiences*. Sheffield: Greenleaf.
- Hilton, M., Archer, E., & van Nierop, P. (2000). Professional Education and Training for Sustainable Development in the UK and the Netherlands: Summary. Retrieved from <http://www.eurofound.eu.int/pubdocs/2000/68/en/1/ef0068en.pdf>
- Hitchens, D., Clausen, J., Trainor, M., Keil, M., & Thankappan, S. (2003). Competitiveness, environmental performance and management of SMEs. *Greener Management International*, 44: 45-57.
- Hox, J. J., & Boeije, H. R. (2005). Data collection: Primary vs. secondary. *Encyclopedia of Social Measurement*, 1: 593-599. <https://doi.org/10.1016/B0-12-369398-5/00041-4>
- Hodgson, Buselich & Halpin (2006). The WA collaboration: Facilitating integration of sustainability issues in a community and civil society context. *Australian Journal of Environmental Management*, 9: 20-27.
- Hogan, T. P., Benjamin, A. M. Y., & Brezinski, K. L. (2000). Reliability methods: A note on frequency of use of various methods. *Educational and Psychological Measurement*, 60(4): 523-531.
- Hussin, H. (2015). *Green Logistic Practices In Malaysia Food-Based Manufacturing Industry*.
- Ilbery, B., & Maye, D. (2005). Food supply chains and sustainability: Evidence from specialist food producers in the Scottish/English borders. *Land Use Policy*, 22(4): 331-344. <https://doi.org/10.1016/j.landusepol.2004.06.002>
- Jenkins, H. (2004). *Corporate social responsibility: Engaging SMEs in the debate: Initial research findings. Report by: The ESRC Centre for Business Relationships, Accountability, Sustainability and Society*. Retrieved from <https://pdfs.semanticscholar.org/7de0/2cd7441d5a31114109bcbe81938d9c84be0c.pdf>
- Katos, G. & Nathan, S. (2004). SME Delivery Mechanism. Presentation of Key Quantitative Research Insight. Retrieved from http://www.sustainability.vic.gov.au/resources/documents/04_sept_15_TQA_final_report.pdf
- Khoa, L. V. (2006). *Greening Small and Medium-Sized Enterprises: Evaluating Environmental Policy in Viet Nam*, (PhD's Thesis, Wageningen University). Retrieved from <http://edepot.wur.nl/121837>
- Kothari, C. R. (2007). *Quantitative techniques*. New Delhi: UBS Publishers LTD.
- Lankoski, L. (2008). Corporate responsibility activities and economic performance: a theory of why and how they are connected. 17, 536-547. <http://dx.doi.org/10.1002/bse.582>. *Business Strategy and the Environment*, 17, 536-

- Latip, M., Sharkawi, I., Sharifuddin, J., & Mohamed, Z. (2018). Investigating Owner-Manager's Intention to Adopt Environmental Management Practices among Food Processing SMEs in Malaysia. *International Journal of Entrepreneurship and Management Practices*, 1 (3), 01-11.
- Lawrence, S. R. R., Collins, E., Pavlovich, K., & Arunachalam, M. (2006). Sustainability practices of SMEs. *Business Strategy and the Environment*, 15(4): 242–257. <https://doi.org/10.1002/bse>
- Lawrence, S. R. R., Collins, E., Pavlovich, K., & Arunachalam, M. (2006). Sustainability practices of SMEs. *Business Strategy and the Environment*, 15(4): 242–257. <https://doi.org/10.1002/bse>
- Lee, S. Y., & Klassen, R. D. (2008). Drivers and enablers that foster environmental management capabilities in small and medium sized suppliers in supply chains. *Production and Operations Management*, 17(6): 573–586. <https://doi.org/10.3401/poms.1080.0063>
- Lekas, D. (2006). Nanotechnology startup concerns, information needs, and opportunities to proactively address environmental, health and social issues: Focus on firms in Connecticut and New York. Retrieved from www.nanotechproject.org/file_download/87
- Littig, B., & Grießler, E. (2005). Social sustainability: A catchword between political pragmatism and social theory. *International Journal of Sustainable Development*, 8(2): 65–79.
- Maholtra, N. (2008). *Essential of Marketing Research: An Applied Orientation*. Australia: Pearson Education Ltd.
- Marsden, S. & Ashe, J. (2006). Strategic environmental assessment legislation in Australian States and Territories. *Australian Journal of Environmental Management*, 9: 205-215.
- Malaysian Industrial Development Authority. (2018). Food Industry in Malaysia. Retrieved from www.mida.gov.my/home/33/pages.
- McKeiver, C. & Gadenne, D. (2005). Environmental management systems in small and medium businesses. *International Small Business Journal*, 23(5), 513–537.
- Miller, G., Pawloski, J., & Stanridge, C. (2010). A Case study of lean, sustainable manufacturing. *Journal of Industrial Engineering and Management*, 11–32.
- Millar, H. H., & Russell, S. N. (2011). The adoption of sustainable manufacturing practices in the Caribbean. *Business Strategy and the Environment*, 20(8): 512–526. <https://doi.org/10.1002/bse.707>
- Mittal, V., Sangwan, K., 2014. Development of a model of barriers to environmentally conscious manufacturing implementation. *Int. J. Prod. Res.* 52(2):584-594. <https://doi.org/10.1080/00207543.2013.838649>

- Moss, L. G., Moss, J. B., & Rutter, W. J. (1998). Systematic binding analysis of the insulin gene transcription control region: Insulin and immunoglobulin enhancers utilize similar trans activators. *Molecular and Cellular Biology*, 8, 2620-2627.
- Moorthy, M. K., Yacob, P., Chelliah, M. K., & Arokiasamy, L. (2012). Drivers for Malaysian SMEs to Go Green. *International Journal of Academic Research in Business and Social Science*, 2(9), 74–86.
- Morath, C., & Doluschitz, R. (2009). 3 Current situation regarding Total Quality Management applications in the food industry. *APSTRACT: Applied Study in Agribusiness and Commerce*, 4(3), 83–87.
- Moldavska, A., & Welo, T. (2017). The concept of sustainable manufacturing and its definitions: A content-analysis based literature review. *Journal of Cleaner Production*, 142, 100–110.
- Naffziger, D. W., Almed, N., & Montagno, R. V. (2003). Perceptions of environmental consciousness in US small businesses: an empirical study. *SAM Advanced Management Journal*, 68(2): 23–32. <https://doi.org/10.1108/17561391111144546>
- Netregs. (2003). SME-nvironment 2003: A survey to assess environmental behaviours among smaller UK businesses. Retrieved from http://www.netregs.org.uk/media/1080/sme_2003_uk_1409449.pdf Production, 166: 744–755. <https://doi.org/10.1016/j.jclepro.2017.08.006>
- Nik Wan, N. Z., Asat, S. H., & Zain, M. M. (2017). Environmental Reporting Practice by SMEs in Malaysia. In *Global Business and Economics Research Journal*, 383-387.
- Nordin, N., Ashari, H., & Hassan, M. G. (2014). Drivers and barriers in sustainable manufacturing implementation in Malaysian manufacturing firms. In *IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 687–691). <https://doi.org/10.1109/IEEM.2014.7058726>
- Norland-Tilburg, E. V. (1990). Controlling error in evaluation instruments. *Journal of Extension*, 28(2): 56. <http://www.joe.org/joe/1990summer/tt2.html>
- NSDC (2005), SME Annual Report, National SME Development Council Malaysia. Retrieved from <http://www.smecorp.gov.my/index.php/en/about/2015-12-21-08-40-32/nsdc>
- NSDC (2009/10), SME Annual Report, Malaysia, National SME Development Council. Retrieved from <http://www.smecorp.gov.my/index.php/en/resources/2015-12-21-11-07-06/sme-annual-report>
- NSDC (2014/15), SME Annual Report Malaysia, National SME Development Council. Retrieved from <http://www.smecorp.gov.my/index.php/en/resources/2015-12-21-11-07-06/sme-annual-report/book/7-annual-report-2014/2-annual-report>
- NSDC (2017/18), SME Annual Report Malaysia, National SME Development Council. Retrieved from www.smecowrp.gov.my/images/SMEAR/SMEAR2017/ENG/FULL.pdf
- Nunnally, J. C. (1978). *Psychometric theory*. (2nd Ed). New York, NY: McGraw-Hill.

- Nutek. (2005). Successful and profitable: How environmental work can benefit your company.
- Padfield, R., Papargyropoulou, E., & Preece, C. (2012). A preliminary assessment of greenhouse gas emission trends in the production and consumption of food in Malaysia. *International Journal Technology*, 3:55-66.
- Pallant, J. (2005). *SPSS survival manual: A step by step guide to data analysis using SPSS*. Sydney: Allen & Unwin.
- Papargyropoulou, E., Wright, N., Lozano, R., Steinberger, J., Padfield, R., & Ujang, Z. (2016). Conceptual framework for the study of food waste generation and prevention in the hospitality sector. *Waste Management*, 49: 326–336. <https://doi.org/10.1016/j.wasman.2016.01.017>
- Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N., & Ujang, Z. bin. (2014). The food waste hierarchy as a framework for the. *Journal of Cleaner Production*, 76(0): 106–115. <https://doi.org/10.1016/j.jclepro.2014.04.020>.
- Pett, M. A., Lackey, N.R., & Sullivan, J.J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*: Sage.
- Petts, J. (2000). Small and medium enterprises and environmental compliance: Attitudes among management and non-management. In Ruth Hillary (Ed). (pp. 49-60). Sheffield: Greenleaf.
- Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of consumer research*, 21(2): 381-391.
- Peter, J. P. (1979). Reliability: A review of psychometric basic and recent marketing practices. *Journal of Marketing Research*, 16: 6-7.
- Pimenova, P. & Van Der, V. R. (2004). The role of support programmes and policies in improving SMEs environmental performance in developed and transition economies. *Journal of Cleaner Production*, 12(6): 549-559.
- Pool, A., Wijngaard, J., & Van Der Zee, D. J. (2011). Lean planning in the semi-process industry, a case study. *International Journal of Production Economics*, 131(1): 194–203. <https://doi.org/10.1016/j.ijpe.2010.04.040>
- Porter, M. & C. van der L. (1995). *Green and Competitive: Ending the Stalemate*. *Harvard Business Review*, 73(5): 120–134.
- Rajendran, D., & Barrett, R. (2003). *Managing Environmental Risk in Small Business: An Agenda for Research* (pp. 1–10).
- Revell, A., Blackburn, R., & Hill, K. (2004). UK SMEs and their Response to Environmental issues. Retrieved from <http://www.psi.org.uk/ehb/docs/BlackburnAug2004ExecSumm.pdf>
- Roni, M., Jabar, J., Mohamad, M. R., & Yusof, M. (2014). Conceptual study on sustainable manufacturing practices and firm performance. *Malaysia Special Issue Sci.Int(Lahore)*, 26(4): 1459–1464.

- Rothenberg, S. & Becker, M. (2004). Technical assistance and the diffusion of environmental technologies in the printing industry. *The Case of SMEs. Business and Society*, 43(4), 366–397.
- Rui Borges Lopes, Filipa Freitas, I. S. (2015). Application of Lean Manufacturing Tools in the Food and Beverage Industries. *J. Technol. Manag. Innov*, 10(3), 120–130.
- Rusinko, C. A. (2007). Green manufacturing: an evaluation of environmentally sustainable manufacturing practices and their impact on competitive outcomes. *IEEE Transactions on Engineering Management*, 54(3), 445–454.
- Russell, S. N., & Millar, H. H. (2014). Exploring the Relationships among Sustainable Manufacturing Practices, Business Performance and Competitive Advantage: Perspectives from a Developing Economy. *Journal of Management and Sustainability*, 4(3), 37–53. <https://doi.org/10.5539/jms.v4n3p37>
- Salazar, L.F., Crosby, R.A., & DiClemente, R.J. (2015). *Research Method in Health Promotion*. (2nd ed). John Wiley & Sons.
- Salim, H. K., Padfield, R., Lee, C. T., Syayuti, K., Papargyropoulou, E., & Tham, M. H. (2018). An investigation of the drivers, barriers, and incentives for environmental management systems in the Malaysian food and beverage industry. *Clean Technologies and Environmental Policy*, 20(3), 529–538. <https://doi.org/10.1007/s10098-017-1436-8>
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8(4):350-353.
- Schrader, C. , Freimann, J. and Seuring, S. (2012). Business strategy at the base of the pyramid. *Business Strategy and the Environment*, 21(5): 281-298.
- Sekaran, U. (2006). *Research method for business: A skill building approach*. United Kingdom: John Wiley & sons, Inc.
- Setbon, M. N., & Raude, J. (2010). Factors in vaccination intention against the pandemic influenza A/H1N1. *European Journal Public Health*, 20: 490-494.
- Searchinger, T., Hanson, C., Ranganathan, J., Lipinski, B., Waite, R., Winterbottom, R., Dinshaw, A., & Heimlich, R. (2013). *Creating a Sustainable Food Future: Interim Findings. A menu of solutions to sustainably feed more than 9 billion people by 2050*. World Resources Institute (WRI), Washington, DC, 2013. Retrieved from the World Research Institute website: https://www.wri.org/sites/default/files/wri13_report_4c_wrr_online.pdf
- Seidel, R. H. A., Shahbazzpour, M., & Seidel, M. C. (2007). Establishing sustainable manufacturing practices in SMEs. *Proceedings of the International Conference on Sustainability Engineering and Science, Talking and Walking Sustainability*. Auckland.
- Schoenherr, T., & Talluri, S. (2012). Environmental Sustainability Initiatives: A Comparative Analysis of Plant Efficiencies in Europe and the U.S. *Science. IEEE Transactions on Engineering Management*, 35(1), 87–108.
- Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for

- sustainable supply chain management. *Journal of Cleaner Production*, 16(15), 1699–1710. <https://doi.org/10.1016/j.jclepro.2008.04.020>
- Simpson, M., Taylor, N., & Barker, K. (2004). Environmental responsibility in SMEs: Does it deliver competitive advantage?. *Business Strategy and the Environment*, 13(3): 156–171. <https://doi.org/10.1002/bse.398>
- Studer, S., Welford, R., & Hills, P. (2005). Drivers and Barriers to Engaging Small and Medium-Sized Companies in Voluntary Environmental Initiatives: Hong Kong, 2005. Retrieved from The Centre of Urban Planning and Environmental Management website: https://www.researchgate.net/profile/Peter_Hills/publication/266469343.pdf
- The British Chamber of Commerce. (2006). Energy Efficiency: The Challenge for Government and Small Businesses. Retrieved from <https://www.britishchambers.org.uk/>
- The Star.(2018,October 15). Malaysian throwing away food at alarming rate.
- Tilley, F. (1999). The gap between the environmental attitudes and the environmental behaviour of small firms. *Business Strategy and the Environment*, 8(4): 238–248. <https://doi.org/10.1002/>
- Tilbury, D., Adams, K., Keogh, A. (2005). A National Review of Environmental Education and Its Contribution to Sustainability in Australia: Business and Industry Education Report: Cranberra, 2005. Retrieved from the Australian Government Department for the Environment and Heritage and Australian Research Institute in Education for Sustainability website: <http://www.aries.mq.edu.au/project.htm>
- Tu, Q., Vonderembse, M.A., Ragu-Nathan, T.S., Sharkey, T. W. (2006). Absorptive capacity: enhancing the assimilation of time-based manufacturing practices. *Journal of Operations Management*, 24(5), 692–710.
- Upton, N., Teal, E.J., & Felan, J.T. (2001). Strategic business planning practices of fast growing family firms. 39(1). *Journal of Small Business Management*, 39(1): 60–72.
- U.S. Department of Commerce: International Trade Administration (2009). Sustainable Manufacturing Initiative. Retrieved from United States Department of Commerce: International Trade Administration: <http://www.trade.gov/competitiveness/sustainablemanufacturing/>
- Vinodh, S., Ramesh, K., & Arun, C. S. (2016). Application of interpretive structural modelling for analysing the factors influencing integrated lean sustainable system. *Clean Technologies and Environmental Policy*, 18(2), 413–428. <https://doi.org/10.1007/s10098-015-1025-7>
- Wen, F. J., & Chung, P. S. (2011). Design of a high-efficiency seven-port beam splitter using a dual duty cycle grating structure. *Applied Optics*, 50(19), 3187. <https://doi.org/10.1364/AO.50.003187>
- Weerasiri, S., & Zhengang, Z., (2012). Attitudes and Awareness towards Environmental Management and its Impact on Environmental Management Practices (EMPs) of SMEs in Sri Lanka. *Journal of Social and Development Sciences*, 3(1): 16-23.

Worthington, I., & Patton, D. (2005). Strategic intent in the management of the green environment within SMEs. An analysis of the UK screen-printing sector. *Long Range Planning*, 38(2): 197–212. <https://doi.org/10.1016/j.lrp.2005.01.001>



© COPYRIGHT UPM

BIODATA OF STUDENT

The student, Umi Nadirah binti Mat Yusuf was born 17th August 1992 in Kemaman, Terengganu. She attended her primary school at Sekolah Kebangsaan Sabak Pengkalan Chepa from 1999 until 2004. She did her secondary school at Sekolah Menengah Sains Machang Kelantan from 2005 until 2009. After she finished her secondary school, she further, she further her study at Universiti Putra Malaysia for her foundation studies. She continued to join Universiti Putra Malaysia for her Bachelor Degree in Agribusiness that she completed in 2015. As her bachelor degree completed, she continued to join Universiti Putra Malaysia for Master Degree in Agribusiness.



LIST OF PUBLICATIONS

Research Paper

Mat Yusuf, U. N., Mohd Nawi, N., Kamarulzaman, N. H., Man, N. (2019). Adoption of sustainable practices among food and beverage SMEs in Peninsular Malaysia. *International Journal of Agriculture, Environment and BioResearch*, 4(5): 143-161. (Published)

Proceeding Paper

Mat Yusuf, U. N., Mohd Nawi, N., Kamarulzaman, N. H., Man, N. (2017). Sustainable practices among food and beverage SMEs in Peninsular Malaysia. In proceeding "3rd International Conference on Food Agricultural and Natural Resources 2017 (FANRES 2017)" 21st-23rd August, 2017, at Universiti Putra Malaysia, Selangor, Malaysia.



UNIVERSITI PUTRA MALAYSIA

STATUS CONFIRMATION FOR THESIS / PROJECT REPORT AND COPYRIGHT

ACADEMIC SESSION : Second Semester 20182019

TITLE OF THESIS / PROJECT REPORT :

FACTORS INFLUENCING SUSTAINABLE PRACTICES ADOPTION AMONG FOOD AND BEVERAGE SMEs IN PENINSULAR MALAYSIA

NAME OF STUDENT: UMI NADIRAH MAT YUSUF

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 (v)

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)
New IC No/ Passport No.:

(Signature of Chairman of Supervisory Committee)
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.]