INFLUENCE OF SUSTAINABLE PRODUCTION ON SUSTAINABLE PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN THE MALAYSIAN MANUFACTURING INDUSTRY

NAZIK MAHMOUD ABBASS

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By

NAZIK MAHMOUD ABBASS

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

November 2018

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DEDICATION

I dedicate this thesis to;

My lovely family members who have always been source of support and encouragement during the challenges

My husband who has been always understanding and supportive

My daughters who have always been accompanied me in my entire journey with amazing love and care

I am indebted to you all

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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Industrialisation has played a significant role in the nation's development. However, in the 20th century, this development was focused mainly on economic growth. Two decades ago, The United Nation raised the issue of merging environmental and social aspects to economic development to mitigate the negative environmental and social impacts of production and consumption. Anchored on the Natural Resource-Based View, implementation of Sustainable production through all process life cycle undertaken as a firms' resource to achieve the sustainable performance, which comprises the environmental pillar, social pillar, and financial pillar will be a competitive advantage and reflect the holistic form of sustainability. In Malaysia context, sustainable production is in an early stage. The general objective is to investigate the factors that influence the implementation of sustainable production through all process life cycle, and its influence on small and medium enterprises (SMEs) sustainable performance encompass the three pillars in Malaysia manufacturing industry. The study employed a self-administered close-ended survey questionnaire for data collection. The survey questionnaire was distributed to the senior managers of manufacturing SMEs in Malaysia, based on the Federation of Malaysia Manufacturers directory (46th edition, 2015). 185 questionnaires were collected as a sample size. The hypotheses examined relationships between stakeholders and top management and sustainable production elements, and sustainable production and SMEs sustainable performance dimensions. Besides, the moderation effect of the company size on the relationship between the sustainable production and sustainable performance dimensions were tested.

The study employed smart-PLS3 software. The response rate for the research was within acceptable range in the Malaysian context. The study found that government, shareholders/owners, and top management but not the customers, influence

sustainable production. Consequently, sustainable production positively influenced manufacturing SMEs' sustainable performance. On the other hand, the company size positively moderates the relationship of sustainable production and sustainable performance collectively and individually except for the social value.

The academic and practical contribution of the study that sustainable practice in its holistic form will results in better performance, hence, for stakeholder, implementation of sustainable production through all process life cycle as useful resource is the right solution for manufacturing SMEs to acquire proper sustainable performance as a competitive advantage. Besides, SMEs required enhancing their access to higher financial and human resource to achieve higher sustainable performance.

Findings of the study should support scholars, governments, and decision-makers to understand the theoretical and practical implications of integrating sustainable production through the whole life cycle. The research framework is developed to propose a set of sustainable production indicators for manufacturing SMEs in Malaysia SMEs, in order to assist the government and decision-makers to support manufacturing SMEs in the implementation the policy of sustainable practice. SMEs required both technical and financial support to improve their resource and capabilities.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PENGARUH PIHAK BERKEPENTINGAN DAN KESAN PENYEDERHAAN SAIZ SYARIKAT KE ATAS HUBUNGAN PENGELUARAN MAPAN UNTUK PRESTASI MAPAN SYARIKAT KECIL DAN SEDERHANA DALAN INDUSTRI PENGELUARAN MALAYSIA

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Perindustrian telah memainkan peranan penting dalam pembangunan negara. Walau bagaimanapun, pada abad ke-20, perkembangan ini tertumpu pada pertumbuhan ekonomi. Dua dekad yang lalu, Pertubuhan Bangsa-bangsa Bersatu menimbulkan isu penggabungan aspek alam sekitar dan sosial kepada pembangunan ekonomi untuk mengurangkan kesan negatif pengeluaran dan penggunaan terhadap alam sekitar dan sosial. Didasarkan kepada Pandangan Berbasiskan Sumber Asli, pelaksanaan pengeluaran mapan melalui semua proses kitaran hayat yang dilaksanakan sebagai sumber firma untuk mencapai prestasi yang mapan, yang merangkumi bahagian alam sekitar, bahagian sosial dan bahagian kewangan akan menjadi kelebihan daya saing dan mencerminkan kemapanan yang holistik. Dalam konteks Malaysia, pengeluaran mapan berada di peringkat awal. Objektif umum adalah untuk menyiasat faktor-faktor yang mempengaruhi pelaksanaan pengeluaran mempan melalui semua proses kitaran hayat, dan kesannya terhadap prestasi perusahaan yang mapan dan sederhana (PKS) yang merangkumi tiga haluan dalam industri perkilangan Malaysia. Kajian ini menggunakan soal selidik yang dijalankan sendiri untuk pengumpulan data. Tinjauan soal selidik diedarkan kepada pengurus kanan pengeluar PKS di Malaysia, berdasarkan direktori Persekutuan Pengeluar Malaysia (edisi ke-46, 2015).

185 soal selidik telah dikumpulkan sebagai saiz sampel. Hipotesis mengkaji hubungan antara pihak berkepentingan dan pengurusan atasan dan unsur pengeluaran mapan, dan pengeluaran mapan dan dimensi prestasi PKS yang mapan. Di samping itu, kesan kesederhanaan saiz syarikat terhadap hubungan antara pengeluaran mapan dan dimensi prestasi mapan telah diuji. Kajian ini menggunakan perisian pintar-PLS3. Kadar tindak balas untuk penyelidikan adalah dalam jangkauan yang boleh diterima dalam konteks Malaysia. Kajian mendapati bahawa kerajaan, pemegang saham /

pemilik, dan pengurusan puncak tetapi bukan pelanggan, yang mempengaruhi pengeluaran mapan. Oleh itu, pencapaian prestasi mapan pengeluar PKS secara langsung dipengaruhi oleh pengeluaran mapan. Sebaliknya, saiz syarikat secara positif menyederhanakan hubungan pengeluaran mapan dan prestasi mapan secara kolektif dan secara individu, kecuali untuk nilai sosial.

Sumbangan akademik dan praktikal kajian ini adalah mengamalkan amalan yang mapan dalam bentuk holistik akan menghasilkan prestasi yang lebih baik, oleh itu, bagi pihak yang berkepentingan, pelaksanaan pengeluaran mapan melalui semua proses kitaran hayat sebagai sumber yang berguna adalah penyelesaian yang tepat untuk pengeluar PKS untuk memperoleh prestasi yang mapan sebagai kelebihan daya saing. Selain itu, PKS perlu meningkatkan akses mereka kepada sumber kewangan dan sumber manusia yang lebih tinggi untuk mencapai prestasi mapan yang lebih tinggi.

Penemuan kajian ini boleh menyokong para sarjana, pemimpin, dan pembuat keputusan untuk memahami implikasi teoretikal dan praktikal untuk mengintegrasikan pengeluaran mapan melalui kitaran keseluruhan kehidupan. Rangka kerja penyelidikan ini dibangunkan untuk mencadangkan satu set petunjuk pengeluaran mapan untuk pengeluar PKS dalam PKS Malaysia, untuk membantu pembuat keputusan dalam melaksanakan dasar amalan yang mapan.

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Nazik Mahmoud Abbass

This thesis was 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 were as follows:

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LIST OF ABBREVIATIONS

CSD	Commission on Sustainable Development.
EoL	End-of-Life.
GRI	Global Reporting Initiative.
HIPs	High Impact Programmes.
IMP	Industrial Master Plan.
ISO	International Standard Organisation.
LC	Life Cycle.
LCA	Life Cycle Assessment.
LCCA	Life Cycle Cost Assessment.
LCSA	Life Cycle Sustainability Assessment.
LCSP	Lowell Center for Sustainable Production.
NSDC	National SMEs Development Council.
QFDE	Quality Function Deployment for Environment.
SCP	Sustainable Consumption and Production.
SD	Sustainable Development.
SDIs	Sustainable Development Indicators.
SMPS	Sustainable Manufacturing Planning and Simulation.
SP	Sustainable Production.
SPIs	Sustainable Production Indicators.
UN	The United Nation.
UNCED	The United Nation Conference on Environmental and Development.
WTO	The World Trade Organisation.

CHAPTER 1

INTRODUCTION

1.1 Chapter Overview

This introductory chapter begins with the background of the study, which includes the essential elements, and issues of sustainable production. Based on this background, the problem statement is identified and discussed; then, the research questions were generated to be asked to attain the research objectives. Also, presented are the significance of the study, its scope, limitations, and finally, an overview of the way this thesis is organised.

1.2 Background of the Study

For many decades, man-initiated activities have led to many drastic and diverse changes to Mother Earth; deforestation, loss of fish and other marine life, and contaminated water and air, the depletion of the ozone layer, and global warming. The destruction of the environment is now has been a matter of great concern, thus all nations must come together to make the effort to protect the environment and conserve it before it is forever lost to the generations to come (UN, 1992). The concept of sustainable development (SD) has been defined by The United Nations World Conference on the Environment and Development as "the development that meets the needs of the present without compromising the ability of future generations to meet their needs" (UN, 1987). It has been known that there is an essential need to strike a balance between the environmental and socio-economic progress and development (Veleva & Ellenbecker, 2001). Philippine Agenda 21 suggested more two dimensions for the SD, thus the fine new dimensions are addressed as (human being, culture, society, economy, and environment) ("Seven dimensions, 2010, July30").

The high growth on the production activity and infrastructure in the past century was beneficial for developed countries as follow; it create good opportunities by increasing the income, jobs, and improving life style of many people. Besides, empowering investment in public infrastructure and reducing poverty levels. Many countries have modernised their societies and economies, this enabled the greatest level of material wellbeing. However, this rapid economic growth result in harmingl the environment. The use of natural resources – biomass, fossil fuels, ores, minerals and water – has grown dramatically from less than 10 billion tonnes in 1950 to over 70 billion tonnes in 2010 (UNEP, 2011). The high consumption natural resources followed by high amount of waste and high gas and metal emissions. These contribute in series of pressures comprises - global warming, reduced food security, water scarcity and air pollution. It has also lead to scarcity of many resources that are strategically important in modern production and consumption systems. In addition, since the 1980s there has been an increasing gap between wealthy and poor people in both developing countries and developed countries.

The present pattern of consumption and production requisite high demand of natural resource of between 25 and 30 tonnes of materials per capita, per annum. Multiplied by the 9 billion people expected by 2050, this would mean a global material use of between 225 and 270 billion tonnes or three to four times the amounts of 2010. To overwhelmed this high demand required huge amount of resource, which is potentially unaffordable. Such quantities of resource are actually not existing and above the earth carrying capacity (UNEP, 20150).

UN (2015) and UN (2018) emphasised that the system thinking of sustainability aspect should underpin the holistic approach. Better to avoid continue looking at the problem from one view. It is difficult to achieve sustainability unless there is a focus on the holistic picture. Thus the concept of sustainable development is addressed as "the development that embrace the three dimension which is (environment, society, and economic) at the same time".

The concept of SD is a holistic philosophy, which clarifies the interrelation between the three pillars of sustainability (environmental, social, and economic), and explains how the balance between the three pillars can contribute in keeping the earth sustainable. Veleva & Ellenbecker (2001) defined the concept of sustainable development; as "the development which respects all creatures and nature, and does not exceed the world's carrying capacity". Product innovation has been recognized as a resources for organizational regeneration via the exploitation and investigation of different resources and capabilities. The discussion on the relevance of product innovation as an instrument of change and driver of sustainable competitive advantage has extended outside academic circles, and pressures force from different stakeholders (e.g., public administrations, customers, society). Spanning from; manufacturing, to knowledge intensive industries, to deploy significant resources, to develop product innovation strategies (Lafuente, 2018). Therefore, different studies made a strong link between product innovation and sustainable production.

This study focus on how SMEs' sustainable performance is influenced by the implementation of sustainable production through all process life cycle. In this study, the sustainable production is defined as "the production process, which protects the environment, adds social value, and attains good financial returns". This will be achieved by analysing sustainable production to the following elements; sustainable design, sustainable manufacturing, sustainable distribution, and sustainable end-of-life.

Due to modernisation, and rapid growth of population, there has been high demand for goods and services, which has led to high consumption and pollution of the planet's natural resources. Although, industries are one of the main factors involved in the consumption of natural resources, and pollution of the earth, but, still sustainable production as a research area dose not undertaken in depth on the manufacturers perspective about their firms' sustainable performance. Research in manufacturing processes was mainly concentrated on production efficiency and producing products of high quality and low prices. The concept of sustainable production has begun to

gain importance, where the environmental and social impacts of production have been taken into account (Linke, Corman, Dornfeld, & Tönissen, 2013). Consequently, sustainable consumption and sustainable production performance have been recognised (Samuel, Agamuthu, & Hashim, 2013).

The United Nation Conference on Environmental and Development (UNCED) focused on the unsustainable paradigm of consumption and production and addressed them as "major factors that have negative impact on the environment, particularly, in industrialised countries". Then, the concept of sustainable consumption and production (SCP) has been combined with the concept of SD (UN, 1992). Consequently, it has become an obligatory goal to implement sustainable production (SP) to minimise the adverse environmental and social effects of producing goods and services.

The United Nation (UN) strengthened its commitment to the concept of SCP by adopting the 10-year framework of programmes (10 YFP) on SCP. The 10 YFP is a solid and operational result of Rio+20, a global universal framework of action to improve international cooperation to speed up the change towards SCP in developed and developing countries (UNEP, 2008). Developed countries launched the establishment of the SCP pattern such as; at the EU level, SCP, and Sustainable Industrial Policy (SIP) Action Plan was produced in 2008 as part of international level work on the UN's 10 YFP on SCP. Thus, the commitment of developed countries to SCP is a viable movement towards saving the earth and achieving sustainable development. This will assist them to overcome the environmental impact that cause by exported goods to developing countries (Doreen & Arnold, 2009).

Due to globalisation, in the last two decades manufacturing process and production of some products have been moved from the developed countries to the developing countries (Jovane et al., 2008), because developing countries offer significantly lower production labour costs (Rao, 2004). However, in developing countries they practise unsustainable consumption and production performance which just focus on the economic growth but not the environment and society, the industrialised economies are responsible from two third of the global environmental impact. If developing countries followed the same way of consumption and production that developed countries have followed, then five planets will be needed to provide the resources for these unsustainable consumption and production practices (Doreen & Arnold, 2009). As such, investigations into the sustainable production of manufacturing industries in a developing country like Malaysia remain relevant and significant.

Manufacturing process in different sectors is directly related to the energy and resource consumption, as well as environmental pollution. Earlier, the development of the manufacturing process had just focused on product quality and high financial returns. However, later on, SP has been added as a new concept (Linke et al., 2013). Lowell Center for Sustainable Production (LCSP) defined the SP as "the procedure used for constructing goods and services without polluting, saving energy and natural resource, feasible economically, safe and healthy for all working people" (Samuel et

al., 2013). However, companies need tools to measure their sustainability performance through the entire product lifecycle from product design to end-of-life.

The action plan of the UN regarding to sustainable development (Agenda 21) encouraged and motivated countries and organisations in all international and national levels to develop indicators of sustainable development as tools to measure the sustainability performance (UN, 1992). Accordingly, different organisations have disclosed different sets of indicators of SD as "guidelines and tools to measure SD in national and international levels". Commonly, most of the initiatives have a large number of indicators, such as GRI and CSD, where indicators of SD are taken as a part of these indicators, which is confusing to manufacturers when they try to select or choose the indicators, which are convenient to their companies' applications (Joung, Carrell, Sarkar, & Feng, 2013).

The global concern of SD has motivated companies to integrate SP aspects into their practice. Some researches and studies concluded that, the sustainability aspect should be integrated through the entire product life-cycle, and implemented in all organizational hierarchical levels, starting from the early decision making stage, passing through the tactical management, and ending with the engineering and operational units in daily base practice. Implementing sustainable development cannot be independently processed; it should be integrated in line with the global business development strategies. Consequently, companies need to analyse the pillars of sustainability in several actions and elements to simplify their understanding. Furthermore, the companies need to evaluate the benefits of implementing SD to their global business development (Hallstedt, Ny, Robèrt & Broman, 2010).

1.3 Sustainable Production in Developing Countries

Developing countries in Asian and Pacific countries are committed to United Nation initiative 10 Years Framework Program (10YFP). The framework has been proposed to accelerate implementation of sustainable consumption and production in both developed and developing countries. Few years earlier, several comprehensive reports showed the whole picture of the status of sustainable consumption and production in Asia and Pacific areas. The main themes have been highlighted in these reports are;

1. Develop national and regional indicators of sustainable consumption and production.
2. Assess the gap in knowledge and practice.
3. Sustainability reporting, benchmarking schemes for industry.
4. Promote eco-labels, sustainable public procurement, and sustainable consumption in general.
5. Coordinate awareness-raising campaigns.
6. fund SCP, including financing for SMEs.
7. Consider eco-innovation and adaptation of new technologies for cleaner production.

On a sector level, energy, buildings, food, mobility and tourism are sectors of interest as expressed by most of the countries in the region with sustainable cities, water management and waste being also a cross-sector issues (UNEP, 2014).

In Africa the 10YFP on sustainable production has been established. Despite of this implantation of sustainable production is relatively new concept in this region. The main strategy focuses on meeting the basic needs of population in more sustainable procedure. the main focus theme are ; energy, water and sanitation, habitat and sustainable urban development, and industrial development, Food Production and consumption, Chemicals and hazardous waste management, Cleaner production and eco-efficiency (UN, 2009).

Obviously, there is a continuous progress in initiating and developing new programs and strategies to make sustainable production reality. As well as, implementation of sustainable production is jumped over the awareness stage to the stage of execution of these strategies in developed countries. The result of international agreement related to control gases emission in order to protect the atmosphere layer currently appeared; scientist mentioned that, due to the implementation of these regulations and agreements, in 2012 the ozone hole over Antarctica was the smallest in the last 10 years.

While, in developing countries a great effort need to be done to establish sustainable production performance. Social issues in developing countries are occupied a large concern, as the percentage of people leaving under poverty line is increasing.

1.4 Sustainable Production Performance in Malaysia

Recently, the Asian public policies and industrial growth gas influenced economies to align with international issues such as environmental and social aspects. This reflects the awareness of Asians about sustainability (Tseng, Tan, & Siriban-Manalang, 2013). Globalisation drove Asian countries to consider environmental implications in their practice (Zhu, Sarkis, Cordeiro, & Lai, 2008). In particular, the Asia-Pacific region has started to develop their policies in line with SD goals; such as, South Korea, Malaysia, and China announced intentions to reduce 30% of greenhouse gas (GHG) emission by 2020, and 40 - 45% of carbon intensity compared to those recorded in 2005 (Keong & Mei, 2010; Lee, 2013).

In Vietnam, referring to the experience of the motorcycle industries, customers' orientation by the benefits of green products, forced manufacturers to incorporate green issues concerns in their product innovation (Lin, Tan, & Geng, 2013). Also, Zhu et al. (2008) stated that, after China has been admitted as a member of the World Trade Organization (WTO) in 2001, it was forced by stakeholders (e.g. governmental, other public pressures, young customers, export, and sale to foreign customers) to practise environmental performance in their production.

In Malaysia, environmental stewardship efforts have been stared since 1967 to avoid anticipated global environmental crises. Throughout, the 6th Malaysia Plan (6MP, 1991-1995) efficient management of the environment had been addressed ("Ministry of Economic Affairs,1990, p389"). In the 7th Malaysia Plan ("7MP, 1996 – 2000"), economic, social, and environmental issues have been included in the country's development plan to work towards achieving economic growth besides environmental conservation (Ministry of Economic Affair, 1996, p589) . The 8th Malaysia Plan (8MP, 2001 - 2005) underpinned SP by promoting the use of cleaner production approaches ("Ministry of Economic Affairs, 2001, p539").

In the 9th Malaysia Plan ("9MP, 2006 – 2010"), green production was launched, and the Ministry of Energy, Green Technology, and Water (KeTTHA) in 2009 with the Department of Environment, Ministry of Natural Resources and Environment have been established to enhance sustainable performance in industries. The Malaysian government's commitment to practise environmental sustainability in parallel with economic growth was clearly started in the 10th Malaysia plan ("10MP, 2011 – 2015") to develop a comprehensive ecosystem for environmental sustainability. There were two major areas introduced to the next coming five years; to establish plans for climate resilient growth and conserve the natural resources. The focus is on five areas namely (i) more incentives Generation for investments in renewable.

Energy; (ii) upraises awareness of energy efficiency to assist productive use of energy; (iii) solid waste management policy enhancement; (i) forests conservation; and (v) emissions reduction for better air quality ("Ministry of Economic Affairs, 2016, p 6-1").

In the 11th MP (2016-2020) focus area are; strengthening the enabling environment for green growth, adopting the sustainable consumption and production concept, conserving natural resources for present and future generations, strengthening resilience against climate change and natural disasters ("Ministry of Economic Affairs, 2016, p 6-2"). Sustainable consumption and production is implemented by undertaking the following five strategies:

(i) Generating green markets through government green procurement, applying of green buildings measures and establishing green certification
(ii) Increasing share of renewables in energy mix by exploring new renewable energy (RE) sources, improving volume of RE personnel and applying net energy metering.
(iii) Enhance demand side management (DSM) by formulating a comprehensive DSM master plan, and expanding DSM criteria.
(iv) Encouraging low carbon mobility through utilisation of energy efficient vehicles and public transportation.
(v) Managing waste holistically through better coordination, encouraging 3R and using waste as a resource for other industries.

The European Union supports Malaysia SCP Policy Programme established a SCP policy concentrated on the national / federal level and organisational level. The SCP was based on six objectives - general issues of sustainability, developing a green economy, transforming technology and innovations for SCP, changing unsustainable production pattern, changing unsustainable consumption pattern, and implementing the lifecycle approach. These objectives should be applied to cover all areas, such as regulatory, economics, education, information, hybrid, and collaborating ("Ministry of Economic Affairs, Economic Planning Unit, 2016").

1.5 SMEs in Malaysia

SMEs perform an important role in developing the economy of Malaysia. The SMEs Corporation Malaysia (2017) annual report defined Malaysian SMEs in terms of annual sales turnovers and number of full-time employees, Table 1.1 and Table 1.2 below show these definitions.

Table 1.1 : Malaysian SMEs definition according to annual sale turnover

Size	Manufacturing (Including Agro-Based) Manufacturing-Related Services	Services Sector (Including ICT)
Micro	Less than RM300,000	Less than RM300,000
Small	From RM300,000 to less than RM15 million	From RM300,000 to less than RM3 million
Medium	From RM15 million to less than RM50 million	From RM3 million to less than RM20million

(Source: SME Corporation Malaysia, 2017)

Table 1.2 : Malaysian SMEs definition according to number of full-time employees

Size	**Manufacturing (Including Agro-Based) Manufacturing-Related Services**	**Services Sector (Including ICT)**
Micro	Less than 5 employees	Less than 5 employees
Small	From 5 to less than 75 employees	From 5 to less than30 employees
Medium	From 75 to less than 200 employees	From 30 to less than75 employees

(Source: SME Corporation Malaysia, 2017)

These SMEs are involved in developing manufacturing, services and agricultural sectors, as well as ICT services (Haron, Yahya, Khalid, & Ganesan, 2010). According to the SMEs annual report 2017, from 2011–2016, the average compounded annual growth rate (CAGR) of SMEs was 6.5%, which is higher than the CAGR of the overall economy of 5.1% (refer to Figure 1.1). Consequently, SME contribution to GDP rose from 32.2% in 2010 to 36.6% in 2016. Based on the latest assessment of the Malaysian GDP growth for the year, SME GDP growth was projected to record a sustained growth of 5.5–6.0% in 2017 ("SME Corporation Malaysia, 2017"). Labour productivity of SMEs as measured by real value-added per worker has increased further from RM 59,073 in 2015 to RM 60,844 in 2016, with a growth of 3.0%. The slightly higher growth than the 2.8% recorded in 2015 (refer to Figure 1.2) ("SME Corporation Malaysia, 2017").

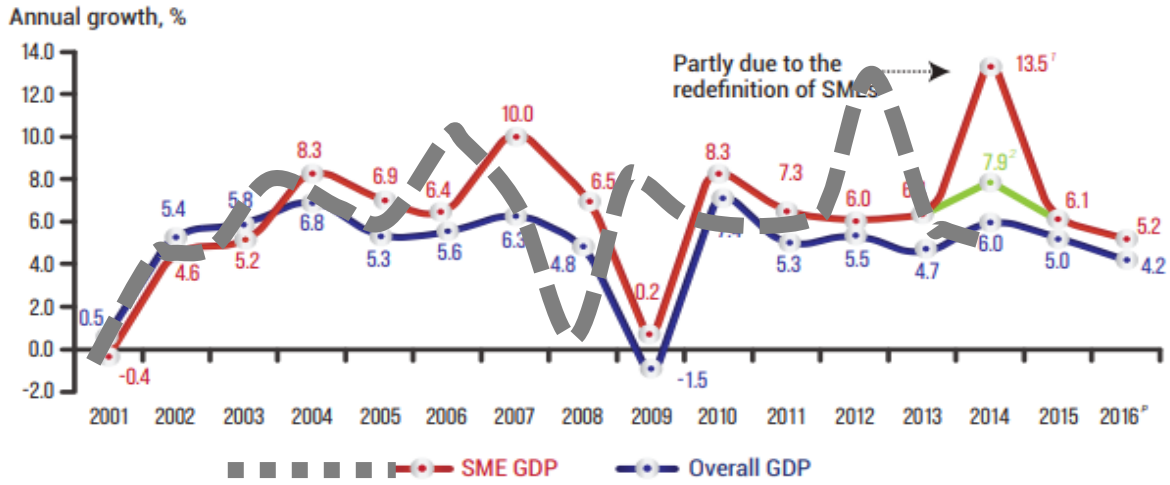

Figure 1.1 : SME GDP and Overall GDP Growth
(Source: SME Corporation Malaysia, 2017)

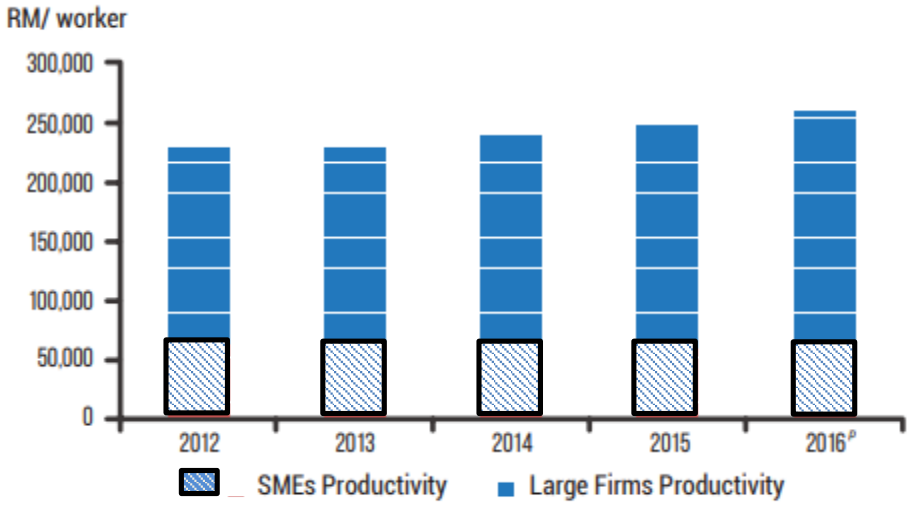

Figure 1.2 : Productivity of SMEs and Large Enterprises
(Source: SME Corporation Malaysia, 2017)

Malaysian SMEs are an active segment of the country's economic development. According to SMEs annual report 2016/2017, SMEs accounted for 98.5% of total business establishments, and those in the manufacturing sector represent 95.4%. In 2016, manufacturing SMEs were responsible for 7.9% of SME GDP growth, and 6.4% of overall GDP growth (SME Corporation Malaysia, 2017). However, there is no sustainable framework, which focuses exclusively on production for SMEs (Samuel et al., 2013).

The commitment of the Malaysian government to develop SMEs was launched in the 1970s with the New Economic Policy introduced in 1971, to enhance Malaysia's well-being, and restructure ethics economic inequities. Besides, the government's commitment to develop SMEs appears in the second Industrial Master Plan (IMP), which ended in 2005, and third Industrial Master Plan, from 2006-2020, being in line with the country's vision to attain developed nation status by 2020.

National SMEs Development Council (NSDC) was established in 2004 to launch a major transformation to SMEs development, which introduced the SME Master plan (2012-2020) in July 2012. This master plan maps the future of SMEs development to attain the nation's vision in 2020. The first High Impact Programmes (HIPs) started in April 2014, would be followed by the other HIPs. This master plan raised the challenge of SMEs from remaining stick to the policies and strategies, to add challenge to environment (SME Corporation Malaysia, 2014).

Later on, the issues faced by SMEs were addressed, as well, critical business operation are funded by government, RM1.93 billion is for Access to Financing programmes. The provision will fund the execution of 34 Access to financing programmes for a target number of 22,524 SME recipients. For Innovation & Technology Adoption, RM236.7 million is provided to fund 25 programmes for target number of 1,995 SME recipients. For Human Capital Development, 40 programmes are funded by a provision of RM137.7 million for target number of 37,820 SME recipients. 34 Market Access programmes are planned and are currently being applied for the benefit of 4,016 SME recipients. Provision of RM129.5 million is provided to fund the programmes. Meanwhile, 14 Infrastructure programmes - primarily to deliver proper business buildings at strategic locations for SMEs to conduct their business – will be executed in 2017 with funding of RM61.7 million to assist 55 SME recipients. Included is also one Legal & Regulatory Environment programme with a provision of RM8 million, to support SMEs navigate the regulatory aspect of doing business in order to ease regulatory burden for entrepreneurs (SME Corporation Malaysia, 2017).

Malaysian government's commitment to sustainable development practice for industries and business has adopted a positive approach by establishing the Ministry of Energy, Green Technology and Water (KeTTHA) in 2009 together with the Department of Environment, Ministry of Natural Resource and Environment. Besides, these plans offer an integrated method to the development of industrial areas and opportunities for growth of SMEs. Furthermore, government agencies and private organizations were established to supported SMEs in overcoming their barriers, such

as, SME Bank, Malaysia External Trade Development Corporation, Standard and Industrial Research Institute of Malaysia (SIRIM), SME Corporation Malaysia, Malaysian Technology Development Corporation (MTDC), Ministry of Science, Technology and Innovation (MOSTI), Federation of Malaysian Manufacturers (FMM) and Dewan Perniagaan Melayu Malaysia (DPMM).

Industries make a large contribution to the environmental impact (Rao, 2004). Therefore, Malaysia raised a vision to be developed economy by 2020, the Malaysian prime minister announced that Malaysia has agreed to reduce its carbon dioxide emissions to 40% by 2020 compared to 2005 levels, conserve natural resources, as well as involvement of the private sector which is coincident with the third industrial master plan of Malaysia (Keong & Mei, 2010). It is clear that SMEs in Malaysia have a vital need to implement sustainable production that enhances environmental protection, social values, as well as economic growth.

SMEs in Malaysia play significant role in employment, economic growth, and products innovation. SME's are spread in wide geographical areas, even in rural areas. This made them influential to the economic development of a country by improving income distribution (Madanchian, 2015). SME growth in both productivity and employment is concrete; as SMEs contribute by the greater part of sales turnover and employment in Malaysia. In addition, the attention is drawn to the critical position of SMEs as a backbone of the economic growth, interconnection between different sector, mounting business bases, and emerging social wealth (Hoq, 2009). Since the majority of establishments in manufacturing and in services are SMEs, it makes economic sense to exploit their potential to further development of Malaysian economy.

It is important that Malaysian SMEs overcome the challenges that have been identified in order to capitalize on any new opportunities that arise. The government carries out robust support in the development to empower SMEs, especially in sectors with high growth and export potential. Specifically, for the industrial infrastructure, in order to enable the expansion and assist the distribution of SMEs all over the country. The policy of the government focus on transforming the manufacturing and service business of SMEs into resilient knowledge-intensive and value generating firms (chin, 2018).

Nor, Bhuiyan, Said &Alam, (2017) stated that Malaysian manufacturing SMEs made a large contribution to the national economy and improved the quality of life. However, they are suffering from financial sourcing issues and affected with the obstacles of human capital, business competitiveness, infrastructure, and government policy. The authors also recommended that the government should establish many agencies, policies, and programmes to further reinforce the development of SMEs performances as well as eliminate barriers that hinder the development of SMEs.

Manufacturing SMEs play a major role in environmental impact as the accumulated amount of emission from all factories is very large; SMEs add recognizable social value by their high number of employees. In spite of that, Al Khidir & Zailani (2009) concluded that, in Malaysia, only large firms are committed to environmental frameworks, nonetheless, SMEs are yet to apply this environmental and sustainable approach. Therefore, the government needs to develop a national framework to assess SMEs environmental performance.

This study aims to understand the influence of sustainable production on SMEs sustainable performance. The results of the study may motivate SMEs in developing countries to practise sustainable production.

1.6 SMEs Sustainable Production

The United Nations Industrial Development Organization (UNIDO) has reported that SMEs make up more than 90% of business establishments globally and on average contribute 50% of the GDP of all countries and for 60% of their employment. There are numerous advantages those claimed for SMEs; SMEs adopt labour-intensive approaches, so they have instant impact on employment generation, they can establish their operations in a short period and look to quick returns, SMEs can facilitate the process of inter-and intra- regional decentralisation, and may develop into an equivalent force equal to the economic power of large companies. In general, SMEs are able to achieve wider economic and socio-economic growth (Cook & Nixson, 2000; Bouri, 2011).

Large and multinational corporations are moving towards sustainable production, because they are strongly committed to international regulations, and affected by the pressures driven by media, campaigns by Non-governmental Organizations (NGOs), and consumer interest. Moreover, manufacturers emerged in sustainable production have a competitive advantage in achieving distinction in the market (Seidel, Shahbazpour, & Seidel, 2007; Schoenherr, 2012). However, this is not necessary the same scenario that happens in Small Medium Enterprises, as SMEs have different driving forces that affect their policies and commitment to the sustainable production development. SMEs in developing countries are facing many obstacles such as, lack of financing, low productivity, inadequate managerial expertise, poor access to management and technology, and heavy regulatory challenges (Ashton, Luque, & Ehrenfeld, 2002; Saleh & Ndubisi, 2006a; Wooi &Zailani, 2010). These obstacles could hamper their progress towards sustainable production.

One of the top priorities of the global agenda is to support developing countries to take advantage of trades and opportunities to reinforce their human and institutional capacity. Governments pay attention to SMEs improvement, because collectively they contribute to the employment generation, economic growth, and poverty eradication (Bouri, 2011).

In line with sustainability practices, all business stakeholders need to consistently measure, to what extend their operations are negatively affecting the environment, society, and economic gains. Implementing sustainability could be translated into strong benchmarks, clear standards and precise objectives (Keong & Mei, 2010). In spite of the huge positive contribution of SMEs to the economic and socio-economic aspects, they can also greatly contribute to the pollution of the environment. Consequently, SMEs need to integrate sustainable production in their performance by taking into account all pillars of sustainability (environmental, social, and economic) in their daily practice.

Based on this deliberation, this research focuses on sustainable production of manufacturing SMEs in developing countries.

1.7 Sustainable Production of Manufacturing SMEs in Malaysia

SMEs are considered as the key structural unit in the free market system. They account for more than 98.6% of all business in developing countries (SME Corporation Malaysia, 2017). As such, SMEs have the largest share of the total number of businesses, employees, and products, but they contribute significantly to environmental pollution and high rate of energy and material consumption (Roxas & Chadee, 2012). Linke et al. (2013) stated that SMEs does not emit large amounts of gas per unit, but, as the number of SMEs is large, the total amount of the gas emission will be substantial.

In line with the global initiative on sustainable development, Malaysia committed to SD as well. In year 2000, the Malaysian government embraced the initiative agenda 21 with local agenda 21 in four different states - Pahang, Perak, Sarawak, and Selangor - (Samuel et al., 2013). Palm oil companies were on the top of the initiator and goodwill that adopted sustainable principles and from the onset, more than 10 plantation companies from all over the world made a commitment to conduct pilot testing of these principles and criteria across its three sustainability pillars (Sawatan, 2005, November 24). Also, the 11th Malaysia Plan (11MP) mainly focuses on consumption and production, which promote the concept of increasing the productivity of high quality, consuming less resource, and reducing the pollution ("Govt. to allocate RM15billion for,"2015).

In the context of promoting sustainable production, the SWITCH-Asia Programme has been launched with the aid of the EU in 2007, to achieve economic growth for 19 (Afghanistan, Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Myanmar, Maldives, Mongolia, Malaysia, Nepal, Korea, Pakistan, Philippines, Sri Lanka, Thailand. Vietnam) (SWITCH Asia, 2017). Asian developing countries based on the principles of sustainable production and consumption. Malaysia was one of the partners of the projects which address the climate change issue, solid waste management, technology transfer ("EU to promote sustainable," 2009). In addition, SIRIM Bhd approved three projects in product foot printing, eco-labeling standards,

and carbon management to enable companies to report their products reliability within the use of labeling ("Sirim gets EU grants," 2013).

Large and Multinational firms in Malaysia are committed to the sustainability principles such as Fuji Xerox ("Fuji Xerox," 2014), and BMW group Malaysia across its internal operations and external contribution to the community ("BMW group Malaysia," 2013). Despite that, manufacturing SMEs sector in Malaysia being in the early stage of sustainable production and green supply chain (Sidek & Backhouse, 2014; Wooi & Zailani, 2010). SMEs are facing barriers in different aspects, like; resources, technology, and strategic business orientation. Besides, the fact that, the owner/managers perception about environmental and sustainability performance as costly and not important to their business development, and their business contribution to environmental pollution is negligible (Yacob, Aziz, Mohamad Makmur, & Mohd Zin, 2013). Add to these, the lack of sustainable production indicators (SPIs) as measurement tools of sustainable performance for SMEs has not been addressed (Samuel et al., 2013).

Despite the efforts of the government to promote an environmentally friendly approach and sustainable production performance for industries and businesses, implementing environmental sustainable development in the SMEs manufacturing sector in Malaysia still requires much to be done, and there is a lack of data related to the SMEs' environmental impact (Sidek &Backhouse, 2014).

In Malaysia, research and studies on sustainable development indicators (SDIs) were launched in 1995 with participation from the academia, Federal, and state government agencies, and non-governmental organizations. Abidin (2018) concluded that implementing sustainable manufacturing practice (SMP) in Malaysian automotive industry, will support company to fix the quality of management. With respect to manufacturing SMEs, Hami (2015) supported the concept of internal SMP incorporates a positive result on economic sustainability, so Malaysian SMEs ought to target attaining economic opportunities from the environmental protection and adding social value. It has concluded that, production process critically influence the firms' sustainability performance. Hence, it is suggested that manufacturing firms in Malaysia are required to extremely focus on the production process once practising sustainable performance (Abdul-Rashid, 2016). As well, SPIs for SMEs required to be addressed as measuring tools of sustainable production (Samuel et al., 2013).

The important questions that arise from the above discussion pertain to the influences and consequences of sustainable production amongst SMEs and what they are. There is also the need to know the drives that motivating the manufacturing SMEs in Malaysia to practice sustainable performance.

1.8 Problem Statement

The idea of SD has been developed and defined because of the rapid growth of the world's population. The population is expected to reach approximately 10.7 billion in 2050 (Colby & Ortman, 2015; Lutz & Samir, 2010; Westkämper, Alting, & Arndt, 2000). Accordingly, there is an anticipation of high demand for goods and service, which will lead to high consumption and pollution of the planet's natural resource in 2070 (Genc, 2013; UNEP, 2008). As a result, sustainable development has become a significant issue in the strategies of governments, societies, companies, and business associations worldwide (Edwards, 2007; Willats, Erlandsson, Molthan-Hill, Dharmasasmita, & Simmons, 2018).

Increasing production means high rates of smoking factories, more energy consumption, and using more resources (Rao, 2004). Nonetheless, defining sustainability or sustainable production is not enough for organisations to practise sustainable performance. Therefore, any research on sustainable production from various perspectives is much needed today than ever. As such, there is a compelling demand to develop tools and frameworks to integrate and measure sustainable production (UN, 1992).

Industries can play crucial role in facilitating the change towards global sustainable performance, as the production processes are responsible for most environmental, social, and economic impacts. According to the Organization for Economic Co-operation and Development report (2008), industries cause approximately 70% of overall global environmental pollution and 60% of gas emission. Likewise, Edwards (2007) mentioned that the industrialised sectors cover 20% of the world population; however, they consume 80% of fossil fuel and metal resources. In Malaysia, the contribution of manufacturing sector to pollution is estimated based on the percentage of their environmental protection expenditure 73.6% (Department of Statistic Malaysia, 2018) that paid to reduce the damage they cause. Consequently, as manufacturing SMEs are account 95.4% (SME Corporation Malaysia, 2017) of the whole manufacturing industry, thus they have large contribution to the overall pollution. This interprets how is it significant for manufacturing SMEs to apply sustainability in all aspects of production in order to develop sustainable performance. This argument demonstrates that sustainable production directly influences firm's sustainable performance.

There is an argument that governments are becoming increasingly aware on the importance and benefits of sustainable production (Abidin, 2018). Such benefits are; lowering of costs and improved efficiency of products by minimising natural resources used and waste, reduced dependence on expensive or hazardous resources by exploring, inventing, and introducing more sustainable alternatives (Bordt, 2009; De Ron, 1998; Kiron, Kruschwitz, Haanaes, & von Streng Velken, 2012). In Malaysia context, the government is committed to sustainable production. This is clearly stated in the 11th Malaysia Plan (11MP). It is mainly focused on promoting the concept of increasing the productivity in high quality, consuming less resource, and reducing

pollution. This will support in accomplishing sustainable consumption and production ("Govt. to allocate RM15 billion,"2015).

In spite of, there are many drivers and pressures on SMEs to practise sustainable production, but the move by companies towards sustainability is still in its early stage. Companies are responding to the market demand, the existing market does not cooperate enough with the sustainable development values (Busch, Bauer, & Orlitzky, 2016; Dugarova & Utting, 2013).

The literature reveals a gap in the area of sustainable production incorporating all process life cycle (PLC) for SMEs in developing countries. For example, Baki (2007) proposed a flexible framework to integrate sustainable production development only in the product's design stage. Vermeulen et al. (2012) proposed a set of ad hoc sustainability indicators to assess and compare processes for the treatment of industrial waste streams. Lindahl, Robèrt, Ny, and Broman (2014) on the other hand, concluded, that firms need to apply strategic sustainability perspective in material management to solve materials problems in different stages. Integrating PLC approach to study sustainable production is getting significant to achieve comprehensive sustainable performance. As, all stages of the production process are at risk of unsustainable performance (e.g. design stage and end-of-life stage related to material consumption, manufacturing stage and distribution related to gas and substance emission).

There are insufficient studies that have accompanied the investigation of all three dimensions of sustainable performance collectively. For instance, Chen et al. (2012) employed to environmental analysis program to evaluate the product sustainability, while Lindahl, Robèrt, Ny, & Broman (2014) studied the effect of the sustainability strategic plans on material management to achieve environmental performance. As well, Schoenherr (2012) focused in the environmental certification to explore their influences on manufacturing plant worldwide. In Malaysia context, Al Khidir & Zailani (2009) focused on the environmental performance of the firm to highlight the procedures required to integrate sustainable performance. To understand the customer's expectation about green products Tseng & Hung (2013) conducted his study to focus on the environmental. Alayón, Säfsten, and Johansson (2017) concluded that the greatest numbers of firms' practices were found in sustainable production principles concerning energy and material conservation, and waste management. This is still predominantly centered on the environmental dimension of sustainability.

Other studies focused on two pillars, for instance Yan, Chen, & Chang (2009) focused on both environmental and economic dimension to measure the product sustainability in design phase. As well, Glock, Jaber & Searcy (2012) conducted study on the sustainable product manufacturing to explore the environmental and economic factor. While, Tomasin, Pereira, Borchardt, & Sellitto (2013) explored the elements of green products to generate an increase in the green products sales. Other researchers like Mattiodaa, Fernandesa, Detroa, Caselaa & Juniora (2013) focused in the social and environmental dimensions understand how TBL is related to the product development

concept. Nevertheless, seldom studies focused on the three dimension of sustainable performance. Thus, it is significance in focusing on the relationships between sustainable production and the three dimensions of SMEs sustainable performance collectively.

Southern Asia is one of the developing areas growing industrially due to the immigration of large industries from the USA and Europe to this area. In the last two decades, the manufacturing processes and production of some products were shifted from the developed countries to the developing countries (Jovane et al., 2008). The reasons beyond selecting Malaysia for this study are; it is classified as one of the industrialised developing countries and the government's commitment to the vision of being developed economically by 2020. The governmental sustainable production policy has been launched for the past two decades, but the rules and legislation were focused on a specific stage of the production lifecycle such as, managing the industrial waste, controlling the gas emission, and meeting environmental requirements (Abdul Hamid, 2017, November 13).

In Malaysia, industries' sustainable performance need to progress to the stage of execution. The sustainability engagements of most listed companies are fixed. The challenge is to help companies learn how to build in sustainability integration (Cheam, 2018). The sustainability implementation is limited to the large companies such as palm oil industry and automotive industry (Khan, 2017). Sustainability execution on all levels and company types is not initiated yet. In spite of that, Bursa Malaysia has generated tool kits to help listed companies get started (Teh, 2016), but still there is a lack of knowledge and awareness about sustainability in terms of small organizational units. Even through, SMEs Corporation Malaysia is collaborating with the Malaysian Productivity Corporation (MPC) to facilitate SMEs implementation of sustainability (Shah, 2018), but, they encourage SMEs to implement approaches like a lean production system to reduce waste without compromising quality. Focusing on systems like lean production reflects that government agencies are still focusing in environmental issues as isolated from the social and economic issues.

There is a gap in the literature pertains the manufacturing SMEs in Malaysia and its implementation of sustainable production through all PLC to achieve sustainable performance it its collective form. For instance, Abdul-Rashid et al. (2017) conducted study on the relationship between sustainable manufacturing practice and sustainable performance amongst the ISO 14001 certified manufacturing firms. Whereas Hami et al. (2015) investigated the effect on sustainable manufacturing practice on economic sustainability within Malaysian manufacturing industries. Both studies focused on Malaysian manufacturing industry in different perspective of this study, which focus on Malaysian manufacturing SMEs sustainable practice in it is holistic picture.

The drivers and barriers of manufacturing SMEs are different from those of large industries. Based on previous studies primary stakeholders such as; external stakeholders (government and customers), internal stakeholders (owners), and top management as a driver motivate and influence manufacturing SMEs to produce green

and environmentally-friendly products (Agan, Acar, & Borodin, 2013; Cuerva, Triguero-Cano, & Córcoles, 2014; Ghazilla et al., 2015; Trianni, Cagno, & Farnè, 2014; Triguero, Moreno-Mondéjar, & Davia, 2013). In Malaysian context, Ghazilla et al. (2015) concluded that stakeholders and regulatory measurements are some of the drivers that work together as collaborative drivers for SMEs green manufacturing practice. Delai & Takahashi (2011) suggested that stakeholder participation in corporate sustainable performance plays a significant role in environmental issues; also they argued that their participation varies according to the company's context.

These previous studies pointed to the importance of stakeholders as drivers for green or environmentally friendly practices. Therefore, this study stimulated to investigate the effect of the stakeholder on manufacturing SMEs' sustainable production throughout the PLC. Qi et al., (2013) emphasised that different studies investigated the influences of the stakeholders on one dimension of the sustainable performance, which will reflect incomplete picture of the sustainability practice. Moreover, the previous studies focused in developed countries, which will not be readily applicable to developing countries (Seidel et al, 2007; veleva, 2001). This study concentrated on sustainable performance that embraces the complete picture of both sustainable production and sustainable performance.

Furthermore, there have been different studies done on the effect of stakeholders on sustainable production practices in large manufacturing establishments, the influence of the stakeholders on the SMEs practises do not conducted by those studies (Alayón et al., 2017; Krajnc & Glavič, 2004; Qi, Zeng, Yin, & Lin, 2013; Seidel et al., 2007; Veleva, 2001). Acknowledging, the differences in the sustainability perspectives such as, firms' size, the economic and political landscape of different firms. This study focuses on manufacturing SMEs' stakeholders and the firms' sustainable production performance in the Malaysian context.

Usually SMEs are rather oriented to profit and financial returns than technical and managerial capabilities. Therefore, company size has a significant impact on sustainable performance in its both collective and individual practices. SMEs in their consumption behaviour ignore the concept of conservation for the coming generations. In contrast to the large and multinational companies, which committed to large expenditure to achieve the sustainable development concept and pursue sustainable performance. Firm size has a significant moderating effect on the relationships of sustainable performance (Wang, Zhang, & Goh, 2018). Different studies investigate the moderating effect of the company size on different management aspects. For instance, Ali et al. (2016) studied the moderating effect of the firm size on the relationship between the management participation and firm performance. While, Chelliah et al., 2010 found that firm size has a moderating effect on the relationships of the firm internationalization in case of the smaller firms. Whereas, Wang et al. (2018) confirmed that firm size moderate the relationship between sustainable supply chain management and firms' (economic, social, and environmental) performance. This study is differentiated from previous one by studying the moderating effect of the

company size on the relationship of sustainable production through all PLC and sustainable performance dimensions collectively and individually.

1.9 Research Questions

1. To what extent do the stakeholders and Top management influence manufacturing SMEs to practice sustainable production?
2. To what extent does implementation of sustainable production affect the Manufacturing SMEs' sustainable performance dimensions individualy and collectively?
3. To what extent does the company size influence the relationships of sustainable production and sustainable performance?

1.10 Research Objectives

The general objective is to investigate the factors that influence the implementation of sustainable production, and its influence on manufacturing SMEs sustainable performance in Malaysia.

The specific objectives of this study can be presented as follows:

1. To investigate the influence of the stakeholders on SMEs to practice sustainable production.
2. To investigate the influence of top management on SMEs to practice sustainable production.
3. To explore the relationship between sustainable production and the sustainable performance of Malaysian Manufacturing SMEs.
4. To explore the moderation effect of company size on the relationships between sustainable production and sustainable performance of Malaysian Manufacturing SMEs.

1.11 Significance of the Research

The issues that have been highlighted in this research expose the global concern about the environmental and social implications that affect the earth's natural resources. Due to the rapid acceleration of population growth, there is a high demand for goods and services. Thus, there are more production, consumption, and pollution. Consequently, the world may witness global disasters of scarce natural resources, and high pollution, soon. Therefore, all governments and organizations at national and international levels need to take action and work towards achieving sustainable development, which will be the ultimate solution. The transformation from unsustainable to sustainable practice is a great challenge that the whole world faces. At this point, the reasons for the significance and importance of these goals should be understood. According to the

statement of the problem, the research questions and objectives of this study have been set. Consequently, both theoretical and empirical implications of the study have been determined.

1.11.1 Theoretical Significance

The results of this study will add to the body of existing knowledge on manufacturing SMEs' sustainable performance and bridge the gap in the literature. This study will be differentiated from previous study by investigating the influence of stakeholders on sustainable production, and including sustainable production through the whole PLC in Malaysia context. This research responds to calls by Zhu et al. (2008), Qi et al. (2013), and Keong & Mei (2010) for further study of the relationships of the firms' stakeholders and sustainable performance. Moreover, Seidel et al. (2007) recognised financial inefficiency and poor management of resources as the main weaknesses of SMEs when they embrace sustainability. Based on the stakeholders theory further studies of the stakeholders' influences on the implementation of SMEs sustainable performance enhance the body of existing knowledge in the literature in this field.

Al Khidir & Zailani (2009) recommended that more researches are needed to support the evolution of business activities towards sustainable development. In particular, researches and theories development will promote responsible sustainability practice within SMEs. Besides, propose a practical solution for the government to support sustainable performance (Alayón et al., 2017; Sidek &Backhouse, 2014).This study, developed the research model that extended the stakeholder theory to study the influence of four of the primary stakeholder of manufacturing SMEs in Malaysia on their sustainable production through all PLC. Previously, there were no proper models and measurement items, which present the whole PLC elements.

The study improved the sustainable production model proposed by Chen, Zhu, Yu, and Noori (2012) and Lindahl et al. (2014) by identifying sustainable production through all PLC. Despite, the increasing number of studies on sustainable production, but, not all the elements of sustainable production (design, manufacturing, distribution, and end-of-life) were considered collectively. Besides, the study responds to the call for further studies by Roxas & Chadee (2012) in accompanying the three pillars of sustainability collectively. The study improved the body of the literature by focusing in both sustainable production elements and sustainable performance pillars altogether. The natural resource-based view (NRBV) theory is extended by this study to understand the influence of the sustainable production through all PLC on manufacturing SMEs sustainable performance considering the three pillars. The integration of natural resource-based view theory will help provide more explanation on the relationship of sustainable production elements and sustainable performance pillars collectively and individually. The actual use that utilizing the resources of sustainable design, sustainable manufacturing, sustainable distribution, and sustainable end-of-life will improve firms sustainable performance as a competitive advantage.

Zhu et al. (2008) found positive relationship between the management support and green supply chain management. The focus of the study within the green concept made environmental impact as the focus of their study. As well, Qi et al., (2013) focused within the relationship of two external stakeholders and firms' environmental performance to find out stakeholders influences is varied consistently with the level of management. On different hand, Keong & Mei (2010) focused on one external stakeholder (government) and its influence of SMEs sustainable practice. This study, extend previous studies by responding to further study in stakeholders and sustainable production throughout PLC and considering all dimensions of sustainable performance. Besides, this study focuses in external and internal stakeholders of manufacturing SMEs in Malaysia.

1.11.2 Practical Implications

This study endeavours to examine the influences of stakeholder on sustainable production through all PLC, and its relationship to manufacturing SMEs' sustainable performance considering the three dimensions (environment, society, and economy). The conclusions of the study contribute to the body of knowledge by helping decision-makers to understand the factors that influence SMEs' sustainable performance. The findings of this research will add to the body of knowledge the implications of sustainable production through the PLC on manufacturing SMEs sustainable performance in developing countries. This will help practitioners and scholars to understand the consequences of sustainable production across all stages of the manufacturing processes, which will assist in the implementation of sustainability, and will enable managers to manage their firms towards achieving sustainability. As well as, helping governments and organizations to set the regulations and legislations that will position SMEs for sustainable production.

1.12 The Scope of the Study

This study pays particular attention to manufacturing SMEs in Malaysia registered with the FMM. Malaysia is one of the newly industrialised developing countries, and concerned with integrating sustainable development to enhance the strategy of being a developed country by 2020. SMEs are expected to take the challenge of positive change towards sustainable performance. Even though, many factors affect the implementation of sustainable performance in the country. This study will explore the influences of stakeholders on SMEs' sustainable production, besides, the influence of sustainable production on the overall SMEs sustainable performance. Furthermore, the study will investigate the effect of company size on the relationship of SP to SMEs sustainable performance. On the theoretical base of; the stakeholder theory, resource-based view (RBV), and natural resource-based view (NRBV) theories, the framework of this study developed. Quantitative approach is used, and PLS-SEM analytical technique used. Outcome of will be proposed SPIs for manufacturing SMEs that encompass three pillars of sustainability through all PLC.

1.13 Organisation of the Thesis

This study has been organised in seven chapters as follows;

Chapter One: the introductory chapter extensively introduced and stated the background of sustainability and SMEs sustainable production. It also outlined the research gap in the literature and industry. Based on, the deficiency and research questions the objectives were developed. The significance and scope of the study were also presented.

Chapter Two: reviews the literature relevant to the study to; explain and define the literature that related to business sustainable performance and sustainable production. It also, shows previous researches have done in the area of the study, reveal the gap in the literature and show how this study can contribute to fill the gap.

Chapter Three: after reviewing literature, a conceptual framework was designed to be employed through this study. Comprehensively, the relations of each variable in the study are described and specific hypothesis statements were developed.

Chapter Four: presents an extensive discussion of the research methodology which includes the research design, variables, sampling process, the instruments, and the statistical analysis procedures.

Chapter Five: focuses on the data analysis evaluates the reliability and validity of the research hypotheses based on the methodology discussed in Chapter Four. The findings are provided in terms of the measurement and structural models.

Chapter Six: is essentially a summary of the hypotheses relative to the findings derived from the data analysis in Chapter Five. The discourses of the hypotheses are in accordance with the four research questions outlined in Chapter One.

Chapter Seven: the core of this chapter comprises the conclusion, which explains how the four research questions are answered by this study. Then, theoretical and practical contributions of this study are presented, followed by explanations of the limitations of the study. Suggestions are then made and guidelines provided for future work. The thesis ends with the concluding remarks.

1.14 Chapter Summary

As the sustainability issues have been widely extended to a global level, and it has drawn the attention of governments and organizations, this chapter shows the significance of implementing sustainable production in SMEs performance. The

research studied SMEs sustainable production performance in Malaysia. All relationships that affect the sustainability issue were presented to enhance implementation of sustainable production in developing countries. The results will motivate and assist decision-makers of manufacturing SMEs in planning their roadmap towards sustainable practice.

1.15 Key Terms

Agenda 21: Is the plan of action to achieve sustainable development that was addressed by the world leaders at the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992.

Global Reporting Initiative Guidelines (GRI): Global Reporting Initiative has released the set of guidelines to measure sustainable development.

International Standards (ISO): The standards those have been set by International Organization for Standardization such as (ISO 14001, ISO 9001, ISO 26000 guidelines).

Sustainable Development: The development that meets needs of the present without compromising the needs of future generations. The development that has less environmental impact, add social value, and achieve economic growth.

Sustainable Consumption and Production (SCP): The consumption and production of goods and services those do not pollute the environment, save energy and natural resource, economically feasible, safe and healthy for all workers.

Sustainable Development Dimensions and Sustainable Development Pillars: These terms are used interchangeably in this study to mean (environment, society, and economic)

Sustainable Production (SP): The manufacturing process that used to produce goods and services which do not pollute the environment, save energy and natural resource, feasible economical, safe and healthy for all workers.

Sustainable Production Indicators (SPIs): Tools of measurement, they could be numbers or ratios resulted from a chain of observations that expose the facts about the phenomenon, and show changes that related to specific time.

Unsustainable Performance: The performance of producing goods and services without considering environmental protection and social value added.

United Nations Commission on Sustainable Development (CSD): The sustainable development set of indicators that have released by The United Nations Division for Sustainable Development.

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