BUSINESS SUSTAINABILITY PRACTICE (BSP) PROFILE ASSESSMENT IN MALAYSIA ECONOMIC SECTORS USING K-MEAN CLUSTERING APPROACH

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ABSTRAK

Dalam tahun-tahun kebelakangan ini, planet kita menghadapi cabaran sosial, alam sekitar dan ekonomi yang besar. Sementara itu, hanya 40% syarikat yang berdaftar di Bursa Malaysia membenamkan konsep kemapanan dalam keseluruhan projek atau perniagaan mereka kerana kurang penyertaan dan kesedaran mengenai kemampanan seperti yang dilaporkan dalam Demokrasi Indeks Alam Sekitar (EDI), Indeks Pembangunan Berkelanjutan (SDI) dan Indeks Perkembangan Manusia (HDI). Oleh itu, tiada kelebihan persaingan di kalangan Sektor Ekonomi Malaysia telah dicapai. Di Malaysia, terdapat hanya beberapa kajian akademik atau laporan perniagaan yang membawakan bagaimana beberapa syarikat yang menggabungkan kelestarian dalam perniagaan mereka. Untuk mengatasi masalah ini dan mencapai amalan kemampanan yang lebih baik, teknik integrasi Amalan Keberlanjutan Perniagaan (BSP) dicadangkan untuk menilai prestasi BSP dengan menggunakan pendekatan K-Mean clustering dan pengesahan keputusan menggunakan kaedah Pakar Elicitasi. Dari percubaan ini, jurang antara elemen amalan pengetahuan dan kesedaran ditingkatkan melalui panduan yang betul, dan teknik ini diakui oleh para pakar. Dari kajian ini terdapat dua hasil utama yang merupakan perkembangan BSP bersepadu yang mengaitkan persepsi (sikap) dan pengetahuan melalui pemetaan antara Matlamat Pembangunan Kemampanan (SDG) dan Pengurusan Projek Hijau (GPM); kedua, pengklasifikasian dan profil sektor terhadap amalan kemampanan yang ditunjukkan dengan mantap dalam kesedaran tetapi terhad kepada pengetahuan tentang kemampanan. Ianya berada dikelompok yang terletak di kuadran pertama dan kedua. Kemudian prestasi BSP yang terbaik adalah sektor perlombongan dan kuari yang pada keadaan mantap dalam amalan mapan iaitu gabungan antara atribusi planet yang terdapat sub-atribusi pengangkutan, tenaga, air, sisa, dan bahan dan perolehan. Sebaliknya, pertanian menunjukkan trend yang tidak menentu untuk setiap atribusi berbanding sektor-sektor lain. Maklum balas bersama telah dipersetujui dengan sistem bersepadu untuk Amalan Keberlanjutan Perniagaan (BSP) yang didapati dalam penemuan pertama sebagai penyelesaian untuk prestasi ekonomi Malaysia dan profil BSP untuk penemuan kedua, di mana 100% maklum balas bersetuju dengan kedua-dua penemuan penyelidikan yang dilaksanakan. Maklum balas daripada pakar adalah penemuan penyelidikan ini adalah salah satu inisiatif yang baik dengan yang demikian akan digunakan dalam aplikasi yang lebih luas untuk mempromosikan kelebihan persaingan antara sektor ekonomi di Malaysia. Sekarang, sudah tiba masanya untuk setiap perniagaan di setiap sektor dan industri di Malaysia mengambil tindakan serius yang akan meningkatkan kesedaran dan meningkatkan kedudukan indeks Malaysia menjadi diantara negara maju pada masa akan datang.

ABSTRACT

In recent years, our planet faces massive social, environment and economical challenges. Meanwhile, only 40% of the companies registered in Bursa Malaysia embed a sustainability concept in their whole projects or businesses due to lack of participation and awareness on sustainability as reported in the Environmental Democracy Index (EDI), Sustainable Developement Index (SDI) and Human Developement Index (HDI). Therefore, no competitive edge among Malaysia Economic Sectors has been achieved. In Malaysia, there were only several academic studies or business reports presenting how a few companies that incorporate sustainability in their businesses nature. In order to combat these issue and achieve a better sustainability practices, an integration technique of the Business Sustainability Practice (BSP) was proposed to assess the BSP performance by using the K-Mean clustering approach and result validation using the Expert Elicitation method. From this attempts, the gap between the practice elements of knowledge and consciousness is improved through proper guidance, and this technique is acknowledged by the experts. From this research there are two main results which are the development of an integrated BSP which associate the perceptional (attitudinal) and knowledge through mapping between Sustainability Development Goals (SDG) and Green Project Management (GPM); secondly, the clustering and sector profiling on sustainability practice shown steadfast in consciousness but limited in knowledge of sustainability. Most of the clusters were located at the first and second quadrant. Then the best BSP performance is mining and quarrying's sector which at steady state in sustainable practice with fully incorporated at planet's attribution which are transport, energy, water, waste, and material and procurement. In contrast, the agriculture shows volatile trend for every attribution rather than other economic sectors. The collective feedback was agreed with the integrated system for Business Sustainability Practice (BSP) as found in the first finding as the solution for the Malaysian economic performance and the BSP profile for the second finding, where 100% of feedback agreed with both research findings to be implement later on. The feedback from the expert is this research finding is one of the good imitative thus will use in wider application to promote the competitive edge among Malaysia economic sectors in Malaysia. Now, it is time for every business in every sector and industry in Malaysia to take a serious action that will improve awareness and enhance Malaysia's index rank to be among developed countries in the future.

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LIST OF SYMBOLS

λ	Attitudinal parameter
ϵ	Epsilon variance
R’	Normalized Value
R	Raw Data Value
R_{max}	Maximum Raw Data Value
m	Average or Arimatic Mean
x_n	Maximum number of respondents
n	Number of respondent
k	Number of cluster
d_{ij}	Correlation distance
d_{mj}	Centroid linkage or distance matrix
$d\ (i,k)$	Euclidean distance
ρ_{ij}	Pearson product moment correlation between i and j
N_k, N_l, N_m	Number of observations in clusters k, l and m
d^2	Squared Euclidean Distance
r	Pearson Correlation
$\bar{x}$	Mean Value

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BSP	Business Sustainability Practice
CAGR	Compound Annual Growth Rate
CSR	Corporate Social Responsibility
DOSM	Department Of Statistic Malaysia
EDI	Environment Development Index
EIA	Environmental Impact Assessment
EPSP	Economic Performance and Social Progress
ETP	Economic Transformation Programme
GDP	Gross Domestic Product
GPM	Green Project Management
HDI	Human Development Index
MDG	Millennium Development Goal
NGO	Non-Government Organization
NKEA	National Key Economic Area
OECD	Organization for Economic Co-operation and Development
PRINCE	Projects in Controlled Environment
PRISM	Project Integrating Sustainable Methods
SDG	Sustainable Development Goal
SDIs	Sustainability Development Indexes
UN	United Nation
WCED	World Commission on Environment and Development
WRI	World Resources Institute
WI	Work Instruction
SOP	Standard Operating Procedure
OPL	One Point Lesson
MIDA	Malaysian Investment Development Authority

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Current century shows an increase of attention in sustainability leanings all over the world. The first conference and analyse of Sustainability was held in 1983 at the new World Commission (Brundtland, 1987; Singh et al., 2012). Later, they released the initial report about sustainable development in the 1890s (Hunter, 1997; Kuhlman et al., 2010). The report organized for continuous environmental strategic to define shared views or perceptions of lasting environmental issue; and to concern into greater cooperation among developed countries at different stages of economic and social growth that interrelate between people, resources, environment and development (Cassen, 1987). This research focuses on economic sectors in Malaysia that influence the Gross Domestic Product (GDP) for Malaysia Development such as services; manufacturing; mining and quarrying; construction; and agriculture (Department of Statistics Malaysia, 2017b).

In the Malaysia context, Bursa Malaysia has always encouraged sustainability concept as the key success of their business today. W. Stubbs et al., (Stubbs et al., 2014) surveyed the performances of sustainability in Malaysia. Among the majority of the companies in Malaysia which is 77% that registered to Bursa Malaysia, only 40% embed the sustainability concept in their overall project or business (Team, 2014). In previous research on companies that were listed in Bursa Malaysia, reviewed that predicting the business capability can help corporation or investors in prudent decision making either in term of financial, the management or others from (Thai et al., 2014). In

order to continuously competing with other countries in the world, Malaysia has prioritized and limited number of key growth engines. Therefore, the Economic Transformation Programme (ETP) announced in the Tenth Malaysia Plan was focusing on 12 National Key Economic Area (NKEAs) such as in healthcare; greater Kuala Lumpur/Klang Valley; wholesale; financial services; education; palm oil and gas; business services; communication contents and infrastructure; oil and gas (energy); agriculture; tourism; and electrical and electronics (Jabatan Perdana Menteri, 2010).

In the meantime, some companies in Malaysia were practicing green in their project management. However, the green practice only covered up in an environmental aspect without emphasizing other important aspects. Hence, incorporating the sustainability in assessing the problem is very important to help increase businesses' profits; and to protect people and the environment. The earlier the sustainability assessment is included in government planning process, the greater the policy design liberty and optimization scope which leads to more effectiveness in the final product or output. The incorporation between the sustainability theory by Elkington, and the Green Project Management (GPM) P5 is shown in Figure 1.1. Since the sustainability assessment is very useful to many organizations, many researchers have developed tools that can claim for sustainability assessment and provide a better application guidelines, data and case study experiences. Since the sustainability assessment become associated with impact assessment tools that consist of Environmental Impact Assessment and Strategic Environmental Assessment (Ness et al., 2007). The development of tools is very important to quantify the performance of the sustainability. J.Voeten (2013) found that Elkington theory is incorporate with sustainability between three elements which are people, planet and profit (Kraatz et al., 2015; Voeten et al., 2013).

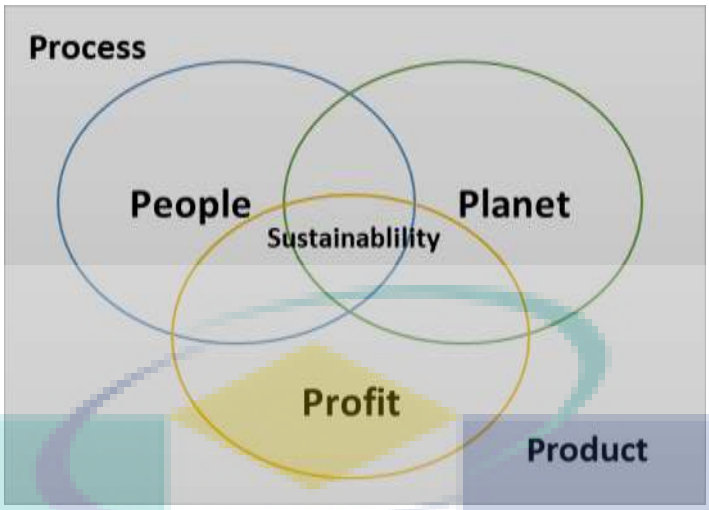


Figure 1.1 Sustainability concept of Green Project Management (GPM) P5 from the Triple-P according to Elkington's theory

Besides, many drivers towards sustainability have shown an increase in awareness of the environmental impact and expressed the need for sustainability (Johnson et al., 2014). Since every company in Malaysia is registered under Bursa Malaysia, it is compulsory for them to return the sustainability reporting of their businesses by addressing the problem towards sustainability. According to the Integrated Reporting in Malaysia from Accountants Today (2014), the survey disclosed an increase in sustainability reporting in which 77% include sustainability in their annual report, but only 40% were embedded whole sustainability concept in their project or business strategy. This was due to the lack of participation in local and international sustainability issues. Sustainability assessment is a process of evaluation and optimization that aim to establish the integration of sustainable development in governmental planning and a decision making processes across all parts (Ridsdale et al., 2016). Thence, the five sectors such as manufacturing, services, mining and quarrying, construction and agriculture are important main players toward Malaysia's economic growth which contribute to the sustainable in the nation' Gross Domestic Product (GDP) (Kui, 2011).

1.2 Problem Statement

The lack of sustainability competitive edge is, in fact, provides disadvantages to a company over its competitors. The business requires innovation in order to maintain a competitive edge toward an economic performance (Jassim et al., 1998; Maldonado et al., 2014; Mutisya, 2015; Rabah, 2015). According to an assessment conducted by

United Nations Environment Programme (UNEP) with World Resources Institute (WRI), Malaysia received low score for the transparency and participation pillars, and a fair score for the justice pillar (International Budget, 2015). While the law associated to environment provides a right to access environmental data upon request, government authorities are not obligated to make environmental and public health data available to the public. Since the SDG was practiced, the preliminary Sustainable Development Goal Index and Dashboard (2016) ranked Malaysia at 55 over 156 countries in SDG Global with 70.0 index score and very low score with less than 50% performance at certain goals. Therefore, governments are facing tough challenges to achieve a sustainable world in 2030 (Turan et al., 2017; Yada, 2006). This includes the global problems such as haze, pollution from the mining activity of bauxite, illegal logging, and the phenomenon of extreme heat have been seriously discussed by various parties (Yeoh, 2015). Lastly, Malaysia was ranked second worst among 70 countries by Environmental Democracy Index (EDI) based on legal index scores. This rank was based on the strength of laws enacted to protect environmental democracy but does not measure its implementation and practices.

1.3 Significance of Study

This study provided information on the limitation of participation in sustainability. The research was motivated by the important elements in participation requirement to improve the participation of sustainability at local and international platform. Therefore, the involvement for all bodies especially in Malaysia towards sustainability practice in which not only have the knowledge but the consciousness as another factor to drive the action or good practice. This study would become a benchmark for any sectors in Malaysia that incorporate with sustainability attributions, Sustainability Development Goals, and attitudinal factor that can be suited to the Malaysian context especially to the five main sectors. An integrated system for business sustainability practice is a new assessment to achieve sustainability development and still under refrigeration system. The findings from this study will also give benefits in future by providing a pre-evaluation to monitor the current performance in each sector. In another word, this study can provide a reference assessment method in sustainability practice for any sectors in Malaysia.

1.4 Hypothesis

An increasing of sustainability practice which balanced with knowledge and consciousness leads to increasing the participation, thus will improve an index and ranking of Malaysia.

1.5 Research Objectives

The general objective of the study is to develop a new systematic assessment model for sustainability edge while promoting the best practices in sustainability. The specific objectives of the proposed research are as follows:

1. To propose an integration technique of Business Sustainability Practice (BSP) in Malaysia context.
2. To assess BSP Profile performance using K-Mean Clustering approach.
3. To validate BSP Performance using Expert Elicitation Method.

1.6 Research Scope

The scope for this study is applicable suited to Malaysia context that were considered several aspect such:

i. The linkage between 3 elements, 12 attributions, and 46 sub-attributions of sustainability with 17 SDGs were incorporated with psychological factor which is an attitudinal parameter.

ii. A practical clustering is considering with two factors which are level of knowledge and level of consciousness.

iii. The data responses were based on selected respondent by using purposive sampling method.

iv. The data were taken at five main sectors which are manufacturing, services, mining and quarrying, agriculture and construction.

v. The validation from the experts using the Expert Elicitation method.

1.7 Thesis Overview

Chapter 1 explains the background of study from previous literatures, problems, objectives and the scopes of the study. Review of the literatures in Chapter 2 provides information on related studies which is about the actual Malaysian performance, an existing assessment method for sustainability and the key elements for the sustainability practice by various investigators. Further, the structural, comprehensive phases and steps are presented in Chapter 3. Chapter 4 presents the results of the research works and comprehensive discussions to answer the objectives of the present study. Finally, Chapter 5 concludes the entire contents of the thesis and provides suggestions and recommendations of improvement for the future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The This chapter begins with the explanation and the background of the sustainability with an elaboration on the current sustainability development performance shown in Human Development Index (HDI). Next, the sustainable economic development is discussed to get an overview on economic perspectives. The concept of sustainability is viewed in the context of local and international. At international level, the concept of sustainability is identified by the United Nation and world scope setting such as from SDG and GPM. On the other hand, the discussion on the concept of sustainability is viewed in Malaysian context that gives focus for the context of this research study such as the driver towards sustainability. Therefore, sustainability business practice and discussion on theoretical framework of BSP that contains the description on importance of knowledge and consciousness in BSP are stated. Next, this chapter provides deeper discussion regarding the best business sustainability practice in Malaysian. The last topic of this chapter is about the review on clustering approach that widely used in many research studies. Finally, an overall literature review in this chapter is concluded as the theoretical and the conceptual framework of the study.

2.2 Background of Sustainability

Nowadays, one of the biggest society's challenges is sustainability (Dobrovolskienė et al., 2016). Sustainability is a concept that broadly used based on the mission and strategy of companies in every sectors (Dobrovolskiiene et al., 2016). Most

of the companies implemented the concept in their business practices where it is linked with their project managements (Silvius et al., 2014). There are three dimensions related to sustainability such as environmental, economic and social (Martens et al., 2013). In the development of sustainability, there are some initiatives on indicators and frameworks done such as from Warhurst (2002). It mentioned the measure of various areas can be improved through Sustainability Development Indexes (SDIs) individually and assessing the aggregation of individual areas with respect to the respective dimension can be achieved towards sustainable development (Singh et al., 2012). Lancker et al. (2000) stated that 'a given indicator doesn't say anything about sustainability, unless a reference value such as thresholds is given to it' (Singh et al., 2012). In order to implement sustainability, comprehensive integration within environmental, economic and social needs to be urged by the policies authority. Environmental monitoring is one of the sustainability activities that can improve the quality of a company or project. The monitoring activities such as measuring and recording the environmental parameters allows evaluation of environmental change and their potential impact (Association, 2015). In detail, environmental monitoring is a process to observe and study the environment by taking a systematic sample of air, water and biota. Thus, the preparation of Environmental Impact Assessment can be prepared. There are many monitoring programs such as the sustainability of metric for waste to energy indicator framework (Chong et al., 2016); monitoring for building (Wierzbicki, 2014); the second Green Power Development Project in Hydropower plant component (Druk Green Power Corporation, 2014); and so on.

2.2.1 Criteria and pillars of sustainability

Sustainability is an integrative concept, which describes a movement towards integration that helps to connect with any element (Duić et al., 2015; Gibson, 2006; Gimenez et al., 2012). The formalization was completed by the World Summit on Sustainable Development in 2002 (United Nations, 2002) with the notion of the three pillars, i.e., social, environmental and economic, as designated by the summit motto 'People, Planet, Prosperity' (Moldan et al., 2012). There are many existing tools such as Life Cycle Analysis, Vulnerability analysis, Multi-criteria analysis, Cost benefit analysis and Impact assessment that can be used to address those categories of sustainability; the Green Project Management (GPM) P5 was introduces as a tool to

support the alignment of portfolios, program and project organizational strategy for sustainability as illustrated in Figure 1.1 in Chapter 1. It focuses on impact of project process and deliverable that corporates with Triple Bottom Line Theory. The Triple Bottom Line or called “Triple-P” was identified by John Elkington (1997). This concept is illustrated in Figure 2.1 below.

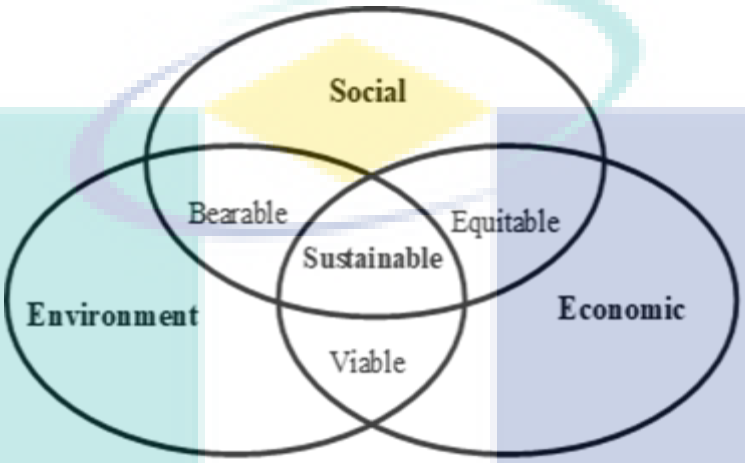


Figure 2.1 The Sustainability Concept of Triple-P
Source: Elkington (1994)

The three pillars concept in Triple-P of sustainability model moves from a conceptual framework to an implementation and action framework. The triple bottom line defined sustainability’s potential and its primary objectives. Sustainability combines the creation of a feasible and viable space for human society within our environmental protection and ecological conservation goals. The economic dimension correctly acknowledges that all of our environmental and sustainability challenges are directly connected to economic production and consumption, and need to be considered alongside the other objectives (Clune et al., 2018).

2.3 Sustainable Development

According to Oxford Advanced Learner’s Dictionary 8th edition, sustainable is associate to the use of natural products and energy in a way that does not harm the environment or that can continue or be continued for a long time. Next, development is defined as a gradual growth of something to make it more advanced, stronger and etc. It has been at the heart of Malaysia's development approach since the 1970s, with an emphasis on eradicating poverty, improving the well-being of the people, providing universal access to education, and caring for the environment. The emergent concern for

environment, resources and social justice in the 1980s led to the advent of the concept of sustainable development (Hunter, 1997), which is defined as 'development that meets the needs of the present without comprising the ability of future generations to meet their own needs' (Cassen, 1987) by the 'Brundtland Report'. It is about improving the lives of everyone, everywhere and achieving all these things together with eluded, alleviated or compensated the planet, people and profit influence by maximize the new development (Scanlon et al., 2004). The starting point of the sustainable development discussion was usually fixed in 1972. Going further back in time, at the beginning of the eighteenth century, in book title 'Sylvicultura Oeconomica von Markowitz' by Harry M.Markowitz invited to "act with nature, and not against it", proclaimed the principle that the "conservation and cultivation of timber should be conducted so as to provide a continuous, persistent and sustaining utilization" (Schmithüsen, 2013). Now, sustainable development has been a universal issue and is broadly considered as an important issue in various sectors (Law et al., 2012). Hence, it is a subject that intrigue more interest among professionals, legislators, Non-Government Organization (NGO), stakeholders and laymen (Tenaga Nasional Berhad, 2016).

From a political and operational point of view, after being projected in the Brundtland report, the idea of sustainable development has been reassessed in several conferences namely the 1992 United Nations Conference on Environment and Development in Rio de Janeiro; the World Summit on Social Development in Copenhagen in 1995; the 2002 World Summit on Sustainable Development in Johannesburg; and the 2012 United Nations Conference on Sustainable Development, again in Rio de Janiero. The sustainable development has also be the subject of numerous projects of national and international organizations and governments, such as the European Commission's "Beyond GDP", the OECD's "Measuring the Progress of Societies" and the Commission on the Dimension of Economic Performance and Social Progress (CMEPSP), generally referred to as the Stiglitz Sen Fitoussi Commission (Stiglitz, 2009). Recently, on September 25th, 2015, the UN General Assembly selected the 17 Sustainable Development Goals (SDGs) of the 2030 Development Agenda "Transforming our world: the 2030 Agenda for Sustainable Development" (Sachs et al., 2016; Turan et al., 2017; United Nations, 2015b). The SDGs have been developed on the beginning of the previous Millennium Development Goals (MDGs) stated in Millennium Declaration adopted by the General Assembly of United Nations on

September 8th, 2000 (Blanchfield et al., 2010). As the MDGs are organized in eight goals with 21 targets and 48 indicators, SDGs associates 169 targets and 232 indicators to the 17 goals. All things considered, it is obvious that an increasing attention is being enthusiastic towards data monitoring on different aspects of sustainable development. Therefore, sub topic below is one of the index monitoring processes towards sustainable development.

2.3.1 Human Development Index

In form of sustainable development country, there are several dimensions that should be considered to achieve SD. Therefore, one of the dimensions to be measured in the SD is Human Development Index. The origin of the Human Development Index (HDI) was found in the annual human development reports produced by the human development reports office of the United Nations Development Programme (UNDP). This was developed and launched by Pakistani economist, Mahbub ul Haq in 1990, which highlighted a clear purpose "to shift the focus of development economics from national income accounting to people cantered policies". In order to construct the human development reports, Mahbub ul Haq formed a group of development economists involve with Paul Streeten, Frances Stewart, Gustav Ranis, Keith Griffin, Farhan C.M, Sudhir Anand, and Meghnad Desai. Nobel laureate Amartya Sen utilized Haq's work in his own work on human capabilities. He believed that a simple composite measure of human development is needed to convince the public, academics, and politicians that they capable to evaluate development not only by economic advances but also improvements in human well-being. Figure 2.2 below shows the underlying principle behind the human development index from United Nation Development Programme web page (United Nations Development Programme, 2018a). There illustrated the integration between different dimension, indicators and dimension index to form the Human Development Index.

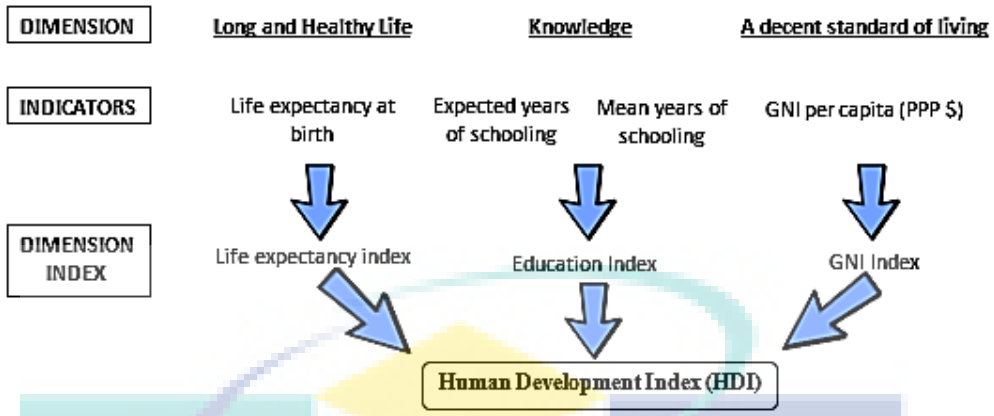


Figure 2.2 Principle behind the human development index

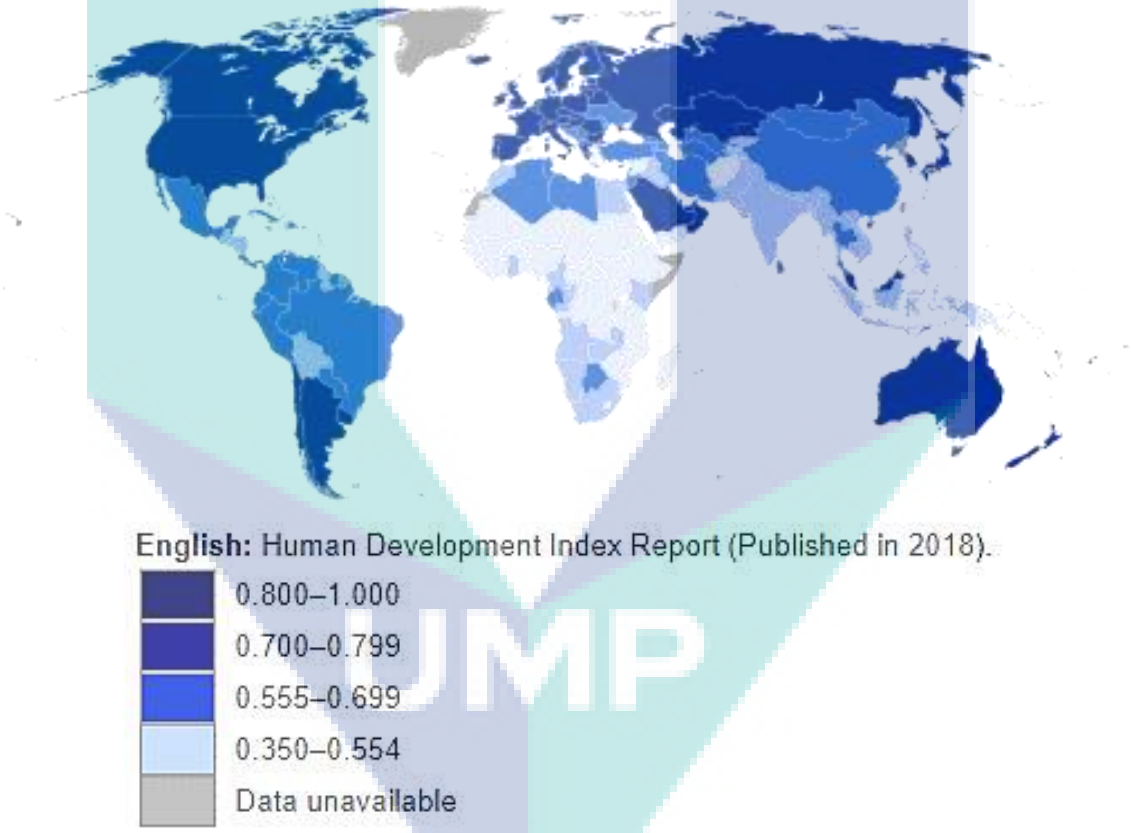


Figure 2.3 World map representing Human Development Index categories in 2017

Source: United Nations Development Programme (2018b)

Figure 2.3 show the world map for current Human Development Index in year 2017 that was published in 2018. The calculation is done using new method of calculation since November 2010 onwards. From figure above, Malaysia was ranked at 57th for year 2017 with 0.8 of average HDI which is presented by the darkest blue category in HDI. This contributed to the change of the HDI's group to the highest index

compares to previous index at 0.797. The value of HDI index can be vary between 0 and 1, with the HDI score close to zero indicating greater distance from the maximum to be achieved on the aggregate of the factors entering the HDI and vice versa for the score close to 1. The full report on HDI performance from year 1997 to 2017 is attached in Appendix A. Referring to the Malaysia HDI's score; the index is more than half which shows a good achievement gained in the entire dimension stated in HDI's principle. Since, HDI is a composite measure with different dimension; there are some limitation such as non-identification of qualitative factors like cultural identity, political freedom and others. Therefore, further literature describes the economic or business capabilities that take account of the importance elements in assessment which are quantitative and qualitative factors that contribute to the sustainable development country.

2.4 Sustainable Economic Development

Economic development has always been a moving target. Not surprisingly, there is growing evidence that the shape of economic policy and practice is significantly changing in many American States on the eve of the 21st Century. An article reviewed the growth and revolution of state economic development as well as its multidimensional system (Mayer, 2008). The evolution includes roughly three broad overlapping phases: a period when states focused on attracting businesses, a period when they focused on developing existing businesses, and a period when states refined and sharpened the strategies they already had in place. This offered evidence that a new fourth phase is emerging in economic development. It is called cluster based economic analysis and strategy development. This new approach has started to address new issues, using new analytical tools, and experiencing new kinds of results (Harris et al., 2018).

There are many effort from companies and civil organizations that indirectly implement the sustainability such as the rising trend among companies to publish their sustainability or corporate social responsibility (CSR) reports (Zorio et al., 2013). This is because sustainable development is very important for our future generations. Thus, everyone should understand the need to grow their economies but not everyone takes into account the negatives that unbalanced economic growth can have on the environment and on people's well-being when we know the importance of regulation for sustainable development (N. A. Ashford et al., 2011).

Hence, each company or business must register at the frontline regulator of their country. The companies are monitored to ensure they align with policies and security of their country. As for Malaysia, the companies must register with Companies Commission of Malaysia (SSM). The main role of SSM is as an agency to incorporate companies and register businesses as well as to provide company and business information to the public. As the leading authority for the improvement of corporate governance, SSM fulfills its function to ensure compliance with business registration and corporate legislation through comprehensive enforcement and monitoring activities to sustain positive developments in the corporate and business sectors of the Nation (Companies Commission Of Malaysia, 2018). It encourages companies and business in Malaysia to carry out and integrate Corporate Responsibility (CR) initiatives into their business strategies and operations by providing approach, tools and resources (Companies Commission Of Malaysia, 2013).

Since the movement or economic development is growing rapidly, the companies have set their own missions, visions and business strategies to compete with other company. Moreover, Bursa Malaysia had their effort to develop and make a continuity an excellence Malaysian business performance by advocated sustainability as key to business success by incorporating economic, environment, social and governance consideration alongside financial that supports business continuity and long term value for companies listed and registered in Bursa Malaysia (Bursa Malaysia, 2018). Therefore, today, almost all businesses in Malaysia or other countries focus on implementation on sustainability with several pillars as mentioned in previous sub-chapter (sub-topic 2.2.1) for their better performance in business development such as in food system industry (Schader et al., 2014), art sustainability (Morgan, 2012), sustainability indicator in construction (Costanza et al., 2016), and tourism sector (Chia et al., 2018). As a result, the implementation of the sustainability in their businesses will helps to increase their profitability in their business gradually (Kim et al., 2006; Lankoski, 2016; Moldan et al., 2012; Yada, 2006). The drivers from international and local are an important push factor to increase the implementation and practicing of the sustainability.

2.5 United Nation Sustainability Drivers

The United Nations is an international organization officially exist on 24th October 1945 to increase political and economic cooperation among their member countries after the nation were ruins in Second World War (Silver, 2018). The 51 countries met in San Francisco at United Nations Conference on International Organization to draw up the United Nations Charter. The name "United Nations", created by United States' leader, Franklin D. Roosevelt and was first used on 1st January 1942. Their establishment aims to maintain international peace and security of economic, social, cultural and giving humanitarian assistance to those in need with fostering relations among nations. The purpose of United Nations is upholding international law, protecting human rights and promoting democracy. United Nation is organized many conferences and efforts to improve countries developments in the world by providing awareness about sustainability through sustainable development goals toward year 2030 (United Nations, 2018).

2.5.1 Sustainable Development Goal (SDG) and 2030 Agenda

The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, is a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. It is also known as "Transforming our World: the 2030 Agenda for Sustainable Development" or to be short, 2030 Agenda. For these 17 goals, there 169 targets set with 1 to 3 indicators used for each target. SDGs is one of the good efforts towards achieving a sustainable world as it was agreed by all UN countries (Costanza et al., 2016). The 17 goals shows in Figure 2.4 were formed based on the successes of the Millennium Development Goals (MDG) before. The goals include new areas of climate change, economic inequality, innovation, sustainable consumption, peace, and justice; all the sustainability priorities and each goals are interconnected to each other (United Nations Development Programme, 2018c). Therefore, the 17 goals provide a roadmap that will help the world to achieve sustainable development through comprehensive action especially in Malaysia.

Figure 2.4 The 17 goals of Sustainable Development Goals

Source: United Nations (2015a)

The 17 sustainable goals covered all the sustainability elements needed in the BSP. From this SDG, it will entirely influence the business sustainability practice. As describe in the Table 2.1, each goal focuses on different viewpoints and aspects in sustainability. The different viewpoints provide a complete understanding and practice towards sustainability. Next, this SDG's are mapped into twelve attribution and 46 sub attributions of the green project management and will further explain in methodology part.

Table 2.1 The description on 17 sustainable development goals

Sustainable Development Goals	Description
SDG 1: No Poverty	An eradicating extreme poverty is one of the greatest challenges of this era. While poverty is multidimensional, the lives of the extremely poor are commonly characterized by lack of income to buy one's basic needs.
SDG 2: Zero Hunger	This implies that one in every nine persons is unable to put enough food on the table and is likely to go hungry. Since an undernourished person is exposed to various health risks and could render the person incapable of adequately achieving full potential, one of the Global Goals aims to end hunger and malnutrition by promoting sustainable agriculture and achieving food security by 2030.

Table 2.1 Continued

Sustainable Development Goals	Description
SDG 3: Good Health and Well-Being	Although the proportion of births attended by skilled health personnel has increased in most parts of Asia and the Pacific in the last 15 years, births in some economies are still at high risk based on the latest data available.
SDG 4: Quality Education	There is a wide consensus that the development of skills is an important driver of inclusive growth (ADB 2015). While a person should continuously expand his or her skill set throughout his or her lifetime, a strong foundation of skill development should start during childhood. Thus, emphasizes lifelong learning opportunities, implying not only access but more importantly, the outcomes of all forms of training (formal education and otherwise).
SDG 5: Gender Equality	Gender equality and empowerment of women are culturally linked and among the most challenging discourse in development studies. Having recognized that women's representation in political and economic decision-making processes is a critical ingredient to fuel sustainable development, the SDGs remain committed to advancing gender equality.
SDG 6: Clean Water and Sanitation	Inefficient usage of water causes stress on the limited resources available. Poor sanitation, on the other hand, threatens the health and well- being of people. The sixth goal seeks for sustainable management of water and sanitation for all.
SDG 7: Affordable and Clean Energy	Energy is a necessity for industrial development. It facilitates the accomplishment of household chores, delivers forms of entertainment and other household convenience, and, more generally, enhances the living conditions of the population.
SDG 8: Decent Work And Economic Growth	While economic growth is essential for a country's progress, its inclusivity is equally important since it will ensure that growth is fairly cascaded at the grassroots of society. Promoting full and productive employment and decent work for all is one of the main channels through which economic growth can be more inclusive for the lower echelons of society.

Table 2.1 Continued

Sustainable Development Goals	Description
SDG 9: Industry Innovation and Infrastructure	Smart infrastructure should be designed not only to make the delivery of basic services more efficient, but also to spur income-generating activities that result in environment-friendly industrialization. To accomplish this, everyone should capitalize on the lessons from both developed and developing countries that have allocated a significant amount of resources on smart infrastructure-related research and development.
SDG 10: Reduced Inequalities	Reducing high levels of social and economic inequalities could be beneficial for various reasons. For instance, with lower inequality and more equitable access to economic opportunities, it will be easier for people from lower echelons of society to fully realize their economic potential. With lower inequality, there is also presumably less risk of social conflict arising from some segments of the population being left out from enjoying the benefits of economic development. SDG 10 aims to arrest the potential threat to long-term social and economic development accompanying high inequality.
SDG 11: Sustainable Cities and Communities	Studies show that where a child grows up can have a strong impact on his or her long-term economic competitiveness. Given its key role as an enabler of economic prospects, housing and environmental investments should be linked to the development of economic policies.
SDG 12: Responsible Consumption and Production	In particular, data from different sources can be combined in the generation of indexes wherein the process associated with the targets can be viewed to be the latent factors from various indicators available.
SDG 13: Climate Action	Combination with global weather indicators such as El Niño Southern Oscillation data. Similarly, mobile censor data can be mined for latent indicators that can be used to monitor.

Table 2.1 Continued

Sustainable Development Goals	Description
SDG 14: Life Below Water	Oceans and seas cover about three-quarters of the world's surface and their health is critical to ensure ecological balance. The role of oceans and seas cannot be undermined not only in the provision of food, but also, more importantly, in weather and climate regulation, to ensure a state of equilibrium in various physical, chemical, and biological processes happening in marine waters. Furthermore, conservation and sustainable use of marine waters and resources are important for food and for the equilibrium of weather systems originating from the seas.
SDG 15: Life On Land	Agriculture and other human activities have a profound impact on terrestrial ecosystems resulting in certain processes like biodiversity loss, land degradation, or even desertification.
SDG 16: Peace, Justice and Strong Institutions	To promote peace and arrest endless cycles of violence by strengthening institutions' capacity to uphold political stability and the rule of law.
SDG 17: Partnerships for The Goals	Attaining the SDGs by 2030 requires a strong commitment to global partnership and cooperation among all players. For low-income economies, official development assistance (ODA) will continue to be a major resource given their limited capacities to raise public resources domestically. Furthermore, ODA could be catalytic in crowding in other sources and building capacities. This section presents available data on ODA and other indicators of SDG 17 for ADB regional member economies.

Source : Asian Development Bank (2016)

The SDG Index created a measurement of the SDGs which the starting point is for 2015 that according to country's level (J. Sachs, Schmidt-Traub, Kroll, Durand-Delacre, & Teksoz, 2016). It will help every country to identify priorities to take early action, understand the key implementation challenges and identify the gaps that must be closed in order to achieve the SDGs by 2030. The SDG Index also allows each country to compare itself with the region, with other counterparts at similar levels of overall

economic development, and with the entire world, including the best and worst performers. Indeed we have constructed the various measures for each SDG so that they immediately indicate a country's position on a 0 to 100 spectrum from the "worst" (score 0) to the "best" (score 100).

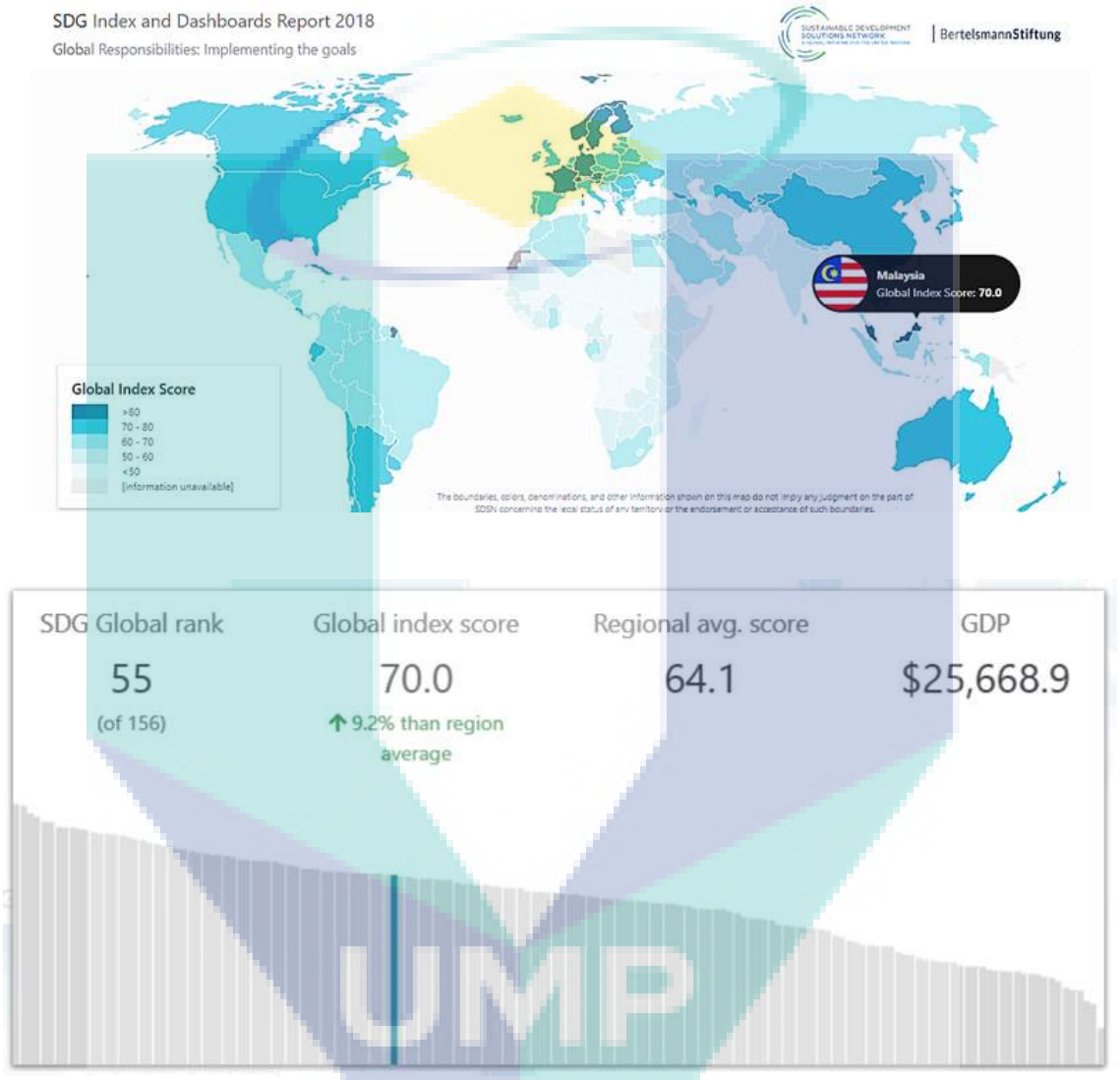


Figure 2.5 The overall performance of Malaysia in SDG index and Dashboards Report 2018

Source: Sustainable Developement Solution Network (2018)

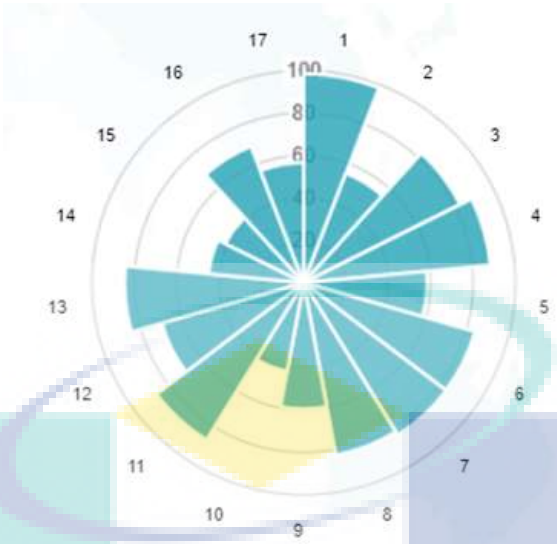


Figure 2.6 Performance of 17 sustainable Development Goal (SDG) in 2018
Source : Sustainable Developement Solution Network (2018)

Based on the SDG Index performance and Dashboard Report for 2018, Malaysia is ranked at 55th over 156 on SDG Global rank. The total SDG index accumulates by Malaysia based on several indicators and criteria that were evaluated as in Figure 2.5. The graph shows an increasing with 9.2% of index score above the region score, while Figure 2.6 show the performance of 17 sustainable development goals achieved by Malaysia. Indeed, in order for Malaysia to compete with other developed countries, drastic actions should be taken in other goals below 50%. The SDG index performance as in Figure 2.5 and 2.6 will be improved by determination of the goals that influence its performances. The emphasis on the low score goals related to the issues of hunger; gender equality; industry; innovation and infrastructure; unbalance for equalities, the responsible consumption and production; life below water; life on land; peace, justice and strong institutions; and partnerships should be taken note as the elements that can be improve for the better performance later. The improvement of the goals is based on the requirement and the ability of our country to drive towards the mission, vision and strategic plan of the better Malaysia.

2.5.2 Green Project Management (GPM) P5

The SDG Compass gives direction to organizations on how they can adjust their strategies just as measure and deal with their commitment to the acknowledgment of the SDGs. Through the realization of the SDGs, the businesses should participate since the

governments worldwide including Malaysia have agreed with these goals. Therefore, the SDG Compass introduced links between SDGs and P5. The links between SDG to the elements in the GPM P5 Standard for sustainability in Project Management will make a great continuity to drive the sustainability. In detail about GPM P5, United Nation Global Compact has created an effort to help individual or organization around the world to build their skill towards sustainability concept by introducing Green Project Management (GPM) P5 Standard tool. This GPM P5 is expanded from the Triple Bottom Line (TBL) theory. This GPM P5 Tool is an integrating project management and sustainability indicator using matrix index which can provide wide framework for the broad context in every implementation (Kraatz et al., 2015). It was developed in August 2011 (Carboni et al., 2013). The GPM P5 Standard may consider the life cycle of social, environment and economy perspective. During the sustainability phase project a process efficiency and product are considered including planning, product realization, designing and developing production and servicing (Tufinio et al., 2013) as shown in Figure 2.1 before. To be clear, GPM P5 are integrated from 5P which are Planet, Profit, People, Product and Process.

On 4th November 2011, GPM was registered and in 2016, GPM received an award as the world's largest organization of professional development in sustainability. The organization success is related to the organization statement "the management of a project starts with the initiating process group and finishes with the closing process group" as stated in the ISO 21500 Guidance on Project Management (Carboni et al., 2013). Likewise, P5 can be used as benchmark to help organizations demonstrate the reality of their commitment to sustainability, thus provide better understand to sustainable development (Tufinio et al., 2013). GPM P5 approach is used to develop profiling of Business Sustainability Practice (BSP) using an integration technique in phase 1 and 2 stated in Chapter 3. Figure 2.7 and Table 2.2 follows, show the overview of the structure in GPM and the detail in each sub elements in GPM P5.

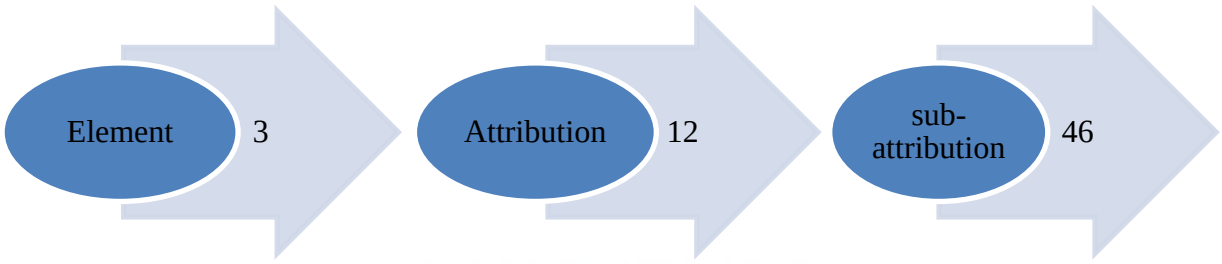


Figure 2.7 An overview of the structure elements in GPM P5

Table 2.2 Twelve attributions and their sub attributions in GPM P5

3 Element	**12 Attribution**	**46 Sub-Attribution**
People	Labour practices and decent work	Employment
		Labour/ management
		Health and safety
		Training and education
		Organizational learning
		Diversity and equal opportunity
		Trained professional emigration
	Society and customers	Community support
		Job/unemployment
		Public policy/compliance
		Customer health and safety
		Market communications and advertising
		Customer privacy
		Cultural impact
	Human right	Non-discrimination
		Freedom of association
		Child labour
		Forced or compulsory behaviour
	Ethical behaviour	Investment and procurement practices
		Bribery and corruption
		Anti-competitive behaviour

Table 2.2 Continued

3 Element	12 Attribution	46 Sub-Attribution
		Digital communication
		Traveling
	Transport	Transportation
		Energy used
		Clean energy return
	Energy	Renewable energy
		Water quality
		Water consumption
	Water	Water displacement
		Recycling practices
		End of life disposal/reusability
		Waste disposal
		Co2 emissions
	Waste	Air quality
		Materials used by weight or volume
	Materials and	Recycled input materials
Planet	procurement	Sustainable procurement practices
		Benefit cost ratio
		Direct financial benefit
		Sustainable return on investment
	Return on investment	Net present value
		Flexibility/optionality in the project
	Business agility	Increased business flexibility
		Local economic impact
Profit	Economic stimulation	Indirect benefits

2.6 Malaysia Sustainability Drivers

Being a sustainable along with others development country, Malaysia has its own driver to accelerate the sustainability in this country. There are many opportunities and support comes from government, legislation, non-government and others as a platform and driver to broader an awareness of sustainability to be practiced in this country as written in this sub-topic. Businesses cannot operate single-handedly and they

could influence their wider social, economic and environmental context. An understanding of these impacts that will be affected the stakeholders is vital to understand the business sustainability. Every organization is unique. But each should be able to articulate a clear commercial rationale for taking action on responsibility and. sustainability issues (C. Ashford, 2018). Hence, the agenda on sustainability should be upheld by everyone especially by the main contribution sector in Malaysia Gross Domestic Product (GDP) in order to make the idea of development country becomes true.

The government will be pro-active to ensure healthy fiscal and monetary management and the smooth functioning of the Malaysian economy. It will escalate the development of the necessary physical infrastructure and the most conducive business environment by consistent with its other social priorities. And where absolutely necessary the government will not be so completely bound by its commitment to withdrawal from the economic role that it will not get involved. It will play its role cautiously and enthusiastically (Mohamad, 1991).

2.6.1 Bursa Malaysia Berhad

Sustainability issues present both risks and opportunities as external factors to companies. By minimizing and mitigating risks; and maximizing and leveraging opportunities, companies can create long term business value (C. Ashford, 2018). Bursa Malaysia is a publicly traded government-linked company and the role of the Bursa Malaysia Berhad is as an exchange holding company approved under Section 15 of the Capital Markets and Services Act 2007. It operates a fully integrated exchange related services including trading, clearing, settlement and depository services. It also hosts more than 900 companies across 60 economic activities in Malaysia.

Bursa Malaysia is committed to becoming the leading market of sustainability, fostering the creation of long term value for the stakeholders and contributing to the sustainable development of the Malaysian economy. Therefore, the mission of Bursa Malaysia Berhad is to advocated sustainability as key to business success by incorporating economic, environmental, social and governance considerations alongside financial that supports business continuity and long term value. As an initial step for Bursa Malaysia to contribute to the SDGs, they have referred the five goals put forward

by the Sustainable Stock Exchange Initiative as relevant for stock exchanges to support the nation goals. The five goals that put forward are goal 5, goal 8, goal 12, goal 13, and goal 17 as described in sub topic 2.5.1 earlier (Bursa Malaysia, 2018).

2.6.2 Eleventh Malaysia Plan

The Honorable Tun Dr. Mahathir Bin Mohamad in a newsletter with the title of "Malaysian: The Way Forward (Vision 2020)" said, "the ultimate objective that we should aim for is a Malaysia that is a fully developed country by the year 2020". By the year 2020, Malaysia can be a united nation, with a confident Malaysian society, infused by strong moral and ethical values, living in a society that is democratic, liberal and tolerant, caring, economically just and equitable, progressive and prosperous, and in full possession of an economy that is competitive, dynamic, robust and resilient. There can be no fully developed Malaysia until we have finally overcome the nine central strategic challenges that have confronted us from the moment of our birth as an independent nation (Mohamad, 1991).

By supporting the vision 2020, Malaysia Plan was to prepare a series of blueprint in every five years. Thus, Minister of International Trade and Industry, Malaysia Dato' Seri Mustapa Mohamed said in MITI report (2016), under the Eleventh Malaysia Plan (11MP), MITI undertook several major initiatives in 2016 to boost Malaysia's economy and for industries to move up the global value chain. These include a number of ramps and blueprints launched by the government (Ministry of International Trade and Industry Malaysia, 2016). Eleventh Malaysian Plan or "Rancangan Malaysia ke-11" is a planning blueprint of Malaysia, which is approved by the Malaysia government for the year 2016-2020. This comprehensive blueprint covers the budget allocation of Malaysia in different sectors as well as the main policies of Malaysia. In The Eleventh Malaysia Plan, the period of the year 2016-2020 is the final leg of the journey towards realizing Vision 2020 and achieving sustainability development.

In the Eleventh Malaysia Plan, it focuses on the action in four main pressure areas that threaten Malaysia; i.e. strengthening the enabling environment for green growth; adopting the sustainable consumption and production concept; conserving natural resources for present and future generations; and strengthening resilience against

climate change and natural disasters which may lead to be future unsustainability. These areas were divided into seven thrusts and sub-focused in different main area which is enhancing inclusiveness towards an equitable society; improving wellbeing for all; accelerating human capital development for an advanced nation; pursuing green growth for sustainability and resilience; strengthening infrastructure to support economic expansion; re-engineering economic growth for greater prosperity; transforming public service for productivity (Economic Planning Unit, 2018a).

According to the executive summary midterm review of the Eleventh Malaysia Plan, Malaysia has continuously embraced sustainable development in the national agenda. In this regard, the commitment to the 2030 agenda for Sustainable Development (2030 Agenda) has been mapped with the Eleventh Plan to align strategies and initiatives to support the Sustainable Development Goals (SDGs). The first phase of a roadmap is being developed to provide guidance for the smooth implementation of the 17 SDGs. The roadmap takes into account the nation's capacities and capabilities in achieving the identified goals and targets of the 2030 Agenda. From the mapping of the SDGs to the Eleventh Plan strategic thrust, there are 17 goals and 169 targets with 241 indicators to be achieved (Economic Planning Unit, 2018b).

2.6.3 Ministry of Energy, Science, Technology, Environment & Climate Change, Malaysia (MESTECC)

From another driver, Ministry of Science, Technology and the Environment of Malaysia, the policy statement is for continuous economic, social and cultural progress and enhancement of the quality of life of Malaysian, through environmentally sound and sustainable development (Ministry of Science Technology and the Environment Malaysia, 2002). The objectives for this policy were to provide a clean, safe, healthy and productive environment for present and future generations. Conservation of the country's culture diversity and natural heritage with effective participation from all sectors and society will lead to and Sustainable lifestyle.

In 2018, after the general election 14 (PRU 14), the entire component of the Ministry of Science, Technology and Innovation (MOSTI), Green Technology and Energy Components from the Ministry of Energy, Green Technology and Water (KeTTHA) and related components of Climate Change and Environment from the

Ministry of Natural Resources and Environment (NRE) has been restructured and formed the Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC). Since the government of Malaysia has changed, the vision, mission, and strategic trust remain have made every effort for the country development through Science, Technology and Innovation (STI) agenda.

The mission of MESTECC is to explore, develop and utilize STI to generate knowledge, create wealth and ensure societal wellbeing towards achieving a competitive, sustainable and inclusive high-income economy (Ministry of Energy Science Technology Environment & Climate Change, 2018). In news at 23rd October 2018, Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC) conducted the Regional Conference on Fourth Industrial Revolution at Putrajaya with the theme of "New and Emerging Technologies in Achieving Sustainable Development Goals". Therefore, this research are strongly follow and aligned with the strategic plan constructed from policy maker towards sustainability development ahead of time 2020 (Ministry of Energy Science Technology Environment & Climate Change, 2018).

2.6.4 Economic Sector under Gross Domestic Product (GDP)

Lastly, the important driver for sustainability in business is Department of Statistic Malaysia (DOSM), which is a premier government agency under the Ministry of Economic Affairs entrusted with the responsibility to collect, interpret and disseminate latest and real-time statistics in the monitoring of national economic performance and social development. Under Ministry of Economic Affairs, it classified the economic activity into 5 sectors that are the main contributor to the Gross Domestic product or called as "Keluaran Dalam Negara Kasar" (KDNK) of Malaysia economic performance. Gross Domestic Product is a monetary measure of the market value of all the final goods and services produced in a period of time, often annually or quarterly. Nominal GDP estimates are commonly used to determine the economic performance of a whole country or region, and to make international comparisons.

Based on the development of Malaysia economy report on first quarter for 2017 in Department of Statistic Malaysia, the real GDP of Malaysia grew at an average of 6.4% over 38 years. For the first 30 years, the high growth rate is associated with the

intensive growth of the manufacturing sector, which accelerated at double-digit growth rate between 1970 and 1995, with the exception of the 1981-1985 period when it slowed down considerably. In contrast, the primary sector, which grew at 4.8% per annum in the early 1970s, slowed down to a mere 2% per annum in the 1990s. However, the manufacturing sector seems to have lost its steam in the new millennium and is being overtaken by the services sector, which is now being designated as the leading engine of growth. Moreover, the government has also been trying to rejuvenate the agriculture sector as the third engine of growth. The rapid growth of the manufacturing sector in the face of a much slower rate of the primary sector (agriculture, forest, and fishing) resulted in a significant transformation of the Malaysian economy (Lee et al., 2014). Lastly, in the year 2016, Gross Domestic Product showed the percentage share by kind of economic sector activity refer to the constant price at 2010. Services has contributed the largest percentage at 54.3% followed by manufacturing sector at 23.0%, while mining and quarrying; agriculture contributed 8.8% and 8.1% to the economic growth, while, construction and imports duties contributed percentage at 4.5% and 1.4% (Department of Statistics Malaysia, 2017c).

Therefore, in achieving sustainable development, the main contributing factor is very important to be analyzed and presented in order to form awareness to investor, legislation, stakeholders and civil communities. In fact, the growth and structural transformation of the Malaysian economy had widespread implications on the growth of employment opportunities as well as the distribution of labor force by sectors. Other sectors, notably those based on emerging technologies, may experience increased innovation. The overall economic health and employment potential of a nation as a whole is the sum of these diverging trends and highly dependent on international trade. Whether nations seek to increase revenues based on competition in technological performance or, alternatively, rely on cost-cutting strategies, can have an enormous impact on both employment and the environment. Therefore, health, safety, and environmental regulation, structured appropriately, as well as new societal demands, can also stimulate significant technological changes that might not otherwise occur. Thus, the five main sectors are very important to accelerate the economy development in Malaysia. Details on 5 main sectors were described based on MITI's as in sub-chapter below.

2.6.4.1 Service

The service sector is the fastest growing sector in the world GDP, where the sector itself has collectively accounted for about two third of the world services trade. In the service sector, it contains three contributor sub-sector; wholesale trade, retail trade, and motor vehicle. The boosted growth of the services sector in the Malaysian economy is definitely in line with the growth transformation that has taken place in many of the developed economies such as in the United States of America and the European Union. From MATRADE press release 2016, the services sector, which accounts for about 53.9 percent of Malaysia's GDP, remains a key driver of growth for the Malaysian economy. The contribution of services to GDP is on an increasing trend and by 2020 the contribution of services is targeted to reach 58 percent; Malaysia has moved into the third stage of economic development (Malaysia External Trade Developement Corporation, 2016). The process of development usually coincides with a growing role of services in the economy, thus services constitute an increasing percentage of GDP in nearly all developing countries.

2.6.4.2 Manufacturing

Manufacturing can be defined as the production of goods or items by using machines, equipment and labor force. Manufacturing activities vary from handicraft items to technology gadgets. But, the term is applied to the process of industrial production in which raw materials are transformed into finished goods and ready for sale. According to Kaldor (1967), manufacturing is an engine of economic growth as industrial goods have a higher-income elasticity of demand (Pacheco-López et al., 2013). The manufacturing sector in Malaysia contributes almost 80 % of the overall country's export and besides, Malaysia is also known as the 21st largest exporting nation in the world. In manufacturing, there are seven sub-sector contributed to sales value for 2018 in the Malaysian economy such as food, beverage & tobacco at 5.3 %; textile, wearing apparel, leather & footwear at 4.2%; wood, furniture, paper products & printing at 5.8 %; petroleum, chemical, rubber & plastic at 7.7%; non-metallic mineral products, basic metal & fabricated metal products at 6.5%; electrical & electronics products at 9.3%; transport equipment & other manufactures at 10.1% (Department of Statistics Malaysia, 2018a).

2.6.4.3 Construction

The Malaysian economy has to perform efficiently and to play an effective role in making true the dream of developed nation status. The performance of the construction sector in quarter 2 for 2018 grew moderately at 5.3 percent refers to the previous record. The expansion was driven by positive growth in civil engineering and special trade's sub-sectors which contribute economic growth at 23.6% and 12.6% and percentage share at 41.7% and 5.1%. For the other two sub-sectors such as non-residential buildings and residential buildings since the percentage share is large but the negative growth shown in the press release of construction statistic 2018. The private sector continued to propel the construction activity with 56.4 percent share as compared to the public sector with 43.6 percent share (Chia et al., 2018). From previous research about the performance of construction sector beyond 2020, the results exhibit that there is a strong correlation between the construction sector and economic growth of Malaysia (Khan et al., 2014). Therefore, the construction sector has been playing a significant role in the aggregate economy of the country in term of its contribution to revenue generation, capital formation and employment creation which ultimately support the gross domestic product (GDP) and the socio-economic development of Malaysia. Considering the substantial role of the construction sector in the economic development of Malaysia, it is necessary for Malaysia government to give due attention and focus on the construction sector for qualifying the title of the developed nation (Khan et al., 2014).

2.6.4.4 Mining and quarrying

The sector of mining and quarrying has a significant socio-economic environment and manpower effect in the Malaysian economy for the country. Since this sector is closely related to the environment, people and also profit, the attention from the legislation and related bodies in Malaysia play their role wisely in order to achieve sustainable development country. This sector is making a large impact especially as a contribution to GDP, earn foreign exchange and bring foreign investment in the country. From a report released by Department of Statistic Malaysia for Economic Census 2016, the mining and quarrying are referred to two sub-sector; i.e. the mineral mining sub-sector refers to mining of bauxite, gold, coal, iron ore, tin, ilmenite, among retreatment, and other mining; whereas quarrying sub-sector refers to granite, limestone, sand

extraction, and another stone quarrying. In 2015, there were double increasing of establishment compared to the year 2010 which only at 402 (Department of Statistics Malaysia, 2017a).

2.6.4.5 Agriculture

The agricultural sector had been the mainstay of the Malaysian economy for many years since independence. The agriculture sector can be generalized into three categories which are crops, livestock, and fisheries subsector. In 2016, the agriculture sector grew 8.1 percent to the Gross Domestic Product (GDP). The increasing of the GDP was contributed by sub-sectors such as oil palm as a major contributor to the GDP of agriculture sector at 43.1 percent followed by other agriculture (19.5%), livestock (11.6%), fishing (11.5%), forestry & logging (7.2%) and rubber (7.1 %). Exports and imports increased by 5.4 percent and 0.9 percent respectively as compared to 2015 (Department of Statistics Malaysia, 2017c). The number of non-citizens employed in the agriculture sector was 600.4 thousand persons, a decrease of 7.1 percent as compared to 2015. According to monthly rubber statistics Malaysia for August 2018, the production of natural rubber rose 11.4% and mainly domestic consumption at rubber gloves, rubber thread, tires and tubes and other (Department of Statistics Malaysia, 2018b).

2.7 Sustainable Business Practice

Before going to the sustainable development country, making sustainable business as smart business is very important to be achieved in the early stage. A strategic approach to long-term material risks and opportunities can make companies more resilient, more innovative and more attractive to investors, customers and potential employees. This article sets out the key drivers for sustainable business success (C. Ashford, 2018). There are four broad benefits of sustainable business practice. Firstly, taking action and engaging audiences can build trust and enhance brand value and help to attract and retain customers, employees and investors as well to strengthen license to operate. Secondly, measuring such as reducing waste, cutting energy and greenhouse gas emissions and improving workers safety can help cut cost and improve the bottom line. Thirdly, minimizing vulnerabilities and anticipating upcoming issues help to improve business resilience such as engaging proactively with regulators and non-

profits can help prepare for future regulations. Lastly, pioneering new product, service, and business models through the lens of sustainability can grow sales such selling product that brings a social benefit or reconfiguring distribution channels to reach marginal groups can create a social impact as well as new opportunities for market expansion.

From an application point of view, there have been several contributions providing discussions and surveys on the use of data, information, and indicators for sustainable development (Dahl, 2012; Mayer, 2008; Ness et al., 2007; Singh et al., 2012). The basic point is that a collection of many diversified indicators to take under control, the so-called "dashboard approach", is important but not sufficient, this due to the participation context, which is not integrate the key elements in practice such as knowledge level and consciousness level (Ramdas et al., 2014). Knowledge is an understanding or information a subject that by experience or study, either known by one person or by other general people while consciousness is the state of being awake, aware of what is around us, and able to think and realize.

Due to practicing sustainable development, the system or tool should be invented to explore the factors that affect the interaction between sustainability indicators due to decision making thus accomplish the sustainable development goal. There are some researches done on measuring sustainability practice in Brazilian case studies and other reserchers. In the Sustainability Performance Measurement system (SPMS),corporate performance measurement systems were developed to investigate the firm is practicing sustainability indicator into their business (Morioka et al., 2016) and several assessment tool were developed by academician for sustainability with their own purpose such as LCA methodology that focus during product life cycle and will estimate an environmental burden; Ten Golden Rules as basis and monitor the development of specific design an in qualitative method; LWSP Framework focus on increasing the comprehensive measurement of environmental impact; Wuppertal sustainability framework Risk assessment used on governmental progress of UN development; Benefit- Cost Analysis is an alternative decision to evaluate the net benefits; Integrated Assessment Models to address complex environmental issues from multiple disciplines theory and data; Sustainability Impact Assessment to analyses the probable effects of a particular proposal.

In addition, from page SDG Compass through the inventory of business tool, there are only 58 tools were develop with a different focus of Sustainable Development Goals by different developer all around the world but Malaysia does not contribute yet in 2015 (SDG Compass, 2015). In addition, there are several analysis on sustainability practice in analysis of corporate environmental report (Cowan et al., 2010), measuring case study of sustainability practice in corporate performance systems (Morioka et al., 2016), Sustainability assessment protocol for hydropower in practice of utility's perspective (Möstl et al., 2012), the principle to practice in sustainability and master planned estates (Hurley, 2011) and the impact on sustainability practice among Malaysian manufacturing business towards social wellbeing (Hassana et al., 2016).

Therefore, the linkage between SDGs and P5 was prepared as in Appendix B by SDG Compass to guide companies or business on how to align the business strategies and make a realization. Thus, will contribute to the SDGs by preparing an assessment tool of integrated BSP performance for sectors in Malaysia. The model of an integrated system for BSP performance as in Figure 2.8 below.

Figure 2.8 An Integrated system of BSP Performance model

The concepts of sustainability are gradually permeating most science and engineering disciplines. Science and engineering together create technologies in the modern world, while sustainability imperatives provide challenges and opportunities. They must be considered to steer the development of useful policies, education, products, technologies, management procedures and ethical principles that protect the human health, wellbeing, the environment, and also protect the future generations. Solution- oriented technologies need to be more holistically integrated into all levels of planning and implementation. Thus, transformative models can be created built upon

real-world data to make sustainability decisions. Standards and guidance are needed to assure the robustness of these decisions that can be quantified and in order to develop such standards, the latest advances in modeling for sustainability, in the assurance of data and decision quality, and in the quantification of sustainability must also be applied (Duić et al., 2015).

Although Malaysia has taken many initiatives and has addressed sustainable development in its policies and plans, there is a weakness in the territory of sustainable development. This shortcoming refers to the intuitiveness of sustainable development definition, which makes interpretation of sustainable development and setting indicators a challenging process. This weakness has been regarded as the absence of comprehensive approaches or frameworks and lack of sufficient sustainable development indicators (Saadatian et al., 2011). Malaysia's involvement in the development of the SDG at the international began in late 2014; with the involvement of Economic Planning Unit (EPU) in the negotiation process between United Nations country members (Inter-Governmental Meetings) held from January until July 2015 to finalize the Post 2015 Development Agenda. Discussions between United Nations country members were including the declarations of P2015DA, Sustainable Development Goal, and Targets, Means of Implementation and follow-up & review. Other than that, Bursa Malaysia was take part on the national agenda which is agenda 2030 that launched at the Historic United Nation (UN) Summit in New York in 2016, the SDGs were ratified by UN member state to focus their efforts on transforming the world by 2030. For Malaysia, the SDGs align to build on the sustainable development agenda already set in motion by the Eleventh Malaysia Plan 2016-2020, which seeks to ensure that no section of society is left behind the nation development. Thus, to ensure the alignment of the SDGs and GPM to the BSP success, clear knowledge, and higher consciousness should be integrated.

2.8 Theoretical Framework of BSP Performance

From Mawhinney (2002), the current practice in the sustainability valuation of urban development appeals seriously on indicator and execution benchmarks approach, with many practitioners seeing this to be the main possible route forward for usage and assessment of sustainability development. There is broad writing accessible on pointer indicator and development, and an indicator element for sustainability practice, in which

key necessities of indicator element or execution criteria for sustainable development are established (Waas et al., 2014; Waring et al., 2015). Therefore, from Ramdas et al. (2014) in the research on the willingness to pay, the theory of behavior change model is proposed. The responsible actions will be produced by the level of awareness that influenced by the level of knowledge on the issues (Ramdas et al., 2014). In performing the practices, a dimension of it should be cleared. The relationship between knowledge with awareness and attitudes are important by performing the best action to gain the output or impact.

However, several authors highlight that agreement with broad statements representing the idea of sustainability is easy (Grootheest, 1999; Lanang et al., 2018; Yada, 2006). But more specific statements and actions were taken are more difficult to agree with and a certain gap between attitudinal statements and actual initiatives becomes apparent (Dewhurst et al., 2003; Shyle, 2018). Studies about businesses' attitudes towards responsibility for sustainable development reveal contradicting results. While some society's members are highly aware of the urgent need for sustainable lifestyles and the role of individuals in achieving so, a high percentage of people lack the awareness and knowledge of sustainability, its importance and the role of civil society. Thus, raising awareness is a major responsibility of governments, NGOs and the private sector to a certain extent.

Table 2.3 Summary of sustainability parameter used in previous research

Authors	**Sustainability Parameter Used**	**Finding**
Tam & Fung, (2012)	Personal attitude	A positive personal attitude will paid more attention on something. Thus, will paid off positive result on it.
Earl et al., (2003)	Level of education and knowledge on sustainability	A suggestion on direct relationship between level educations with knowledge of sustainability. Thus, a positive slope produced as indicator that education promotes an understanding of the concept of sustainability.
Caeiro et al., (2013)	Holistic perception	A contribution in higher education sector toward holistic perception on sustainability development should be observed to educate the community beyond sustainability implementation processes.

Table 2.3 Continued

Authors	Sustainability Parameter Used	Finding
Roorda, (2013)	Education and strategy	An action research on education for sustainable development (ESD) with coherent strategy to integrate SD in higher education sector.
Samuel et al. (2012)	Societal well-being	A social well-being indicates the societal effect by considering the three basic dimension employee, customers and immediate community (directly or indirectly towards surrounding communities)
De Olde et al., (2016)	Decision making	Comparing 48 indicator-based assessment tools to gain insight practical requirements, procedures and complexity. The practical tool will perceived by farmers. The farmers expressed a hesitation to apply the outcomes in their decision making and management.
Bardos et al., (2016)	Stakeholder perspectives	Sustainability assessment to support sustainable remediation by considering different stakeholder perspective's requirement.
Marchand, Triste, Gerrard, Padel, & Lauwers, (2014)	Spiritual ecological, awareness and consciousness level	The spiritual ecological awareness is present amongst the students but the conversion transformation of this awareness to consciousness level is required at deeper level in student communities; and might happen with age and with continuous practice.
Chatterjee, (2009)	Life-cycle thinking	A life-cycle thinking required toward environmental conditions, diversity of human needs, resource consumption and waste generation will avoid an obsolescence.
Ramdas & Mohamed, (2014)	Knowledge, Attitude, sensitivity and motivation	An environmental concept that consists knowledge with disposition components of attitudes, sensitivity and motivation by accelerating an intention to act or intended behaviour will apply the willingness pay concept for the environmental attributes.

From table above, the researchers were focused on different aspect or parameter based on the needed for every research study. But their focus are to develop and sustain their own performance. From the finding, most of the parameter used with different parameter based on their need for their reaearch. Whatever the parameters used, better when its compliment to the objective of the research study. For this research study, the parameter related to the knowldege, attitude and psyhcology aspect as preferable. Therefore, the finding from researcher ramdas Mohamed (2015) more suitable reference for this research study.

The relationship between knowledge, attitude and behavioral intention is an explanation of the theory of action. The hypothesis of action is an expresses that an individual's choice to take part in behavior or is not an outcome of their assessment towards sustainability practice and actions is not a motivated by extreme wishes and unconsciousness aims (Ekman et al., 2012). Therefore, measurement of quantitative which is knowledge is very important by considering the qualitative factor such an attitudinal factor toward the best practices. By doing this research, the theoretical framework model of BSP performance as in Figure 2.9 below was implemented the level of knowledge as tangible factor and consciousness or attitudinal parameter as an intangible factor to the inspiration towards business sustainability practices.

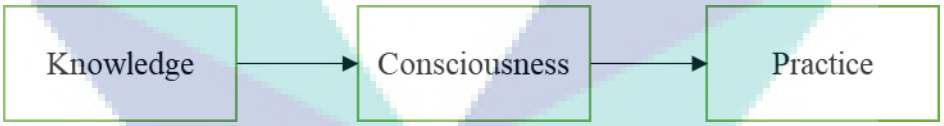


Figure 2.9 Theoretical Framework Model of BSP Performance

The best practices of the sector are determined by the mean correlation between the level of knowledge and the level of consciousness. The dimension's theory of willingness or participation towards sustainability should be correlated between the knowledge; awareness and attitude or consciousness (Ramdas et al., 2014).

2.8.1 Elements in practices: knowledge and attitudinal parameter

Attitudinal parameter is a mathematical symbol used in this research study, to describe the emotional disposition of design stakeholders (decision makers) when making decisions. From discussion by Ramdas et al. (2014), the concept of action towards environmental literacy and willingness to pay based on the behavior change

mode that depends on the level of knowledge and will influence the awareness and attitude of practitioner. In addition, the research on business attitude is essential as the most serious barriers to change in business is attitudinal. From Ajzen et al. (1991), the theory of reasoned action concludes that a strong relationship between belief, attitudes, and behavioral intentions exists, which then leads to a certain behavior. Beliefs and attitudes are influenced and formed through macro-environmental pressures, personal relationships, individual values and motivations (Ajzen, 1991). Next, Hobson et al. pointed out that the general attitude towards the environment and the implementation of sustainable business practices are most important (Hobson et al., 2001).

Base on the literature, knowledge is an essential element towards everything especially in doing any action. Thus, every action or practice need a process called decision making. Since the decision-making process often depends on the divergent attitudinal character or the risk attitudes of the DMs. Hence, the exponential score function proposed by Wu, (2015) has been extended and modified to reflect DMs attitudinal character. Through the introduction of an attitudinal parameter (λ), which is a mathematic symbol used in this research study, to describe the emotional disposition of employees in the different sector when making decisions. The attitudinal parameter (λ) has within the range [-0.9, 0.9], hence if the attitudinal value within the range $0.1 < \lambda \leq 0.9$ is called as risk-averse. If $\lambda = 0$, so it is risk neutral and finally, if $-0.1 < \lambda \leq -0.9$, then it consider to be risk-seeking and the illustration as in Figure 2.10 below (Lanang et al., 2018).

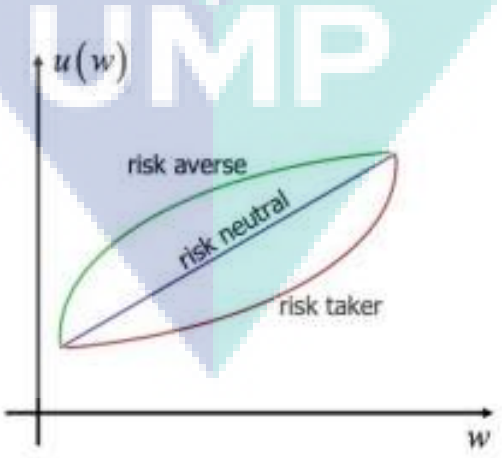


Figure 2.10 The illustration graph of an attitudinal theory

Source: Lanang et al. (2018)

2.9 Review on clustering approach

Clustering is the mission of splitting the population or data into various congregations with the end goal that information focuses in similar gatherings are more like other information focuses on a similar gathering than those in dissimilar gatherings. In basic words, the idea is to separate clusters with comparative characteristics and move out into groups. A typical repetitive assignment in which one tries to identify a limited arrangement of categorizations or group to describe the information is known as clustering. There are several types of clustering techniques and methods such as Hierarchical Methods, Partitioning Methods, Density-Based Methods, Grid-Based Method and Model-Based Methods. For further categorizing methods, they were also clustered into different algorithms techniques. The categorizing and the description of every technique as in Table 2.4 below.

Table 2.4 Several clustering method with the algorithm techinique used

Clustering methods	**Description**	**Algorithms techniques**
Hierarchical	It follows two approaches which are bottom-up and top-down where all clusters are combined and are transformed into one & all observations are split into different bunches respectively.	• Agglomerative Algorithms • Divisive Algorithms
Partitioning	The number of database (n) items and the partitioning strategy builds "k" segment of information. Each division will have a cluster by arranging the information into k gatherings, which fulfil the accompanying prerequisites. Each gathering contains no less than one object.	• Relocation Algorithms • Probabilistic Clustering • K-Medoids Methods • K-Means Methods
Density Based	This method is based on two function types that are connectivity and density functions. The basic idea behind it is that the thick clusters are formed and they should grow as long as they cross the threshold of the neighbouring clusters.	• Density-based connectivity clustering • Density functions clustering

Table 2.4 Continued

Clustering methods	Description	Algorithms techniques
Grid-Based	The objects together shape a framework. The object form is quantized into a limited number of cells that shape a network structure.	• Constraint-based clustering • Clustering algorithms used in machine learning • Gradient descent and artificial neural networks • Evolutionary methods
Model-Based	In this model is theorized for each group to locate the best shape of data for a given model.	• Algorithms for high dimensional data • Subspace Clustering Projection Techniques • Co-Clustering Techniques

Source from: RoopRekha et al. (2016)

There are many previous researches using the clustering approach with a different technique. The clustering approach is used in various field of study such in Table 2.5 below.

Table 2.5 Clustering approach with different technique at various field of study.

Authors	**Title**	**Field of study**	**Method Finding**
Cross, 2013	Statistical and Methodological Considerations When Using Cluster Analysis in Neuropsychological Research	Medical	To find relationships among a suite of variables from which patterns or structures can be determined either to gain a more thorough understanding of outcome variables or to develop groups that can be subjected to further analyses.
Smith et al., 2018	Locus of control and PTSD symptom clusters	Medical	The locus clustering between locus of control and five factor model PTSD symptom among combat veterans using Bivariate correlations.

Table 2.5 Continued

Authors	Title	Field of study	Method finding
Noiva et al., 2016	Cluster analysis of urban water supply and demand: Toward large-scale comparative sustainability planning	Water system	Hierarchical cluster analysis is used to identify the similarities between different cases of hydro climatic water supply and cluster the possible cumulative effects of water basin
Sonetti et al., 2016	True Green and Sustainable University Campuses? : Toward a Clusters Approach	Education	Homogenous campus by providing the university ranking was prepared by using clustering method
Yang et al., 2015	A systematic approach to ON-OFF event detection and clustering analysis of non-intrusive appliance load monitoring.	Energy	The detection and clustering the time duration an electrical appliance using K-mean clustering.
McLennan et al., 2016	Learning through a cluster approach: lessons from the implementation of six Australian tourism business sustainability programs	Tourism	A cluster approach can provide a clearer path to sustainability while also offering support and savings on resources and cost.
Benk et al., 2017	Confidence in Government and Attitudes toward Bribery: A Country-Cluster Analysis of Demographic and Religiosity Perspectives	Ethics	The demographic and religiosity perspectives analysis by classifying the countries towards bribery accepting
Shuja et al., 2017	Functional Analysis of Industrial Clusters in Malaysia	Economic	Using of pairwise linkage rations for correlation matrix of different industries and found that the largest contribution to the economy was manufacturing sector.

Based on the previous research, the clustering approach is used because of the clustering approach can give a clear path and offering support and saving on resources and cost towards sustainability (Char-lee et al., 2016). In addition, the clustering algorithm was very useful for developing software in data analysis that can minimize the within group sum of a square and also group the dissimilarities of objects (Murtagh et al., 2014). Moreover, the cluster analysis is widely used in different disciplines with the largest objects but decrease the degree of association (Cross, 2013). The clustering approach with K-mean algorithm of different sector based on selected variables was implemented in this research study. The K-mean clustering is a method of vector quantization which is a classical quantization technique from signal processing that allows the modeling of probability density function by the distribution of prototype vectors. In this research, the Minitab was used as the signal processing for the different sector

2.10 Review on validation process.

Validation is an evaluation by collecting several data. This is the process on which establishes scientific evidence that capable on delivering a consistence quality of products. There are several resercher doing the validation for their works with several method and techiques such in table below.

Table 2.6 Review on validation process for previous research work.

Authors	**Validation method used.**	**Findings**
National Research Council, (2015)	Traceability	Traceability is an important component of the assurance of food quality and needs ongoing validation because it is also a vital component of operational standards and certification programs.
MOSTI (2011)	Expertise	The validation from GRI's expertise and Universities as an outcome to compile and restructure the research management centre.
CEDA (2015)	Data collection	In baseline monitoring, it was judged that data collection needed for numerical model validation
Gebauer, Worch, & Truffer, (2012)	cross-case analysis	Enhance internal validation analysis by a cross-case analysis that synthesized the findings through a qualitative pattern-matching logic

Table 2.6 Continued

Authors	Validation method used.	Findings
Sasaki, Mcgibbon, Wheeler, & Boruta, (2011)	Analytical Research and Development	A group that work concertedly with the process and structure characterization groups in concert to enable profiling and stability evaluation with degradant identification.
Tarmidi et al., (2006.)	Collaborating	To improve the validation and verification by make more collaborating between organizations.
Hurley (2011)	Ex-post assessment	Ex-post assessment provides critical evaluation of the outcomes of a project, allowing validation and continual calibration and improvement.
Ekman et al., (2012)	Cross-validation	Using pattern classification and cross-validation, important measures and their functional relevance are investigated in an unbiased fashion.
Singh et al. (2012)	Item analysis or external validation	The validation adjustments are normally carried out at different stages such selection, scaling, weighting and aggregation. In order to improve the quality of the final results, the validation is normally performed by using either item analysis or external validation
Morioka et al. (2016)	Interview	Each interview was recorded, transcribed and sent to the interviewee for validation, whenever possible, as suggested by the literature (Voss et al., 2002), and the interviewee's responses were triangulated from the other actors.

In this researh study, the validation from the expert is choosen. This method to verify the result and the findings from this research study. The validation on this research is using expert elicitation method. An expert elicitation method were contain sevene steps as requirement step on the validation method as in Figure 2.11 below. The selection of the experts based on their participation in the sustainability practice, the working experience and the position in the organization or bodies. The details were describe on chapter 3.

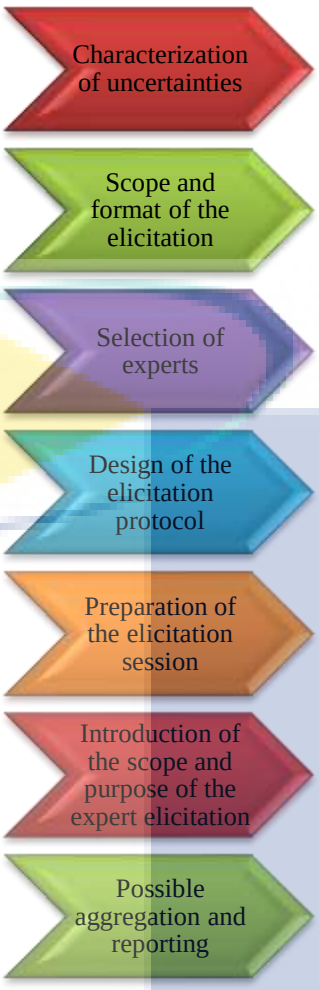


Figure 2.11 Seven step on expert elicitation method.

2.11 Summary

Being sustainable enable companies of enhancing their reputation and brand value in the market and among consumers and investors; thus, providing companies with a long-term intangible benefit. Sustainability within the business world not only benefits the external environment; yet, it also marvelously benefits the business itself in the long run. The behavioral transition towards sustainability requires reformations and modifications among various entities within a society. The process of behavioral change involves a variety of steps and procedures. At the earliest stages comes the step of raising awareness among society. In addition, there is no integrated technique between linkage SDG and GPM with an attitudinal parameter to perform the profile performance among sectors in Malaysia context.

CHAPTER 3

METHODOLOGY

3.1 Introduction

In the previous chapter, some explanation, and some gaps were identified in the literature which included the need of holistic, flexible and adjustable approach and methodology to facilitate and support the sustainable development through, green project management P5, Agenda 2030 and Vision 2020. Applied research is the targeted method regarding to trigger a business management case in Malaysia. This chapter begins with the overall flow chart of the research which highlighted the two main phases, where an integration technique of Business Sustainability Practice (BSP) in Malaysia context was developed and analyze the output using a K-Mean clustering approach by presenting the cluster of BSP Performance. Thus a structured questionnaire was designed by using several methods that will be explained on the subtopic below.

This research approaches a part of an ongoing research project of sustainable business practices from 2017 until 2018. The research consists of two main phases with several steps to develop an assessing of Business Sustainability Practice (BSP) to trigger business plan in management to be competitive in the global market. Hence, the three objectives stated in Chapter 1 were answered by the end of this research. Figure 3.1 presents an overall process flow covering the tools and equipment needed and the deliverables from each process. Further explanation of the methodology will be in the next topic and subtopic.

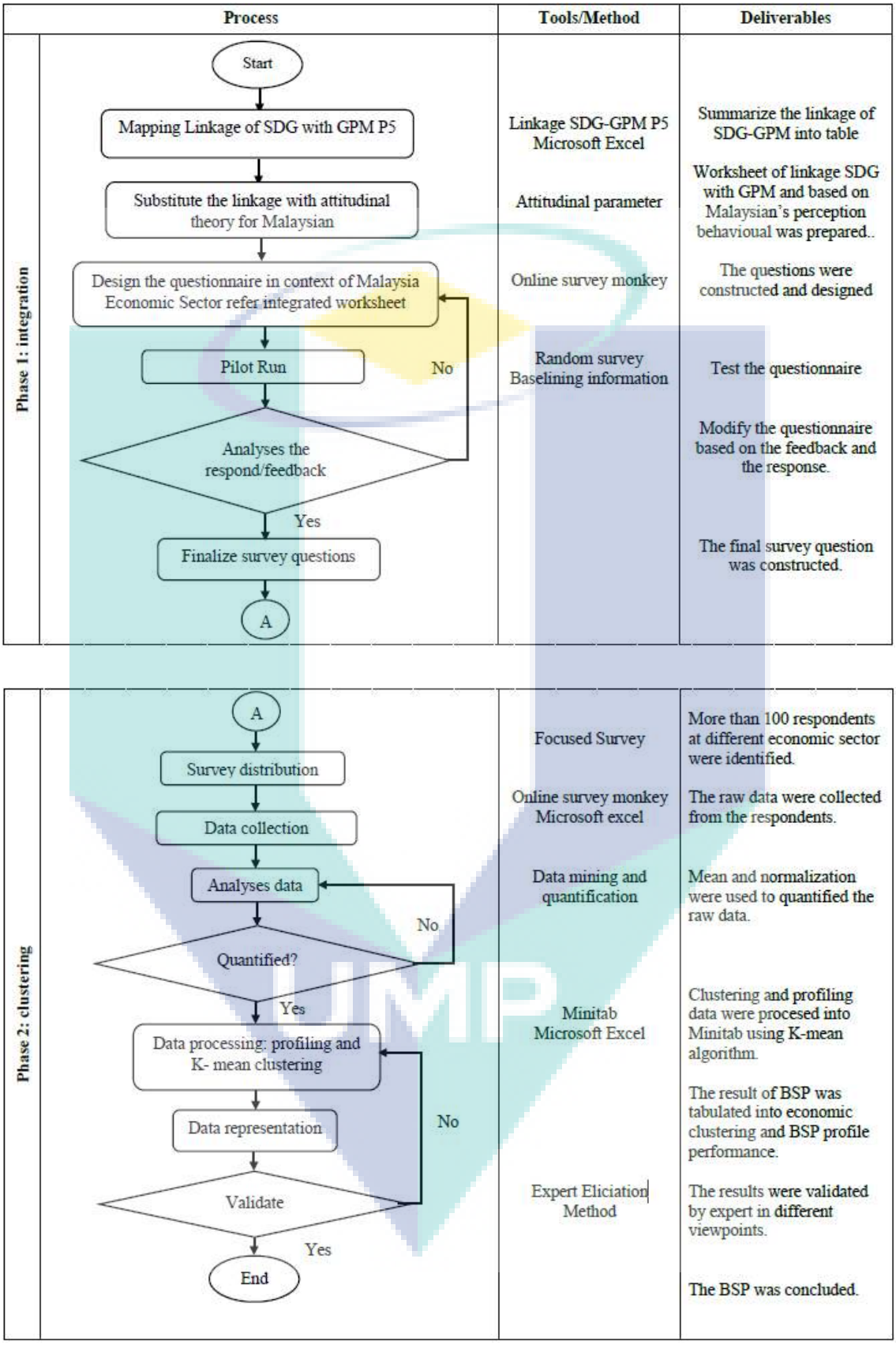


Figure 3.1 Overall Flowchart for Research Methodology

3.2 Phase One: Integration

The first stage began with the identification of the current knowledge and information in which sustainability practices of sectors in Malaysia were managed and reported. An inductive approach is considered to be the most appropriate for this research, i.e., where the lack of empirical research is approached by identification of current problems and the consequent exploratory nature of this stage (Mintzberg, 1980). The strategic procedures are chosen as this allows detailed exploration of several cases in an iterative process, which potentially produces more robust outcomes as discussed in the literature review. The strategic processes are focused and considered for the mission and the vision of sustainability driver, taken from United Nation, namely Green project management P5 and Sustainable Development Goals (SDG) which they are supported by Malaysia's bodies, i.e., prime minister's office, legislation, NGO's, and public awareness by considering the background of economy in Malaysia with their culture behavioral. From this phase, the first objective which is an Integration technique of Business Sustainability Practice (BSP) in Malaysia context as in chapter 4 later was proposed.

3.2.1 Sample Preparation Step One: Mapping Linkage of SDG with Green Project Management

The research starts by mapping the linkage of the SDG and GPM P5. This phase involved an extraction from linkage between SDG and GPM as promote by SDG Compass published in "Linking the SDGs and P5" for wider coverage of the sustainability concept (SDG Compass, 2015) as in Appendix B. A set of accumulation worksheet related to the previous linkage is formed by providing a standard calculation to all respondents. The linkage between the SDG and GPM P5 is a technique to make sure the seventeen goals of sustainable development escalate towards the pillar of sustainability with their twelve attributions and 46 sub attribution suited to the Malaysia current conditions (Gibson, 2006; Johnson et al., 2014). From the accumulated information and the concept, structural design of the worksheet is developed as attached in Appendix C. From the worksheet, the purple area of mapping and standard calculation of the worksheet was prepared as an integrated worksheet.

3.2.2 Step Two: Substitute Attitudinal Parameter

Next, the worksheet is designed simultaneously by incorporating the attitudinal character or risk attitude of the decision making (which indicates the pessimistic or risk-averse character of the decision making, the optimistic or risk-prone character of the decision making) while answering the questionnaire which is the psychological factor (Tsakos, 2008). Through the introduction of an attitudinal parameter (λ), which is believed could be effective in tackling the complex; ill-defined and human-oriented decision problems in an assessment of BSP. It is within the range $\lambda \in [-0.9,0.9]$, hence, if $0.9 \leq \lambda < 0.1$, then the DMs is said to be risk-averse. If $\lambda = 0$, the DM is risk neutral and finally, if $-0.1 < \lambda \leq -0.9$, then the DM is consider to be risk-seeking (Lanang et al., 2018). The attitudinal is tabulated in Table 3.1 below.

Table 3.1 An attitudinal parameter

Attitudinal Response	**Attitudinal parameter**
Risk seeking	$-0.1 < \lambda \leq -0.9$
Neutral	$\lambda = 0$
risk-averse	$0.9 \leq \lambda < 0.1$

Source: Lanang et al. (2018)

Table 3.2 An extended and modified attitude parameter

Attitudinal Response	**Attitudinal parameter**
Risk seeking	-0.9
Neutral	0
risk-averse	0.9

An attitudinal theory that is extended and modified according to the culture of the Malaysian Economy is as in Table 3.2. The decision making is defined by a single number between the ranges of the attitudinal parameter. The selection is based on the worst, the best and normal case attitude response toward the decision making or feedback (Kruser et al., 2015; Kruser et al., 2017). The selection number of a single attitudinal parameter is used to convert the qualitative to quantitative value rather than a range numbers. The quantification value is done by referring to the respondent while answering the questionnaire as in next step.

3.2.3 Step Three: Design the Survey

The integration between SDG, GPM, attitude and Malaysia economy sectors were done beforehand. Next, the questionnaire is developed using survey monkey application tool. Survey Monkey is an online survey development cloud-based software and was founded in 1999. The survey design was the use of mixed method approach which is quantitative and qualitative methods that will discuss in terms of their advantages and disadvantages (Bryman, 2007; Renner et al., 2003; Sogunro, 2002). In order to offset the weaknesses and draw upon the strengths of both methods, the use of mixed method research has become increasingly common in recent years (Sogunro, 2002). Nevertheless, combining quantitative and qualitative types of research into an integrated framework has been criticized for these research approaches are said to be incompatible (Bryman, 2007). However, from a more technical perspective, this connection is seen as not fixed and ineluctable in real issues. Hence, the data collection and data analysis techniques are seen as capable of being fused and thenceforth called a mixed method approach (Bryman, 2004, 2007).

The core characteristics of well-designed mixed methods study in BSP Performance research include the following:

1. Collecting and analyzing both quantitative and qualitative data.
2. Using rigorous procedures in collecting and analyzing data appropriate to each method's tradition, such as ensuring the appropriate sample size for quantitative and qualitative analysis
3. Integrating the data during data collection, analysis, or discussion.
4. Framing the procedures within theoretical models of research, such as within a public model that pursues to understand multiple viewpoints on a single issue

Based on the previous research, good practice in conducting survey will give the best result in the related case study. Therefore, three important elements are considered in this survey which are descriptive research, analytical studies and evaluation research. These elements help the survey to be on track by providing the estimation on specific parameters in the targeted population and to describe the association. In addition, the clarification for a specific problem will be solved through focused data and the effect of

one set of a variable can be analyzed and will discover the effects of a plan change onward (Kelley et al., 2003). Other than that, the psychology approach such as using a Likert scale is implemented in the survey question design to give more focus and easy to answer the question, so the respondent be able to answered the question concisely and honestly (Chomeya, 2010; Joshi et al., 2015; Kelley et al., 2003; Zaller et al., 2015). The structure of the surveys is made concerning the objectives and the related factor of the study. The survey was divided into three parts which are demographic, business development and sustainability development. The structure of the survey formation is shown as in Table 3.3.

Table 3.3 The structure of survey formation

Part Name.	**Part Description**	**Details**
Demographic information	The demographic or respondent background	-State working -Job designation -Economic sector
Business Development	The employees, attitude or concern about the organizational effort with the current practice of the company	-Current Existing of company core value, mission and vision, and company background.
Sustainability Development	The employees' attitude or opinion about the situation that related to the GPM and the SDG	-Level of knowledge -Preferable in the element of sustainability -Preferable in attribution -Preferable on the linkage GPM-SDG

There are eight questions provided and which requires around ten minutes to answer. The example of the survey questions as in Appendix D. The complexity in this particular research is the knowledge and judgment of attitudes to assess the important of attribute to sustainable business practices. The quantitative research in the form of a questionnaire will provide numerical evidence and allow statistical analysis. A semi-structured in-depth opinion will constitute the qualitative part of this research and give a sense of process and enhance the breadth and depth of the issue. Therefore, the next sub-topic shows the three part of survey formation on this research to collect the raw data.

3.2.3.1 Part One: Demographic

From this part, the collection of several information employees and employers are statistically as shown in Appendix E. From Department of Statistic Malaysia (DOSM) there are several economic activities contributed to Gross Domestic Product (GDP) performance. The questions aim to obtain as much feedback as possible on the respondent's information, this will relate to the current sustainability performance in Malaysia. Therefore, this part consists of three questions relates to the personal information which are currently state she/he working, job designation either executive or non-executive, lastly their current involvement category in the economic sector.

3.2.3.2 Part Two: Business Development

From this part, the information about the current progress and development of sustainability for companies in Malaysia are collected. The structures of the questions focused on an employee perception about the existing sustainability practice of their company in the company core value, mission, and vision.

3.2.3.3 Part Three: Sustainability Development.

Finally, there are several questions related to the linkage of the SDGs with elements in the Green Project Management (GPM) P5 Standard for sustainability. These linkages are based on a more detailed analysis available on the SDG Compass (Global Reporting Initiative, 2015) in which all twelve elements in Green Project Management (P5) are mapped to the 17 SDGs. The performance is measured by providing several situations that related to those linkages. From this situation, the decision making is needed to answer. Therefore, the behavior model in the previous chapter is used to evaluate the consciousness level of the respondents.

3.2.4 Step Four: Pilot run

After the draft of the question is completed, a pilot run is conducted. The survey was distributed to undergraduate students and other public workers in any position at any sectors by using random survey method. The objective of this pilot run is to create a baseline for the information especially in taking responses and feedback to the question before throwing out to the focused group of the respondent (Lee-Kelley, 2006). Reconstruction and modification of the survey formation are focused in this phase to

prepare a deliverable compact and precise questionnaire for the respondent. The outcome of this phase is to identify the awareness level of the respondent about sustainability according to the various sector in Malaysia. The random sampling allows the results to be generalized to a larger population, where a statistical analysis will be performed if appropriate (Kelley et al., 2003) and also to reduce the noise. The companies and bodies involved in this pilot run are as in Figure 3.2 below and the pilot run survey question as in Appendix G. Next, the clustering phase will be prepared in the next sub-section to assess the Business Sustainability Practice (BSP) to answer the second and third objectives.

Figure 3.2 List of companies and bodies involved in a pilot run

3.3 Phase Two: Clustering

After baselining and integrating processes in which the integrated survey question is formed, a focused survey distribution, data collection, and analysis should be done to complete the study. Phase two is a clustering phase which targeted group of respondents are determined. The background observation of the respondents is conducted under the guidance from the supervisor. The method used for the survey distribution is a purposive sampling which thoughtful choice of participants by sets out to find people who can and are agreeable, and classify the respondents by different sectors according to the GDP (Kelley et al., 2003; Nuttall et al., 2017; Renner et al., 2003). From Bernard, H. R. (2002), the sampling will provide the information by virtue of knowledge or experience. Another researcher, Cresswell et al. (2011) stated that purposive sampling involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest.

The clustering technique using K-Mean algorithm in Minitab and the validation was prepared by using the Expert Elicitation method that will be discussed in next subtopic.

3.3.1 Step Five: Survey Distribution

The distributed surveys have taken a month to be collected back using the postal method. There are several advantages and disadvantages using postal questionnaire such as the disadvantage are low responses rates, the potential of deceits unknown participants the questionnaire and etc. However, a well-constructed, concise and structural survey question will overhaul the disadvantages (Kelley et al., 2003). The concise and explicit research question includes the questionnaire layout, structured question using Likert scale rather than fill the answer, simple instruction, minimal question and others (Chomeya, 2010; Joshi et al., 2015; Zaller et al., 2015). As a result, 45 over more than a hundred targeted respondents responded, in contrast to the previous research (Lee-Kelley, 2006) that said only less than 20 percent will respond through the postal method. Therefore, modification of the method capable to increase the number of the respondent as expected. In addition, the postal method was prepared for the respondents that meet certain practical criteria such as easy to accessibility, geographical proximity, time availability, or willingness to participate included in the purpose of the study.

3.3.2 Step Six: Data collection

Thus, the data collection are taken part through the online Survey Monkey's collection data. As a result, 45 expert respondents are chosen as possible candidates to be categorized into five classes with the same economic activities. Next, data mining and sorting are done by using Microsoft Excel and online Survey Monkey application. The most important to the least important data ware separated into different categories such as demographic info, knowledge level, level of business practice and others, to clarify the analyses in the next step. Figure 3.3 below shows the list of company that involved in this research study included for the Expert Elicitation method in the validation stage.

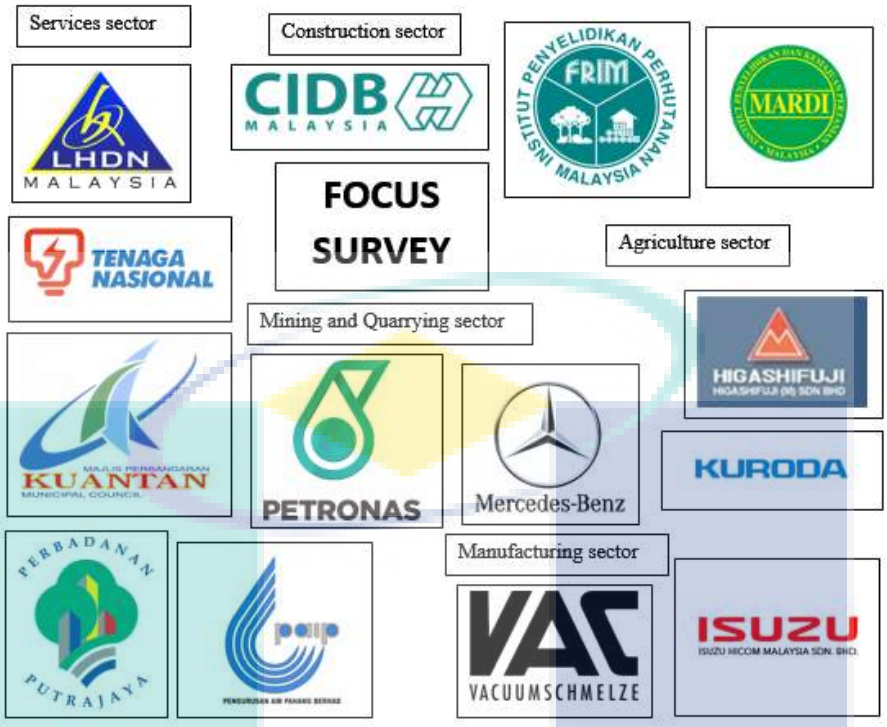


Figure 3.3 List of companies and bodies involved in this research study

Expert elicitation method is useful to have perfect knowledge regarding to the future estimation or judgment by providing realistic decision making. It is a formal process that can provide high value, perceptible, transparent and explicitly subjective data on parameters to provide an empirical data source towards sustainability practice for five main sectors an expert knowledge is required when extrapolating outcomes from a sample of the population. There are several steps to perform an expert elicitation method such as selection of the parameters as in sub-topic 2.10, in this research study, there are linkage parameters between twelve attribution in GPM and seventeen SDGs. Secondly is the selection of experts, which are 45 experts across different economic sectors either in government or non-government in Malaysia. There is irregular percentage participation of expert in every sector and there is no suggestion from the results that association is an important descriptive factor to weight the expert judgments. Thirdly, an overview of the elicitation process which was stated in the survey question as illustrated in Appendix D for consistency for all the respondents. Next, the assessing expert judgment and aggregation of expert belief, in order to avoid such bias feedback or result, an implementation of attitudinal parameter was done in the survey questions. Lastly, the computer models are usually used to support and classify the findings from

an expert. Thus, the validation of the finding was supported by using the same method in step nine.

3.3.3 Step Seven: Analyses of data

From the survey question, the qualitative result is transformed into quantitative data by performing in corporation of the attitudinal parameter as stated in the previous phase. The conversion from the Likert scale is interpreted in Table 3.4 below. The adoption of mixed methods and integration method to quantified the qualitative data are practiced by previous researchers (Rehana et al., 2007; Turan et al., 2017; Yada, 2006).

Table 3.4 The interpretation from the Likert scale to attitudinal response.

Likert Scale	Value factor	Attitudinal Response
Yes	1	Risk Averse
No	-1	Risk seeking
Neutral	0	Neutral

Therefore, several statistical analysis techniques is applied to perform a mixed method approach as mentioned before. The average and normalization technique as in Equation 3.1 and Equation 3.2 are applied to the raw data collection. This step is very important when dealing with different parameters or attributions. Therefore, every parameters and attribution should have the same scale for a fair comparison and calculation between them.

$$Average\ or\ Arimatic\ Mean, m = \frac{x_1 + x_2 + x_3 \ldots x_n}{n} \quad 3.1$$

$$Normalize\ \text{Raw data}, \mathrm{R}' = \frac{R}{Rmax} \quad 3.2$$

The example of an average calculation is shown in Equation 3.3 and Equation 3.4 for the first respondent and first attribution (S1) in the construction sector. There are three mappings in first sub-attribution or first row which is linkage between 17's SDG and sub attribution (employment) for first attribution (labor practices and decent work) in people element for the first attribution of sustainability after considering the attitudinal parameter that explains before and the example structure of worksheet for

BSP as in Appendix C. Thus, the calculation example of average and normalization were shown as in Equation 3.3 until 3.6 below. Construction sector are consist of nine respondents (Respondent no 1, 15, 20, 21, 22, 39, 40, 41, and 45) and first respondent's data collection is taken for an example of the calculation process as in Figure 3.4. The average for all SDG linkages with first sub attribution and the average of all the sub-attributions in the first attribution are calculated in Equation 3.3 and 3.4 and as shown in Figure 3.4 below. Lastly, the calculations of the average of the nine respondents in the construction sector and normalization value for construction among sectors are as in Equation 3.5 and 3.6.

3 ELEMENT	12 ATTRIBUTION	46 SUB ATTRIBUTION	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17	TOTAL
people	labour practices and decent work	employment	-0.9	0.9						0.9										0.3
		labor/ management					0.9			0.9		0.9								0.9
		health and safety						0.9		0.9				0.9						0.9
		training and education				0.9					0.9									0.9
		organisational learning				0.9				0.9	0.9								-0.9	0.45
		diversity and equal opportunity					0.9													0.9
		trained professional emigration								0.9			0.9							0.9
			-0.9	0.9	0	1.8	1.8	0.9	0	4.5	1.8	0.9	0.9	0.9	0	0	0	0	-0.	0.75
	society and customers	community support											0.9				0.9			0.9
		job/unemployement	-0.9	0.9						0.9										0.3
		public policy/compliance																0.9		0.9
		customer health and safety			0.9			0.9						0.9						0.9
		market communications and advertising												0.9						0.9
		customer privacy												0.9						0.9
		cultural impact										0.9						0.9		0.9
			-0.9	0.9	0.9	0	0	0.9	0	0.9	0	0.9	0.9	2.7	0	0	0.9	1.8	0	0.8143
	human rights	non-discrimination					0.9			0.9		0.9								0.9
		freedom of association																0.9		0.9
		child labor								0.9		0.9								0.9
		forced or compulsory behavior								0.9				0.9						0.9
			0	0	0	0	0.9	0	0	2.7	0	1.8	0	0.9	0	0	0	0.9	0	0.9
	ethical behavior	Investment and procurement practices												0.9						0.9
		bribery and corruption																0.9		0.9
		anti-competitive behavior																0.9		0.9
			0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	1.8	0	0.9

Figure 3.4 Example of first respondent on BSP's.integrated worksheet

$$Average\ in\ sub\ attribution = \frac{linkage_{1} + Linkage_{2} + linkage_{8}}{3\ linkage} \qquad 3.3$$

$$= \frac{-0.9 + 0.9 + 0.9}{3} = 0.3$$

$$Average\ in\ \text{first}\ attribution = \frac{employment + \cdots + trained}{7\ sub\ attribution} \qquad 3.4$$

$$= \frac{0.3 + 0.9 + 0.9 + 0.9 + 0.45 + 0.9 + 0.9}{7} = 0.75$$

$$Average\ in\ sector = \frac{respd.1 + respd.15 + \cdots + respd.41}{9\ \text{respondents}} \qquad 3.5$$

$$= 0.48$$

$$Normalization = \frac{average\ construction}{max.avg.\text{among sector}\ (mining\ and\ quarrying)} \quad 3.6$$

$$= \frac{0.55}{0.87} = 0.63$$

NO	SERVICES	MANUFACTURING	CONSTRUCTION	AGRICULTURE	MINING AND QUARYING
1	0.64	0.41	0.54	0.24	0.83
2	0.70	0.60	0.70	0.81	0.90
3	0.67	0.56	0.69	0.67	1.00
4	0.72	0.82	0.70	0.67	1.00
5	0.57	0.44	0.50	0.50	1.00
6	0.49	0.55	0.33	0.89	1.00
7	0.61	0.69	0.53	0.44	1.00
8	0.62	0.60	0.57	0.40	1.00
9	0.73	0.66	0.69	1.00	1.00
10	0.79	0.56	0.74	0.00	1.00
11	0.79	0.59	0.73	0.50	1.00
12	0.63	0.44	0.65	0.18	0.88
AVERAGE BY SECTOR	0.66	0.58	0.61	0.52	0.97
NORMALIZE BY SECTOR	0.68	0.60	0.63	0.54	1.00

Figure 3.5 Average value of respondents for five sectors by normalization method.

Thus, Table 3.5 above is an average and normalization data for each sector. The normalization technique is implemented to find sustainability performance in every sector as in the figure above. The normalization technique is applied to form a standard result for each sector. The normalization is a pre-processing stage for the large data and the function is to find a new single range from an existing group sector (Ginevičius, 2008; Patro et al., 2015). Therefore Figure 3.5 is an overall average and normalization calculation for five sectors.

3.3.4 Step Eight: Data processing and representation

From the data processing, the correlation between the level of knowledge and level of consciousness toward sustainability practice in every sector are determined by using Minitab and Microsoft Excel. The quantitative data is generated to form a profiling distribution and the clustering of Business Sustainability Practice (BSP) as presented in a quadrant using k-means clustering. It is relatively an efficient method by specifying the number of clusters in advance and the final results are sensitive to

initialization and often terminate at a local optimum. In general, a large *k* probably decreases the error but increases the risk of overfitting. So, the number of clusters based on the probability for two parameters which indicates two axes such level of knowledge and level of consciousness. Therefore, the number of k to be assigned is four, *k* =4. There are several steps in producing the cluster such in k-mean approach. The brief and overview of k-mean clustering, the coding and the flow chart of algorithms and the analysis step using Minitab.

3.3.4.1 K-Mean clustering overview

K-mean clustering is used to group the observations into clusters that share the common characteristics. This technique is applicable when you have enough information to make good starting cluster designations for the clusters. For example, in this research study, the use of k-mean to classify the 5 main sectors into the best practices for future analyses by referring to the level of knowledge and level of consciousness. To start the partition process, the practice was divided into four levels as an initial group: The best practices, the lowest practices, high knowledge with low consciousness and the high consciousness with low knowledge. Next, the k-mean cluster used a non-hierarchical procedure for group observations.

This process begins with a grouping of observations into a predefined number of cluster, *k*. Then, k-mean algorithm is continued further for three steps as illustrated in Figure 3.6 below until the convergence iterate at the stable stage, in which no objects are moved into different cluster, i.e., determine the centroid coordinate of a random data point; and determine the closest distance of each object to the centroids according to Euclidean distance is an observation function as in Equation 3.7 below. Thus, the cluster is changed by through losing or gaining an observation and is recalculated the centroid of the cluster; and group the object based on the mean or minimum distance from the centroid. Lastly, the steps are repeated until the data points are assigned to their cluster group. Thus at this iteration, all the observations are in the nearest cluster.

$$\text{Euclidean distance, } d(i,k) = \sqrt{\sum_j (x_{ij} - x_{kj})^2} \qquad 3.7$$

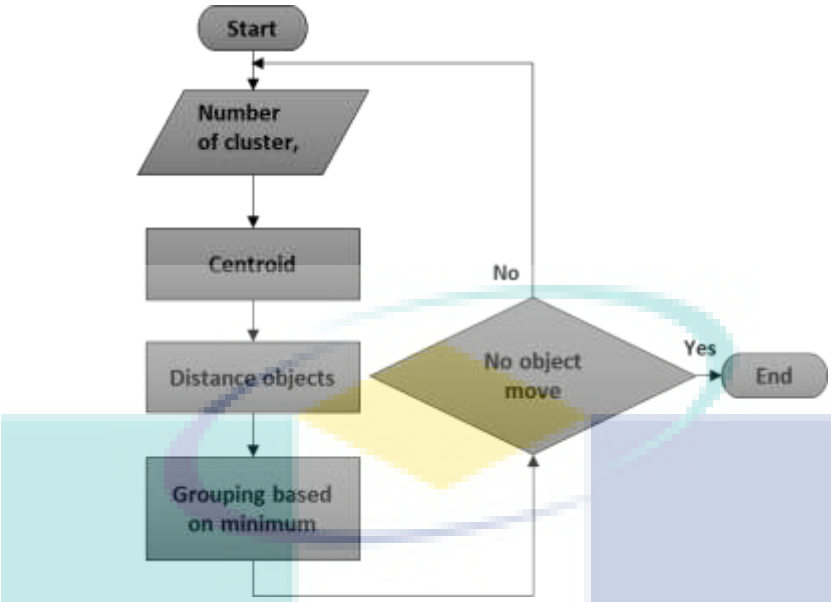


Figure 3.6 The general step of k-mean clustering

The Euclidean distance, $d(i,k)$ is a cluster observation, where $d(i,k)$ is the distance between observations i and k. By doing this K-Mean Clustering algorithm's observation, there are two cluster variables to be identified:(i) for the distance measure that calculated the correlation between clusters using correlation method, and (2) defining the linkage of the centroid between clusters or means using linkage method. Thus, the distance observation is measured using correlation distance method, d_{ij} and the centroid linkage or distance matrix, d_{mj} as in Equation 3.8 and 3.9 below.

$$\text{Correlation distance, } d_{ij} = 1 - \rho_{ij} \quad 3.8$$

$$\text{Distance matrix, } d_{mj} = \frac{N_k d_{kj} + N_l d_{lj}}{N_m} - \frac{N_k N_l d_{kl}}{N_m{}^2} \quad 3.9$$

Where,

ρ_{ij} Is the Pearson product moment correlation between variables i and j

N_k, N_l and N_m are the number of observations in clusters k, l, and m

3.3.4.2 Data processing in Minitab

There are several steps of the k-mean clustering algorithm technique. The Minitab software is used as data processing. The process of clustering in Minitab need several steps to be considered, in order to prepare the data to analyze and interpret the

statistical and graph for the k-mean clustering. The empty user interface of the Minitab is as in Figure 3.7 below. The user interface of Minitab consist of two partitions which are a session for store the input and output, and worksheet for key in the data and the variables as an input.

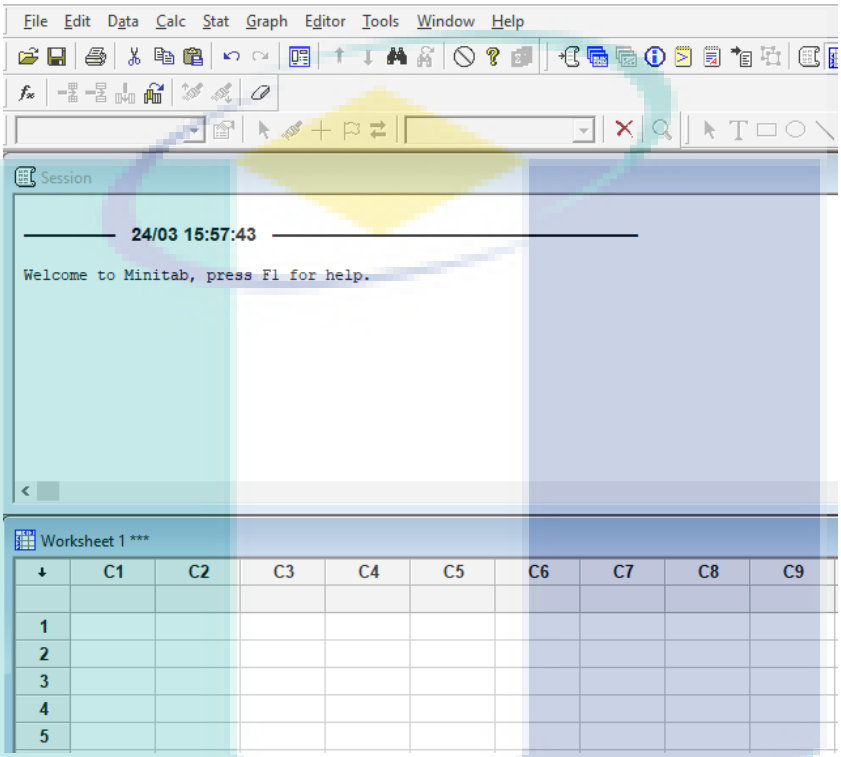
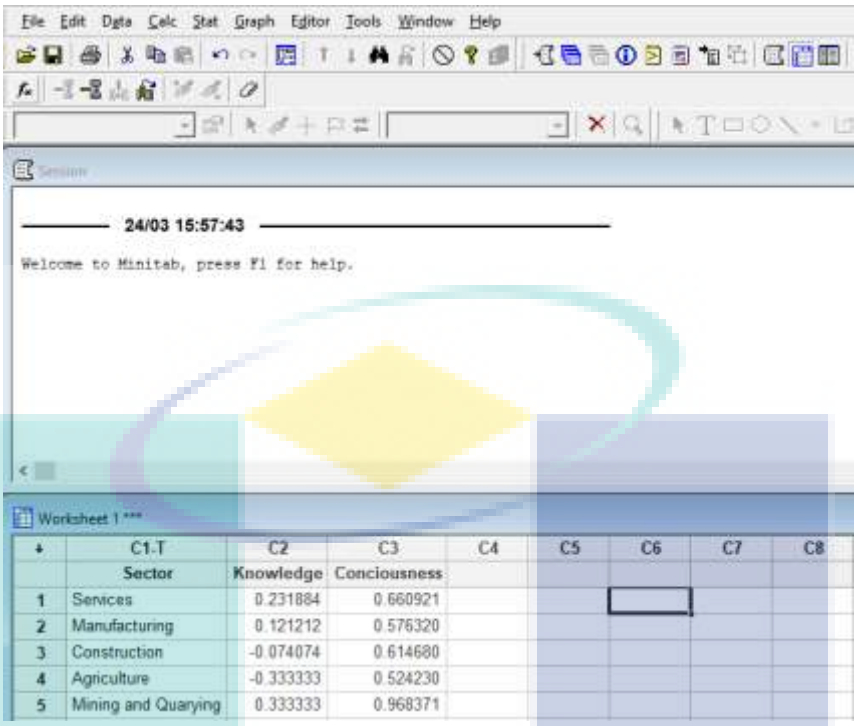


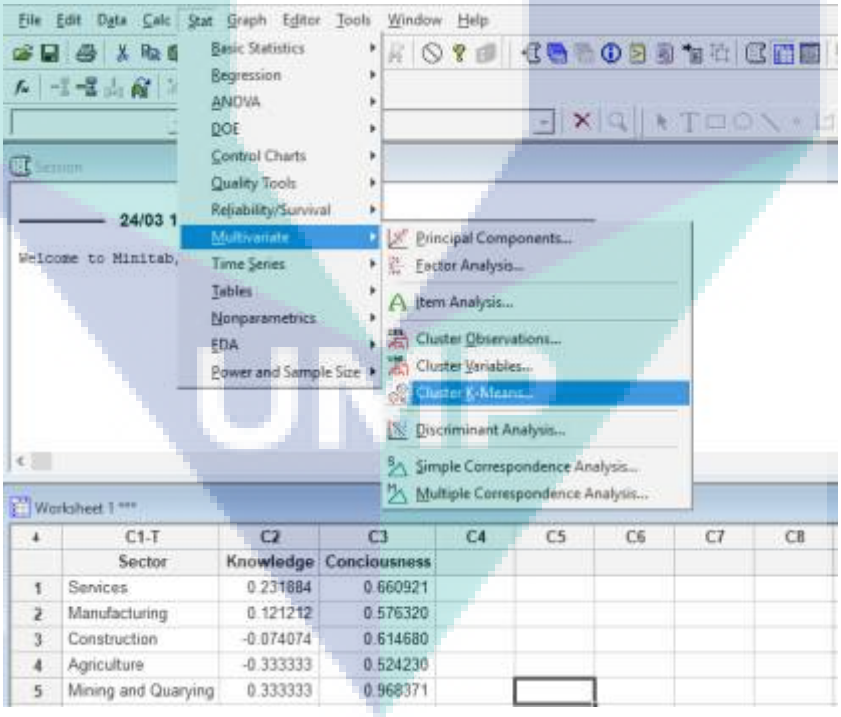
Figure 3.7 The user interface in Minitab software

Firstly, the data should be entered into the worksheet such the five sectors, level of knowledge and level of consciousness that known as variables. The measurement data was entered into the column C1 until C3 such in Figure 3.8. The data should have two or more numeric columns, with each column representing a different measurement and the standardize variables should be prepared before. The Variables in Minitab worksheet must have the same weight to measure equally because of different scales in different cases. In this research study, the different level of knowledge and consciousness in every sector were standardized using mean and normalization method. Therefore, the variables are in the ratio of -1.0 to 1.0 as measured before in subchapter 3.4.4 that contain in the worksheet's columns C2 and C3 which describes a characteristic or level practice of the sectors.



	C1-T	C2	C3	C4	C5	C6	C7	C8
	Sector	Knowledge	Conciousness					
1	Services	0.231884	0.660921					
2	Manufacturing	0.121212	0.576320					
3	Construction	-0.074074	0.614680					
4	Agriculture	-0.333333	0.524230					
5	Mining and Quarying	0.333333	0.968371					

Figure 3.8 The numeric data as variables in the worksheet



	C1-T	C2	C3	C4	C5	C6	C7	C8
	Sector	Knowledge	Conciousness					
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4	Agriculture	-0.333333	0.524230					
5	Mining and Quarying	0.333333	0.968371					

Figure 3.9 The step to perform cluster k-mean in Minitab

To perform an analysis of the k-mean cluster, choose the statistic ‘Stat’, next select ‘multivariate’ and lastly choose the ‘Cluster K-Mean’ as shown in Figure 3.9. The setting of the cluster’s number and the initial partition column was determined. Thus to

start the analysis, several selected variable was decided. As in Figure 3.10, the two variables were chosen and the cluster number with zero initial value was stated.

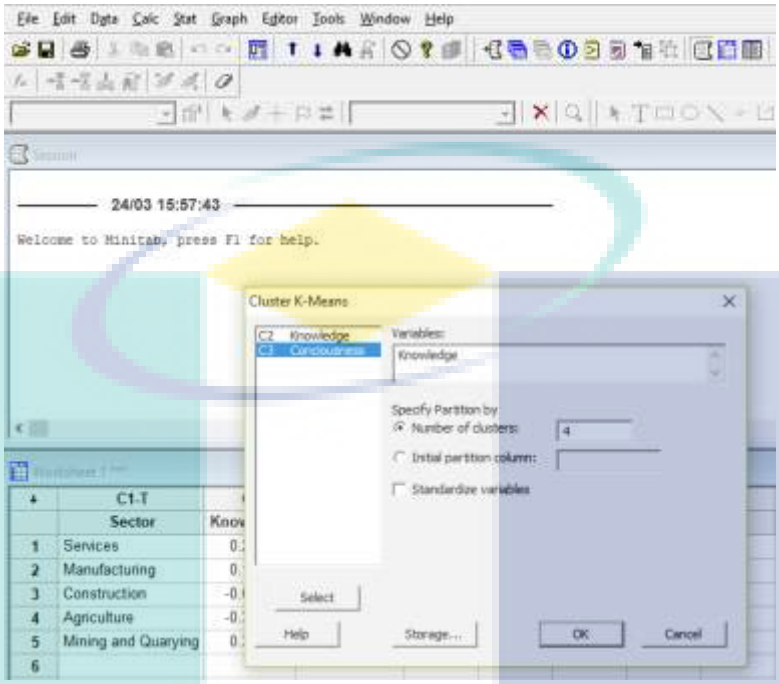

Figure 3.10 The step to start the clustering analyses from the variable and cluster number.

Next, the setup of clustering analysis in Minitab after the variables in the worksheet was inserted. The procedure was started with specifying the initial partition that provided two options such set the number of clusters or initial partition column. The initial partition in this research was specified by number of the cluster with neglect the initial partition column as in the figure above. The selected cluster in this research based on the parameter or variable that contains two variables: knowledge and consciousness. Thus, the number of the cluster was set up at k=4 by using probability concept that necessary observed in the next result discussion in Chapter 4 without prior knowledge of the initial cluster. An alternative cluster was assigned during the clustering algorithm process. K- Mean clustering begins with grouping the first four rows of data as the initial cluster centroids which based on the cluster centroid they are closest to.

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Final Partition

Number of clusters: 4

	Number of observations	Within cluster sum of squares	Average distance from centroid	Maximum distance from centroid
Cluster1	1	0.000	0.000	0.000
Cluster2	2	0.010	0.070	0.070
Cluster3	1	0.000	0.000	0.000
Cluster4	1	0.000	0.000	0.000

Cluster Centroids

Variable	Cluster1	Cluster2	Cluster3	Cluster4	Grand centroid
KNOWLEDGE	0.3333	0.1765	-0.0741	-0.3333	0.0558
CONCIOUSNESS	0.9684	0.6186	0.6147	0.5242	0.6689

Distances Between Cluster Centroids

	Cluster1	Cluster2	Cluster3	Cluster4
Cluster1	0.0000	0.3833	0.5395	0.8011
Cluster2	0.3833	0.0000	0.2507	0.5185
Cluster3	0.5395	0.2507	0.0000	0.2746
Cluster4	0.8011	0.5185	0.2746	0.0000

Figure 3.11 The k-mean algorithm analysis stored in Minitab at session part

From the figure above, there are four clusters with their own observation and variability in which the first cluster contains one observation, the second cluster contains two observations, while the third and fourth clusters contain one observation. From the analysis on observation, the clusters that are more significant were having fewer observations than other clusters. Clusters that have very few observations may contain outliers or unusual observations with unique characteristics. The variability which is the average distance and the within-cluster sum of the square could be affected

by smaller or larger number observations. In general, a cluster that has a small sum of squares and the small average distance from the centroid (within the cluster) such for cluster 1, 3 and 4 there are more compact rather than second cluster. In addition, the higher maximum value cluster from the centroid indicates an observation in the cluster that lies farther from the cluster centroid.

The analysis on the cluster centroid which is in the middle of the cluster is a vector that contains one number for each variable, where each number is the mean of a variable for the observations in that cluster. The centroid can be thought of as the multi-dimensional average of the cluster. The centroid can help to interpret each cluster and the location of the cluster. Each centroid representing the average observation within a cluster across all variables in the analysis and the distances between cluster centroids called grand centroid. At last, the distance between cluster centroids indicates the distances between cluster centroids in the final partition are from one another. A larger distance generally indicates a greater difference between the clusters.

3.3.5 Step Nine: Result validation

Based on k-mean clustering approach, the 45 employees with 5 main sectors are classified into 4 clusters: high consciousness with high knowledge; low consciousness with low knowledge, high consciousness with high knowledge and low knowledge with low consciousness of sustainability practice among employees in the different sectors. The four categories described their own performance as a trigger factor to be more competitive to each other, thus improve the management in the business case. Therefore, the results are validated through a process of collecting feedback from the expertise of various viewpoints and fields, which serves as the research findings as in Figure 2.11 before. There were 7 experts out of 15 that responded to answer the validation survey which accordingly Expert Elicitation method. The selection based on their participation in the sustainability practice, the working experience and the position in the organization or bodies. There were 13 questions including the demographic information, the feedback or response on the result finding in Chapter 4 and open-ended question for improvement in this research study. In this survey question, a brief and result presentation was included to make sure an expert know the objectives, scope and the research outcome or finding before answer the survey questions. The whole survey structure was attached in Appendix F.

3.4 Summary

The probabilistic-based approach or information-based approach is bottomed up, meaning there is no clue on how the problem should be solved. The derivation from raw data and build a new approach on top of it and generalize the result into the theory for further reference. Therefore, in this research, the probabilistic approach is practiced by accelerating the factor to achieve the SDGs. Thus, the integration and clustering phases in this BSP will act as a catalyst for sustainability practice in Malaysia's industry. It is also recommended in the document to be made as a strategic management tool in business. Therefore, it has a high priority with respect to the business objectives of the company and the policies in Malaysia to be integrate by referring to this profiling of BSP. Figure 3.12 shows the five steps that can be applied to set or align their courses by ensuring that sustainability is an outcome of their core business's strategy. Thus, the reporting of the profiling are made based on the five steps in SDG Compass

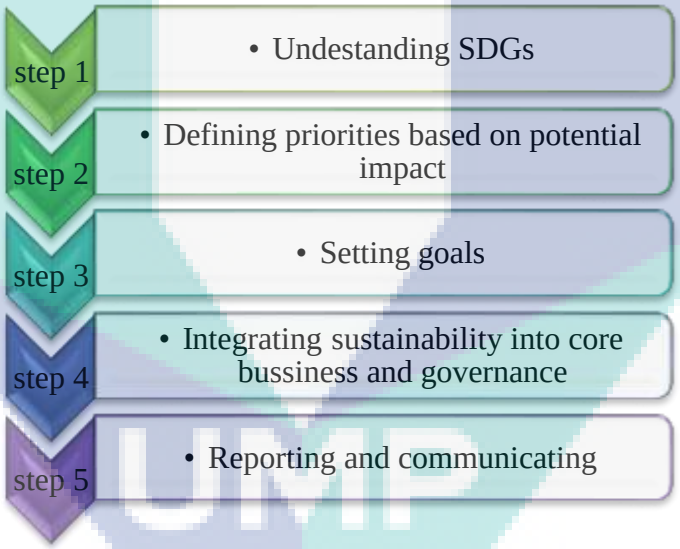

Figure 3.12 The steps that assist business contribution to the SDGs

Creating alignment between the company's values and goals and employees' personal values and visions would most probably ensure successful participation in sustainable development. Allowing employees to suggest their own innovative ideas and solutions towards more sustainable business operations would create a sense of ownership, which enhances long-lasting employees' commitment which called as willingness towards sustainability development. Thus, in evaluating indicator data, attempts are made to understand the condition and trends of complex systems. This

information, or feedback, on the condition and trends of systems can be used to inform decision-making, modify behaviors, and inform the development of policy, action plans and projects. Indicators are often aggregated into indices, to further abridge the understanding of the status and amendment of key areas of concern. Therefore, there are two finding in this section. Firstly, BSP Profile performance on the five sectors are based on level of knowledge and consciousness, and secondly, the BSP performance on economic sectors towards twelve sustainability attributions.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter provides the result and discussion that answered the problem statement thus meet the objectives for this research project. The results are based on three objectives, which are propose an Integration technique of Business Sustainability Practice (BSP) in Malaysia context, an assessment of BSP Profile performance using k-mean clustering approach and validation on BSP Performance using Expert Elicitation Method. The elaboration on the findings is discussed more in subtopics below.

4.2 Introduction of Integration technique of Business Sustainability Practice (BSP) in Malaysia context

An integration of BSP model is a process from linking of SDGs and GPM P5 from GPM Global (Global Reporting Initiative, 2015) which applied as behavior parameter to psychological factors that is related to individuals' tendency for engaging the sustainability dimension which are environment, social and profit. This integration technique maps between global initiative and Malaysia initiative by considering an individual attitude. Figure 4.1 shows an integrated system of BSP Performance which mapped between several elements, attributions, global initiatives and psychological parameter.

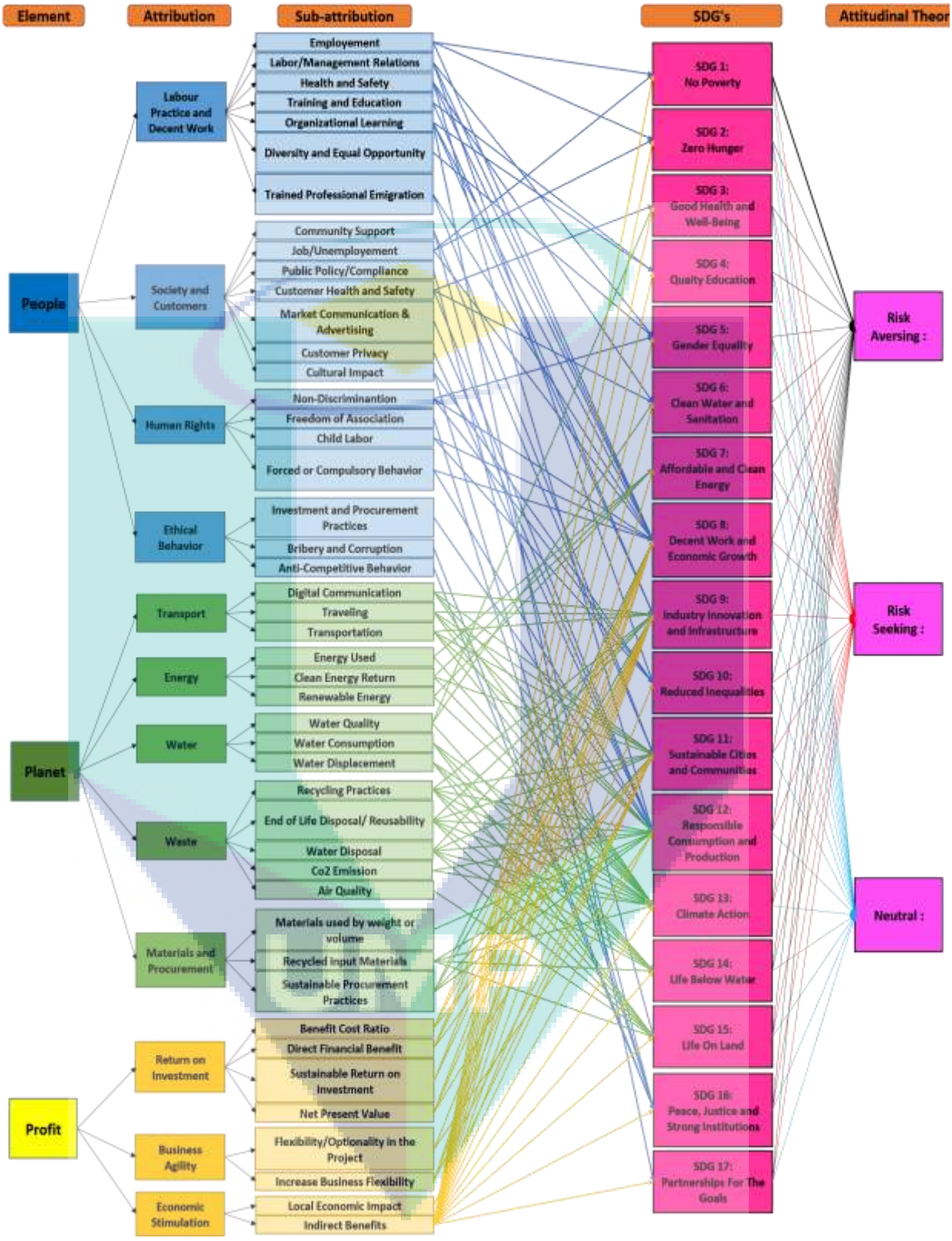

Figure 4.1 An integrated system for Business Sustainability Practice (BSP)

The business sustainability practice which includes the perception or attitudinal behavior as psychological factor is more relevant to measure ones sustainability performance. The mapping defines the route relationship between GPM, SDG and

attitudinal theory, and thus become a structure that evaluates the sustainable practice performance, completely. The best practice not only based on the completion or successful, instead, a complete and sustainable practice aligned with the goal, aim and target will be more practical and successful. Therefore, this system can be a roadmap on sustainable practices for every companies or bodies of the five main sectors in Malaysia. The implication from this integrated system is everyone can achieve the global initiative by aligning the sub-elements in the GPM and give awareness toward interests of an attitude in practicing sustainability.

4.3 Sector profiling based on consciousness and knowledge level

The incorporation of individuals in the process of SD is compulsory for comprehensive results. Therefore, understanding and accepting the concept of sustainability, which is usually achieved by raising the awareness and motivating individuals via several of mechanisms, helps to enhance the involvement of people in SD. However, it is significantly important to mention that revolution and commitment towards SD need to be made voluntarily for long-lasting results. This includes an understanding on how groups of individuals within a society observe sustainability and its dimensions. Knowing which kind of mechanisms that motivates them is very helpful in terms of influencing their behavior sources of motivations vary among diverse groups of people. An autonomous feeling to adopt new accomplishments endorses with the earlier statement that regarding the need to understand the concept of sustainability and the individual's role and contribution. Having a clear understanding provides an individual or society with the sense of autonomy and confidence to the suggested transformation or practicing.

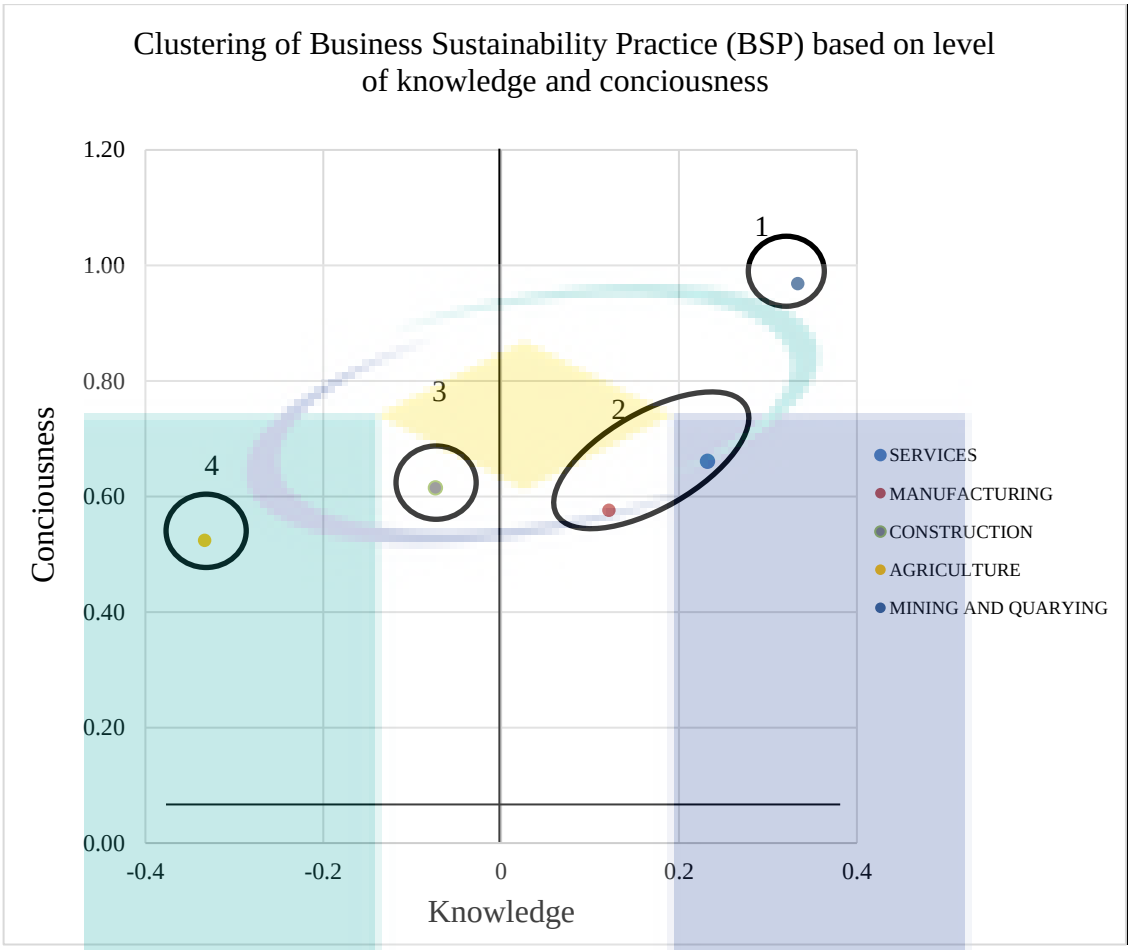

Figure 4.2 The clustering of Bussiness Sustainability Practice (BSP) Performance

From Figure 4.2, it shows a profiling on BSP in which a group of people of the same economic activity are tabulated and clustered. For overall finding, most of the sectors performed well in contributing to sustainable practices with their steadfast consciousness although they have limited knowledge about sustainability. They are located at the first and second quadrant. Next, the first cluster exhibits at the first quadrant with the highest level of consciousness and level of knowledge. The first quadrant for mining and quarrying activities which performed 0.33 for knowledge and 0.97 for consciousness level that nearly to 1.00. For the second cluster, the group is consisted of two different economic sectors with the same performances on sustainability practice which are services and manufacturing. Both performed at a moderate level for consciousness and slightly lower in terms of knowledge with average performance for both at 0.62 and 0.177, accordingly. The third and fourth clusters are located at the second quadrant with a positive consciousness index but a negative knowledge index. Both levels of sustainable practices of the third cluster is construction

while the forth is agriculture with 0.61 and 0.52 for consciousness index and -0.07 and -0.33 for knowledge index, accordingly.

Mining and quarrying can be very environmentally destructive. Through dumping dumps and heaps of waste material, they have a direct impact on the landscape. Extraction methods can also contaminate air and water with sulfur dioxide and other toxins, endangering biodiversity and local communities. A year back, there is lot of mining and quarying issues such in Pahang, Johor, Serawak and so on. Altough the Pahang government plans to mete out harsher punishments and implement stricter mining guidelines in the state but he public should be act as an eyes and ears of the authorities to protect forests reserves from being encroached on. Therefore, the awarness should be implement first to the public for being an important role to the government toward illegial mining and quarrying activities. While the knowledge on the endanger or importanness on controlling the mining and quarrying activities to public, enforcer and miner or quarrier must educate continuosly for being practicle in future. Thus, an innovative way on controlling an aspect and impact to mining and quarying activities will be more align with people, planet and profit orientation.

For the second cluster are services and manufacturing. Both performed at a moderate level for consciousness and slightly lower in terms of knowledge with average performance at 0.62 and 0.177, accordingly. The manufacturing and services are the larger sector in Malaysia. Thus, in the minds of politicians, industry leaders, researchers and people alike, the Fourth Industrial Revolution or Business 4.0 has become a common term. It is a future that holds the promise of exponential change and the emergence of new technologies that revolutionize our everyday lives. In Malaysian Investment Development Authority (MIDA), an incentive for manufacturing sector were promote to the sectors through Investment Act 1986, Income Tax Act 1967, Customs Act 1967, Sales Tax Act 1972, Excise Act 1976 and Free Zones Act 1990. Al this tax will cover the manufacturing, agriculture, tourism and approved service sectors for research and development, training and environmental protective activities. Such governemnt and non-government organization put an awarness on the sustainability through awarness programme and activities such go green programme, voluntery for community program, run programme and so on. In addition, for qualification such for ISO 14001, ISO 9001 and other are the qualification requirement for manufacture and

service company. The qualification are important to make sure the products and service comply the international requirement which include the sustainability aspects. The different level of education, will limit the understanding on the certain aspect. For example, not all the employee know the importnaness of the ISO but an awarness on several part in this sectors should be strenghthen by preparing the standard operating procedure (SOP), one point lesson (OPL) or work instruction (WI) for their understanding.Thus, they will understand on what the requirement on sustainability in their area and company will comply all the requirement needed.

For third and fourth cluster, construction and agriculture. In construction, most of the employee or worker from outside. They oly focus on what they are doing. But in construction sector, they had many organization to follow up and taking care such SHO, jabatan alam sekitar, bomba and so on. for the higher level in construction sector will give and show the guidelines but the implementation based on their self awarness. Therfeore, the awarness on safety and health, ethics and enviromental control must implement first for their exposure towards sustainability sector among others.for the agriculture, most of the farmer come from rural area and village. They had much skill on the planting and farming without improper knowledge. This is because they doing the activities from generation to generation. Thus, the innovative need to enlarge and upgrade the farmer by incresing the knowledge on farming and planting with updating technologies.

The economic sector profiling above is evaluated using Minitab toward the BSP performance. The clustering is determined by calculating the number of observations, cluster sum of squares, distance from centroid, cluster centroids, and distance between cluster centroids using k-mean analysis. The observation on the first cluster contains one observation, represents the best practice, and establishes sector with higher knowledge and higher consciousness. Second cluster contains two observations that represent the higher consciousness and lower knowledge and is classified as mid-growth sector. The same classification goes to third cluster which contains 1 observation. The forth cluster contains 1 observation and represent the lowest practice of sustainability in among sector of economic activities. Business sector analysts believe that these final groupings are adequate for the data. In these results, the average distance from centroid is lowest for cluster 1, 3 and 4 (0.000) and highest for cluster 2 (0.070). This indicates

that cluster 4 has variability compare the other remaining clusters which have the least variability between knowledge and consciousness elements that requires improvement.

It is shown that, high knowledge on sustainability does not guarantee a whole sustainable practice since a balance factors between knowledge and consciousness is absent. The Figure 4.2 shows around 5.6 percent of Malaysians that involved in Malaysia economic sector have a deep knowledge on sustainability while 66.9 percent perform the sustainability through their consciousness. For example, in the construction sector, the consciousness is high but the level of knowledge cannot support the circumstances of the manufacturing industry. Therefore, the service and construction sectors employers should take a proper action to find the best framework to increase the knowledge level of sustainability for their employees. The highest sustainable practice in terms of economic sector is mining and quarrying, where this trend comes about when the sector would not have the pressure from the contribution toward GDP. From figure above, it shows that the performances of the sectors are affected by the knowledge factor. Higher knowledge develops more consciousness. Hence, the practicing performances can be upgraded through the improvement of knowledge and awareness of sustainability.

On the other hand, the sustainability is practiced indirectly in our daily life as instilled in every religion teachings which is to respect people, to perform charity, to clean dirty, avoid money waste and be kind to living or non-living, and so on. This show proves that the sustainability is already practiced but without a proper knowledge and consciousness, the practice is inadequate. Therefore, the relationship between consciousness and knowledge are both very important elements to be practiced to achieve the 2020 Vision and Agenda 2030. As a conclusion, this profiling is important to create a competitive edge among sectors in Malaysia economic sector in order to place their sector among the best clusters. An improvement of the sustainable practice will be calculated by using BSP performance as in the second finding of this research. A self-assessment on their sustainability's performance through several attributions will be observed as finding in the next sub-chapter.

4.3.1 BSP Performance based on economic sector

From Figure 4.3 below, the BSP performance shows the twelve attributions in sustainability with their current performances on each sector. The graph shows the performances of twelve different attributions divided in three elements of sustainability. The people element consists of four attributions which are labor practices and decent work, society and customers, human rights, and ethical behavior. For the second element, planet were consists of five attributions such as transport, energy, water, waste, and also material and procurement. Lastly, the third element is profit that consists of three attributions which are return on investment, business agility and economic stimulation.

Based on the finding in 4.2, the sustainable practice is a combination between intangible and tangible aspect. An enough knowledge on the natural environment and ecosystem which includes the understanding of its relationships, facts and concepts is one of tangible aspect which can be measured while awareness or consciousness is intangible that cannot be measure but will give a good impact for a short time in long lasting result. The issues and the solution to the problems are identified by using intangible knowledge. Thus, for the behavioral or tangible knowledge is developed by looking for the benefits and their actions. Therefore, the competitive edge among companies in the same sector would be developed by looking at the profile performance between the knowledge and consciousness aspects. The level of the knowledge and consciousness are then calculated. This provides a current performance for every twelve attributions in sustainability that linkage with the seventeen Sustainable Development Goals.

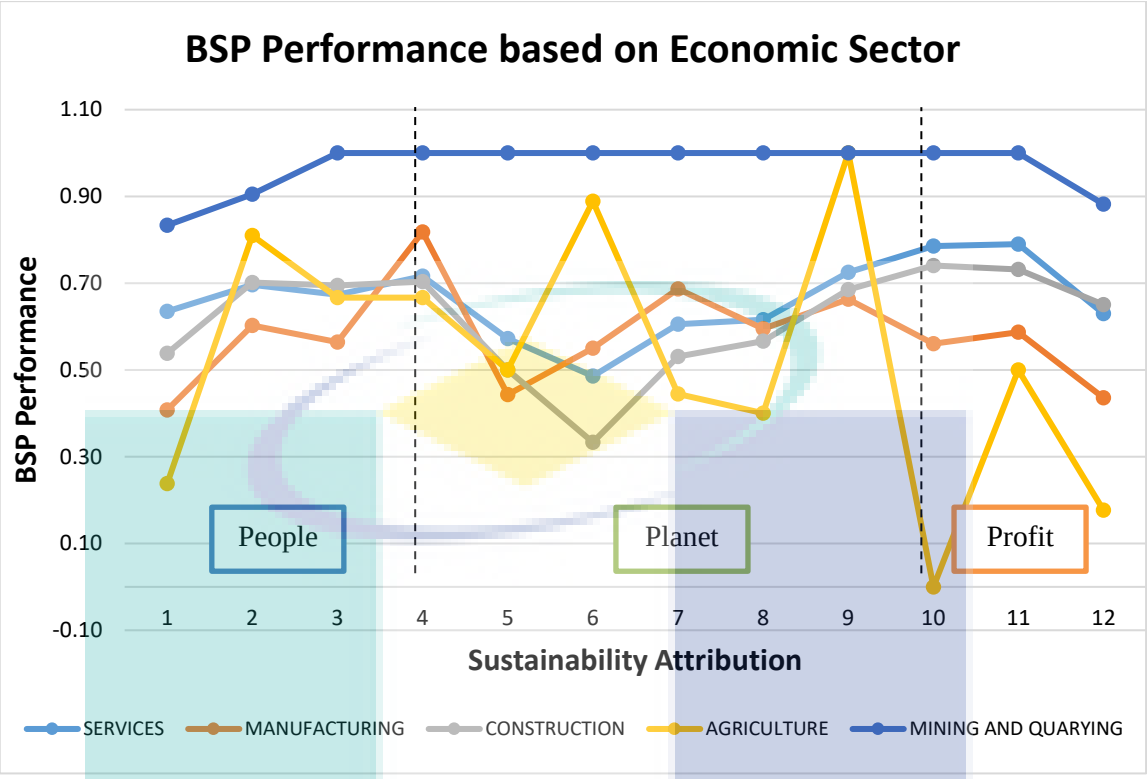

Figure 4.3 BSP performance based on the twelve attribution in sustainability

The graph above (Figure 4.3) shows a various trend for the sustainable performance. The most sustainable sector is mining and quarrying. Most of the attributions reached the maximum index, i.e., five attributions from the planet and two attributions both from the people and profit hit the maximum index. Meanwhile, the other 3 indexes show more than 80% of the BSP Performance. The graph shows, mining and quarrying is at as steady state in sustainable practice with fully incorporated at planet's attribution which are transport, energy, water, waste ,and material and procurement. In contrast, the agriculture shows volatile trend for every attribution. The index for material and procurement is at the higher level while the lower contribution are on the return on investment, economic stimulation, waste, labor and practice, and water which indicate index value is less than 0.5, while other attributions performed inaudible good which is more than 0.5. Next, the attributions in construction performance are likely in a moderate level which achieved index which more than 0.5. The performance for the service sector shows that the overall elements and attributions are above than moderate line which is more than 0.5 except for the 6th attribution which is energy. Lastly, the manufacturing sector shows volatile performance on every attribution.

Since independence, the government of Malaysia has formulated various development plans by replacing New Economic Policy (NEP) during 1971 until 1990 to National Development plan (1991-2000). The shortcoming of the system related to the racial riots in 1969 has urged Malaysia government to ensure equitable growth in different ethnic groups in terms of economic achievement. Based on the previous finding, agriculture had the moderate consciousness but a very low knowledge on sustainability. Therefore, based on Fong Cha Onn (1990), in more than 50 years ago most rural households are Malays. They were involved in agriculture with relative backward methods used in farming, thus low yield was produced. Later, Malaysia government has continuously restructured the societies to ensure the GDP increases, and the employment by sectors commensurate more too racial composition of the population, thus, improving the participation of Bumiputera in modern sectors and fairer distribution of income.

Table 4.1 The BSP Performance value for 5 main sector

Sector/ Attribution	**Services**	**Manufacturing**	**Construction**	**Agriculture**	**Mining & Quarrying**
Labour practices & decent work	0.64	0.41	0.54	0.24	0.83
Society & Customers	0.70	0.60	0.70	0.81	0.90
Human Rights	0.67	0.56	0.69	0.67	1.00
Ethical Behaviour	0.72	0.82	0.70	0.67	1.00
Transport	0.57	0.44	0.50	0.50	1.00
Energy	0.49	0.55	0.33	0.89	1.00
Water	0.61	0.69	0.53	0.44	1.00
Waste	0.62	0.60	0.57	0.40	1.00
Materials & Procurement	0.73	0.66	0.69	1.00	1.00
Return on Investment	0.79	0.56	0.74	0.00	1.00
Business Agility	0.79	0.59	0.73	0.50	1.00
Economic Stimulation	0.63	0.44	0.65	0.18	0.88
Human Rights	0.67	0.56	0.69	0.67	1.00

The Table 4.1 shows a clear index value for each attribution in every sector. Therefore, from the graph shown above, the performance of the sector based on the attributions or self-assess in which attributions can be observed. Therefore, precaution can be taken by pre-evaluation or pre-assessment on their sustainable performance. In addition, the required attributions to improve a business can be evaluated by improving their overall performances. The performances of every attribution are contributed to the level of the sustainable performance and their practices in the project or company for every sector. Therefore, the success of Bursa Malaysia is dependent on the performance of sustainable practice and the participation of the companies in all sectors by concerning the achievement of Gross Domestic Product in Malaysia. The level of BSP with all the attributions will provide a direction to all the sectors to improve their performance. A balance in all attributions will give good practices in all aspect or elements in sustainability. Which can accelerate the successes of the sector thus will increase the profit in future.

The performance for agriculture had volatile trend for every twelve elements. The obvious finding in this results in on profit emelemnt. The return on investment for 10^{th} element at zero index. This show that most of the farmer lack of knowledge on ROI concept on their crops. While in bussiness agility and economic stimulation show less than 0.5 which low performance. The 11^{th} and 12^{th} element more on project flexibility and local economic impact or indirect benefit which most of the rural area with larger agriculture activities do not have fund and source for develop their crops for import and export. The profit element show unstable performance because, most of the farmer make the activities as their routine and life cosumer not profit oriented alone. This is also because lack of information and knowledge on develop on their economic activity.

Performance for mining and quarying in all three elements shows the optimum performance in sustainability. In recent years, the mining and quarrying was highligted for every enfrocer and public tought such in highlight in electronic and non-electronic media. The attributions on the planet show an optimum performance such in water, waste, energy, transport and material procurement. The higher performance on the planet attribution is one positive impact toward mining and quarrying activities performance in Malaysia. While for construction, service and manufacturing.performance, almost all the attributions show the same trend. The lowest

performance energy attribution in manufacturing and service shows the larger energy used to operate the activity in that sector. While the energy return and energy source in that sector is uncontrol. The attribution on the water, waste and materials also show the average performance which can be improve by control the environmental managmenet system but the quality management system should be sustain for better sustainability performance.

4.4 Validation on the BSP Performance

The BSP performance was validated by a group of experts that involved in sustainability either directly or indirectly toward their economic activities. The validation in this research was using the Expert Elicitation method that started from the Delphi method which collects the group opinions with an expert in 1969 by Dalkey et al. The validation is important to make sure the findings will give benefits to the society that involved in any sectors in Malaysia. The feedback was presented in an online survey form from the achievements and successes of the research findings. The further validation results are briefly discussed in subchapter below and the full survey question is prepared in Appendix F.

4.4.1 Expert Elicitation Method

The findings in the subchapters 4.2 and 4.3 were validated by experts in different organizations in government and private organizations. They involve in decision making in organizations such as manager, general manager, senior lecturer, and vice director with more than five years experienced. Figure 4.4 and Figure 4.5 below show a data collection for their demographic as a support toward their opinion on this validation process. The data collection from respondents is as in figures below.

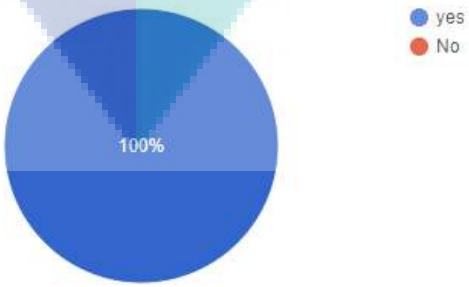

Figure 4.4 The involvement expert on sustainability knowledge and practices

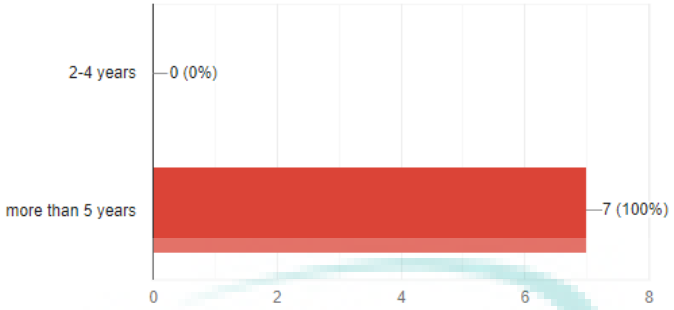

Figure 4.5 The experience's year of the expert on different field

Therefore, by using the Expert Elicitation Method, the observation on the Malaysian Economic condition, and their feedback on the research findings were collected as illustrated in Figure 4.6 until 4.8. The Figure 4.6 below shows the judgment and the opinion of the experts towards the current Malaysia's economic condition. This feedback will give wider observation and perspective on the progress or achievement toward the economic activities performance in Malaysia.

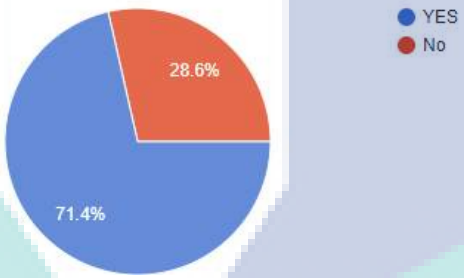

Figure 4.6 The judgment of expert on the economy condition in Malaysia

While for the feedback on the research finding in objective 1 and 2 which are served as the integrated system of sustainable performance for sector that integrate between intangible and tangible factors.

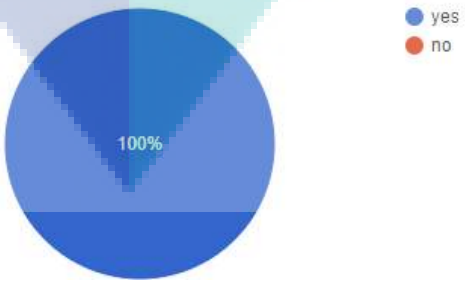

Figure 4.7 The expert acceptance on integrated system of BSP as solution to the current performance for first finding.

From Figure 4.7 and 4.8, the collective feedback is aligned with the integrated system for Business Sustainability Practice (BSP) as found in the first finding as the solution for the Malaysian economic performance and the BSP profile for the second finding. 100% of the feedback agreed with both research findings to be implemented later on. Therefore, a whole utilization of this system will promote a competitive edge among Malaysia economic sectors in Malaysia.

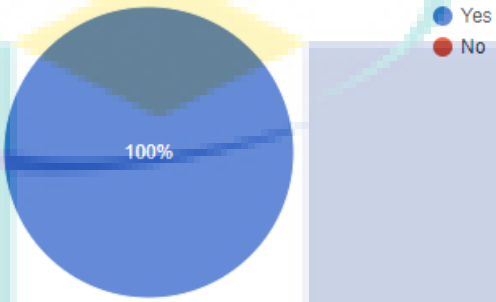

Figure 4.8 The expert acceptance on BSP profile to current level performance for second finding.

4.5 Summary

From the profile performance of the Business Sustainability Practice, a healthy competition among sectors can be developed. The development of the companies will contribute to the Malaysia's Gross Domestic Product performances. Thus, contribute to a better rank in the global index such as in Economic Development Index, Human Development Index and others. A successful country begins with the development of the individual's awareness and the willingness for the action that will take for everybody. In addition, the education and the legislation from the higher operational such as the management of a company, head of department, stakeholders, Non-Government Organizational, government of Malaysia's legislator and any bodies will help to create awareness and implementation of the sustainability in their operations and services. Lastly, the feedback from the expert in this research finding is one of the good initative thus will use in wider application to promote the competitive edge among Malaysia economic sectors in Malaysia

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 Introduction

The shared nature of the global development challenges faced today gave calls for collective actions that are inspired and shaped by the challenges and opportunities of the next fifteen years. Building vibrant and systematic partnerships with the private sectors are a vital prerequisite for the successful implementation of a transformative agenda to accelerate sustainable development in the post of 2015 era. The private sector is a critical component in addressing the development challenges through its contributions in many areas, including growth, jobs, poverty reduction, food security, climate change mitigation, environmental sustainability, and contributions to taxes. Thus, the public sector holds the greatest responsibility for enforcing SD standards and requirements, which pushes the private sector to use its competencies in achieving so. Therefore, collaboration among the public and private sectors is fundamental for the global Sustainable Development. The global trends and challenges are indicating the urgent need for changing patterns of behavior and collaborating for enhancing the wellbeing of people, economies and ecosystems. The first building stone of such a process is establishing a fair transparent governance system, which provides an enabling environment for sustainable future. Incorporating the civil society and ensuring commitment at the individual level is highly important. Changing behavior of citizens could be accomplished through raising awareness and using motivational mechanisms such as peer pressure, challenges, religious teachings and ensuring voluntarily commitment of people.

In this chapter, a conclusion and recommendations on the future work in this extended research study are presented. The conclusion and future work recommendation are stated based on the effectiveness on BSP Profile assessment on economic sector that an integrated system for Business Sustainability Practice (BSP), BSP profile performance by using k-mean clustering approach in Minitab and using expert elicitation method for validation findings.

5.2 Conclusion

In this study, five different economic activities have been clustered successfully by k-mean clustering method and integrated BSP system by using the Minitab Software. The assessment of the clusters after a validation from experts using the expert elicitation method was presented. The five economic sector in Malaysia was clustered by defining two main parameters that relating to the sustainability performance. An overall for first finding, most of the sectors performed well in contributing to sustainable practices with their steadfast consciousness although they have limited knowledge about sustainability. They are located at the first and second quadrant. For second finding, the best BSP performance is mining and quarrying's sector which located at steady state in sustainable practice with fully incorporated at planet's attribution which are transport, energy, water, waste ,and material and procurement. In contrast, the agriculture shows volatile trend for every attribution. Next, manufacturing, construction and services show the same performance with moderate performance in every attribution. For the second finding, a pre-evaluation or self-assessment on their companies or bodies using BSP performance will measure using 12 attributions of sustainability. Lastly, the validation from the expert in this reseaserch were validated with positive feedback as a good initiative that can be used in wider application and promote toward all agencies and bussiness in Malaysia.

5.3 Recommendation

From the current research findings, the following potential areas are considered to be improved for future research works:

i. Further study on the multiplier index specifically for Malaysia as a benchmark is still unapproachable due to limited data in certain period. Thus, the sustainability index calculator can be developed. In addition, a programming and graphic user

interphase can be created to make more a professional outlook as a platform for the assessment.

ii. The number of population should be increased by improving the quality of indexes and increased the number of expert on more fields by using more methods of validation to give a strong support finding.

iii. The current finding in BSP performance with five sectors and 12 attributions can be improved by including the other 46 sub attributions. Thus, it will be more specific to be adapted by the practitioners.

This chapter will summarize all the research processes and results of studies that have been carried out on the classification of lubricants based on their aging point using e-nose. Additionally, some recommendations are also listed as improvements and expansion from current research to be further studied in the future.

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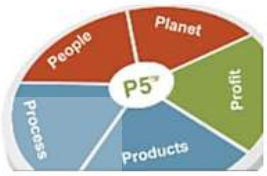
APPENDIX A
HUMAN DEVELOPEMENT INDEX PERFORMANCE

TABLE 2

Human Development Index trends, 1990–2017

HDI rank	Human Development Index (HDI) Value 1990	2000	2010	2012	2014	2015	2016	2017	Change in HDI rank 2012–2017[a]	Average annual HDI growth (%) 1990–2000	2000–2010	2010–2017	1990–2017
VERY HIGH HUMAN DEVELOPMENT													
1 Norway	0.850	0.917	0.942	0.942	0.946	0.948	0.951	0.953	0	0.76	0.27	0.17	0.42
2 Switzerland	0.832	0.889	0.932	0.935	0.939	0.942	0.943	0.944	0	0.67	0.47	0.18	0.47
3 Australia	0.866	0.898	0.923	0.929	0.933	0.936	0.938	0.939	0	0.36	0.27	0.24	0.30
4 Ireland	0.763	0.857	0.909	0.902	0.921	0.929	0.934	0.938	13	1.16	0.60	0.45	0.77
5 Germany	0.801	0.868	0.921	0.928	0.930	0.933	0.934	0.936	−1	0.81	0.59	0.24	0.58
6 Iceland	0.802	0.860	0.891	0.909	0.925	0.927	0.933	0.935	5	0.71	0.36	0.68	0.57
7 Hong Kong, China (SAR)	0.781	0.827	0.901	0.911	0.923	0.927	0.930	0.933	3	0.58	0.87	0.49	0.66
7 Sweden	0.816	0.897	0.905	0.908	0.920	0.929	0.932	0.933	5	0.96	0.09	0.43	0.50
9 Singapore	0.718	0.819	0.909	0.920	0.928	0.929	0.930	0.932	−2	1.33	1.05	0.36	0.97
10 Netherlands	0.829	0.876	0.910	0.921	0.924	0.926	0.928	0.931	−4	0.55	0.39	0.32	0.43
11 Denmark	0.799	0.863	0.910	0.924	0.928	0.926	0.928	0.929	−6	0.77	0.53	0.30	0.56
12 Canada	0.849	0.867	0.902	0.908	0.918	0.920	0.922	0.926	0	0.21	0.39	0.38	0.32
13 United States	0.860	0.885	0.914	0.918	0.918	0.920	0.922	0.924	−5	0.28	0.32	0.16	0.27
14 United Kingdom	0.775	0.867	0.905	0.898	0.919	0.918	0.920	0.922	5	1.13	0.43	0.25	0.64
15 Finland	0.784	0.858	0.903	0.908	0.914	0.915	0.918	0.920	−3	0.90	0.52	0.25	0.59
16 New Zealand	0.818	0.869	0.899	0.905	0.910	0.914	0.915	0.917	−1	0.61	0.35	0.28	0.42
17 Belgium	0.806	0.873	0.903	0.905	0.909	0.913	0.915	0.916	−2	0.80	0.33	0.21	0.47
17 Liechtenstein	..	0.862	0.904	0.913	0.911	0.912	0.915	0.916	−8	..	0.48	0.19	..
19 Japan	0.816	0.855	0.885	0.895	0.903	0.905	0.907	0.909	1	0.48	0.34	0.39	0.40
20 Austria	0.795	0.838	0.895	0.899	0.901	0.903	0.906	0.908	−2	0.53	0.66	0.20	0.49
21 Luxembourg	0.782	0.855	0.889	0.892	0.895	0.899	0.903	0.904	1	0.89	0.39	0.24	0.54
22 Israel	0.792	0.853	0.887	0.893	0.899	0.901	0.902	0.903	−1	0.75	0.39	0.26	0.49
22 Korea (Republic of)	0.728	0.817	0.884	0.890	0.896	0.898	0.900	0.903	1	1.17	0.79	0.30	0.80
24 France	0.779	0.849	0.882	0.886	0.894	0.898	0.899	0.901	0	0.86	0.38	0.31	0.54
25 Slovenia	0.767	0.825	0.882	0.877	0.887	0.889	0.894	0.896	0	0.73	0.68	0.23	0.58
26 Spain	0.754	0.825	0.865	0.873	0.880	0.885	0.889	0.891	1	0.90	0.47	0.43	0.62
27 Czechia	0.730	0.796	0.862	0.865	0.879	0.882	0.885	0.888	1	0.86	0.80	0.42	0.72
28 Italy	0.769	0.830	0.870	0.874	0.874	0.876	0.878	0.880	−2	0.76	0.48	0.15	0.50
29 Malta	0.740	0.783	0.843	0.849	0.862	0.871	0.875	0.878	4	0.56	0.74	0.59	0.64
30 Estonia	0.733	0.780	0.845	0.859	0.864	0.866	0.868	0.871	−1	0.63	0.79	0.44	0.64
31 Greece	0.753	0.796	0.856	0.854	0.864	0.866	0.868	0.870	−1	0.56	0.72	0.24	0.54
32 Cyprus	0.732	0.802	0.850	0.852	0.856	0.860	0.867	0.869	−1	0.91	0.59	0.31	0.64
33 Poland	0.712	0.785	0.835	0.836	0.842	0.855	0.860	0.865	5	0.98	0.62	0.50	0.72
34 United Arab Emirates	0.727	0.798	0.836	0.846	0.855	0.860	0.862	0.863	1	0.94	0.47	0.45	0.64
35 Andorra	..	0.759	0.828	0.849	0.853	0.854	0.856	0.858	−2	..	0.88	0.51	..
35 Lithuania	0.732	0.756	0.824	0.831	0.851	0.852	0.855	0.858	5	0.33	0.87	0.58	0.59
37 Qatar	0.754	0.810	0.825	0.844	0.853	0.854	0.855	0.856	−1	0.72	0.19	0.52	0.47
38 Slovakia	0.739	0.764	0.829	0.842	0.845	0.851	0.853	0.855	−1	0.33	0.83	0.44	0.54
39 Brunei Darussalam	0.782	0.819	0.842	0.852	0.853	0.852	0.852	0.853	−8	0.46	0.28	0.19	0.32
39 Saudi Arabia	0.697	0.743	0.808	0.835	0.852	0.854	0.854	0.853	0	0.64	0.84	0.78	0.75
41 Latvia	0.704	0.728	0.816	0.824	0.838	0.841	0.844	0.847	2	0.33	1.15	0.53	0.69
41 Portugal	0.711	0.785	0.822	0.829	0.839	0.842	0.845	0.847	1	0.98	0.46	0.44	0.65
43 Bahrain	0.746	0.792	0.796	0.800	0.810	0.832	0.846	0.846	7	0.60	0.06	0.87	0.47
44 Chile	0.701	0.759	0.808	0.819	0.833	0.840	0.842	0.843	0	0.80	0.62	0.61	0.68
45 Hungary	0.704	0.769	0.823	0.830	0.833	0.834	0.835	0.838	−4	0.89	0.68	0.26	0.65
46 Croatia	0.670	0.750	0.808	0.816	0.824	0.827	0.828	0.831	0	1.14	0.75	0.40	0.80
47 Argentina	0.704	0.771	0.813	0.818	0.820	0.822	0.822	0.825	−2	0.91	0.54	0.20	0.59
48 Oman	..	0.704	0.793	0.804	0.815	0.822	0.822	0.821	0	..	1.19	0.50	..
49 Russian Federation	0.734	0.720	0.780	0.798	0.807	0.813	0.815	0.816	3	−0.18	0.80	0.66	0.40
50 Montenegro	..	..	0.793	0.800	0.805	0.809	0.810	0.814	0	..	..	0.36	..
51 Bulgaria	0.694	0.712	0.779	0.786	0.797	0.807	0.810	0.813	6	0.26	0.90	0.61	0.59
52 Romania	0.701	0.709	0.797	0.795	0.802	0.805	0.807	0.811	2	0.11	1.18	0.25	0.54
53 Belarus	..	0.683	0.792	0.803	0.807	0.805	0.805	0.808	−4	..	1.49	0.29	..
54 Bahamas	..	0.776	0.789	0.807	0.807	0.807	0.806	0.807	−7	..	0.17	0.32	..
55 Uruguay	0.692	0.742	0.773	0.790	0.801	0.800	0.802	0.804	1	0.70	0.40	0.57	0.56
56 Kuwait	0.713	0.786	0.792	0.796	0.799	0.802	0.804	0.803	−3	0.99	0.07	0.20	0.44
57 Malaysia	0.643	0.725	0.772	0.781	0.790	0.795	0.799	0.802	1	1.20	0.63	0.54	0.82
58 Barbados	0.716	0.752	0.782	0.795	0.796	0.797	0.799	0.800	−4	0.49	0.39	0.34	0.41
58 Kazakhstan	0.690	0.685	0.765	0.781	0.793	0.797	0.797	0.800	0	−0.07	1.12	0.64	0.55

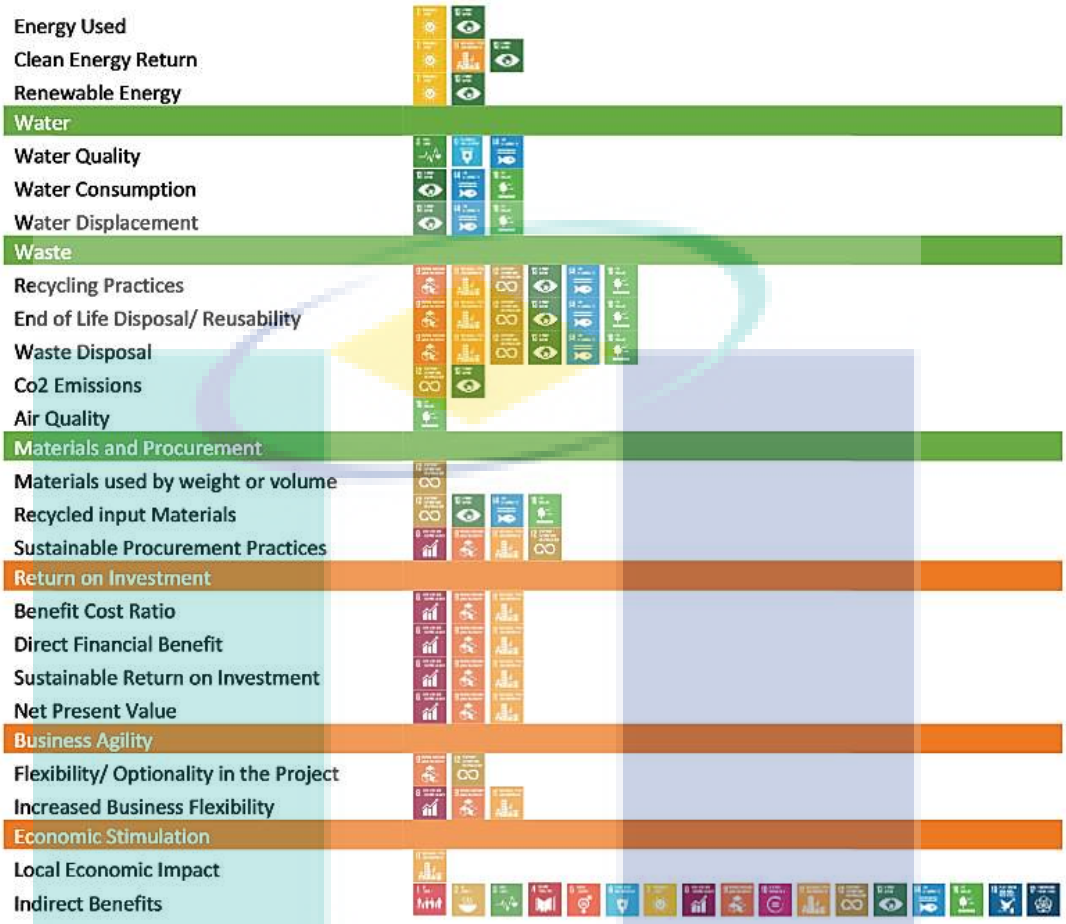
APPENDIX B
THE LINKING OF SDG AND P5



Linking the SDGs and P5

The following table links the Sustainable Development Goals (SDGs) to the elements in the GPM P5 Standard for Sustainability in Project Management These linkages are based on a more detailed analysis available on the SDG Compass website (www.sdgcompass.org).

GPM P5 Standard	Sustainable Development Goal
Labor Practices and Decent Work	
Employment	
Labor/Management Relations	
Health and Safety	
Training and Education	
Organizational Learning	
Diversity and Equal Opportunity	
Trained Professional Emigration	
Society and Customers	
Community Support	
Job/Unemployment	
Public Policy / Compliance	
Customer Health and Safety	
Market Communications and Advertising	
Customer Privacy	
Cultural Impact	
Human Rights	
Non-Discrimination	
Freedom of Association	
Child Labor	
Forced or Compulsory Behavior	
Ethical Behavior	
Investment and Procurement Practices	
Bribery and Corruption	
Anti-Competitive Behavior	
Transport	
Digital Communication	
Traveling	
Transportation	
Energy	



APPENDIX C
THE STRUCTURE OF WORKSHEET IN BSP FORMATION

CONSTRUCTION

RESPONDENT : 1

3p	12 sub criteria	sub-sub elements	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17	TOTAL
people	labour practices and decent work	employment	-0.9	0.9						0.9										0.3
		labor/ management					0.9			0.9		0.9								0.9
		health and safety						0.9		0.9				0.9						0.9
		training and education				0.9					0.9									0.9
		organisational learning				0.9				0.9	0.9								-0.9	0.45
		diversity and equal opportunity					0.9													0.9
		trained professional emigration								0.9			0.9							0.9
			-0.9	0.9	0	1.8	1.8	0.9	0	4.5	1.8	0.9	0.9	0.9	0	0	0	0	-0.9	0.75
	society and customers	community support											0.9				0.9			0.9
		job/unemployement	-0.9	0.9						0.9										0.3
		public policy/compliance																0.9		0.9
		customer health and safety			0.9			0.9						0.9						0.9
		market communications and advertising												0.9						0.9
		customer privacy												0.9						0.9
		cultural impact										0.9						0.9		0.9
			-0.9	0.9	0.9	0	0	0.9	0	0.9	0	0.9	0.9	2.7	0	0	0.9	1.8	0	0.8142857
	human rights	non-discrimination					0.9			0.9		0.9								0.9
		freedom of association																0.9		0.9
		child labor								0.9		0.9								0.9
		forced or compulsory behavior								0.9				0.9						0.9
			0	0	0	0	0.9	0	0	2.7	0	1.8	0	0.9	0	0	0	0.9	0	0.9
	ethical behavior	Investment and procurement practices												0.9						0.9
		bribery and corruption																0.9		0.9
		anti-competitive behavior																0.9		0.9
			0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0	1.8	0	0.9

planet	transport	digital communication									0.9		0.9	0.9	-0.9					0.45
		traveling									0.9		0.9	0.9	-0.9					0.45
		transportation									0.9		0.9	0.9	-0.9					0.45
			0	0	0	0	0	0	0	0	2.7	0	2.7	2.7	-2.7	0	0	0	0	0.45
	energy	energy used							0.9						-0.9					0
		clean energy return							0.9				0.9		-0.9					0.3
		renewable energy							0.9						-0.9					0
			0	0	0	0	0	0	2.7	0	0	0	0.9	0	-2.7	0	0	0	0	0.1
	water	water quality			0.9			0.9								0.9				0.9
		water consumption													-0.9	0.9	0.9			0.3
		water displacement													-0.9	0.9	0.9			0.3
			0	0	0.9	0	0	0.9	0	0	0	0	0	0	-1.8	2.7	1.8	0	0	0.5
	waste	recycling practices									0.9		0.9	0.9	-0.9	0.9	0.9			0.6
		end of life disposal/reusability									0.9		0.9	0.9	-0.9	0.9	0.9			0.6
		waste disposal									0.9		0.9	0.9	-0.9	0.9	0.9			0.6
		Co2 emissions												0.9	-0.9					0
		air quality															0.9			0.9
			0	0	0	0	0	0	0	0	2.7	0	2.7	3.6	-3.6	2.7	3.6	0	0	0.54
	materials and procureme	materials used by weight or volume												0.9						0.9
		recycled input materials												0.9	-0.9	0.9	0.9			0.45
		sustainable procurement practices								0.9	0.9		0.9	0.9						0.9
			0	0	0	0	0	0	0	0.9	0.9	0	0.9	2.7	-0.9	0.9	0.9	0	0	0.75
profit	Return on Investment	Benefit cost ratio								0.9	0.9		0.9							0.9
		direct financial benefit								0.9	0.9		0.9							0.9
		sustainable return on investment								0.9	0.9		0.9							0.9
		net present value								0.9	0.9		0.9							0.9
			0	0	0	0	0	0	0	3.6	3.6	0	3.6	0	0	0	0	0	0	0.9
	business agility	flexibility/optionality in the project									0.9			0.9						0.9
		increased business flexibility								0.9	0.9		0.9							0.9
			0	0	0	0	0	0	0	0.9	1.8	0	0.9	0.9	0	0	0	0	0	0.9
	Economic stimulation	local economic impact											0.9							0.9
		indirect benefits	-0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	-0.9	0.9	0.9	0.9	-0.9	0.5823529
			-0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.8	0.9	-0.9	0.9	0.9	0.9	-0.9	0.7411765
	Total each SDG		-2.7	2.7	2.7	2.7	3.6	3.6	3.6	14.4	14.4	4.5	15.3	16.2	-12.6	7.2	8.1	5.4	-1.8	

APPENDIX D
THE FINAL SURVEY QUESTION

SURVEY OF GREEN PROJECT MANAGEMENT (GPM) ON SUSTAINABILITY IN BUSINESS

The purpose of this research is to identify the perception of Green Project Management (GPM) on sustainability in Business. This research is being conducted by Sustainable Development Centre Group under Faculty of Manufacturing Engineering, University Malaysia Pahang.

You are welcome to participate in this survey and provide some information in order for me to complete my research.

The procedure involves filling an online survey that will take approximately 8 minutes. Your responses will be confidential. The results of this study will be used to calculate the sustainability in the specific sector by producing a mathematical model that can improve our business.

If you have any questions or suggestions about this research study. You may email to solehasahimi93@gmail.com / faizmt@ump.edu.my / kartina@ump.edu.my for any inquiries or further information.

* Required

1. **Email address** *

1. Demographic Information

In this section, there are 3 questions related to your job background. Please answer all the questions.

2. **Which state are you working?** *

Mark only one oval.

- 01 - Johor
- 02 - Kedah
- 03 - Kelantan
- 04 - Melaka
- 05 - Negeri Sembilan
- 06 - Pahang
- 07 - Pulau Pinang
- 08 - Perak
- 09 - Perlis
- 10 - Selangor
- 11 - Terengganu
- 12 - Sabah
- 13 - Serawak
- 14 - Wilayah Persekutuan
- Other: _____

3. **Based on Gross Domestic Product (GDP), in which economic sector you are involved?** *
Mark only one oval.

- Agriculture (Include Livestock and horticulture)
- Mining and Quarrying
- Manufacturing
- Construction
- Services (utilities, Wholesales and retail trade, food & beverage and accommodation, transport & storage, information & communication, finance & insurance, Real estate and business services, government services and other services such community service, private or non-profit services)

4. **What is your job designation?** *
Mark only one oval.

- Executive (eg: Engineer, Officer, Manager, Director or equivalent)
- Non-Executive (eg: Technical assistant, administrative assistant, or equivalent)

2. Business Development

5. **I am clear about the vision, mission and the core values of my company and it is clearly communicated to me.** *
Mark only one oval.

- Strongly Agree *Skip to question 5.*
- Somewhat Agree *Skip to question 5.*
- Neutral *Skip to question 5.*
- Somewhat Disagree *Skip to question 5.*
- Strongly Disagree *Skip to question 5.*
- Do Not Have At All *Stop filling out this form.*

Business Background

Please choose based on your company background (optional)

6. **Which of the following describes your company background? (can choose more than one)**
Check all that apply.

- [ ] Business strategic (eg: have a planning for future)
- [ ] Integrity (eg: operate within letter and spirit of the law)
- [ ] Ownership (eg: treat company assets as our own and company's long-term success in mind)
- [ ] Profit Oriented (eg: have target profit at certain period)
- [ ] Planet Oriented (eg: consider an upcoming consequences while using a large of logs)
- [ ] People Oriented (eg: Welfare on employee, customer satisfaction, respect among team members)
- [ ] Strategic management (eg: have a structural organisation)
- [ ] Other: _____

3. Sustainability Development

This section relates to the sustainability. Please answer the questions based on your understanding or knowledge.

7. **On the scale of 6, please rate your knowledge about the Sustainability.** *
Mark only one oval.

	0	1	2	3	4	5	6	
zero knowledge	◯	◯	◯	◯	◯	◯	◯	Extremely knowledgeable

8. **Based on your perception, please choose ONE element as the best priority in the sustainability concept OR N/A if NONE is the priority.** *
Mark only one oval.

- ◯ People *Skip to question 8.*
- ◯ Planet *Skip to question 9.*
- ◯ Profit *Skip to question 10.*
- ◯ N/A *Skip to question 11.*

People

9. **Please choose only ONE as the preferable sub-elements in sustainability for People** *
Mark only one oval.

- ◯ Labour practices and decent work
- ◯ Society and customers
- ◯ Human Rights
- ◯ Ethical Behaviour

Planet

10. **Please choose only ONE as the preferable sub-element in sustainability for Planet** *
Mark only one oval.

- ◯ Transport
- ◯ Energy
- ◯ Waste
- ◯ Water

profit

11. **Please choose only ONE as the preferable sub-element in sustainability for Profit** *
Mark only one oval.

- ◯ Return on Investment (ROI)
- ◯ Business Agility
- ◯ Economic Stimulation

Sustainability Development (cont.)

please choose either yes or no for every situation below.

12. **Do you agree on the situations below.** *

Mark only one oval per row.

	Yes	No
End poverty		
End hunger		
Good Health and Well-being		
Provide Quality Education		
Achieve Gender Equality		
Provide Clean Water and Sanitation		
Affordable and Clean Energy		
Decent Work and Economic Growth		
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		
Reduce inequality within and among countries		
Sustainable Cities and Communities		
Responsible Consumption and Production		
Combat climate change		
Conserve and sustainably use the oceans, seas and marine resources		
sustainable use of terrestrial ecosystems, manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss		
Promote Peace, easy access to Justice and build effective Institutions		
Build global Partnerships for Sustainable Development		

APPENDIX E
THE DATA RESPONDENTS

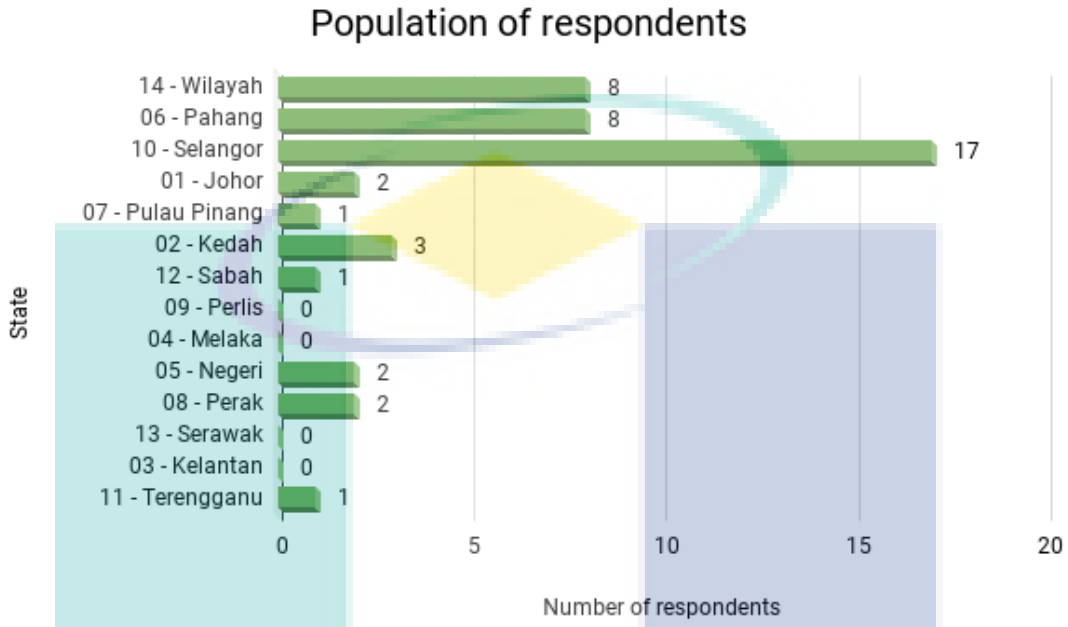


Figure 5.1 Population of the respondent in different state

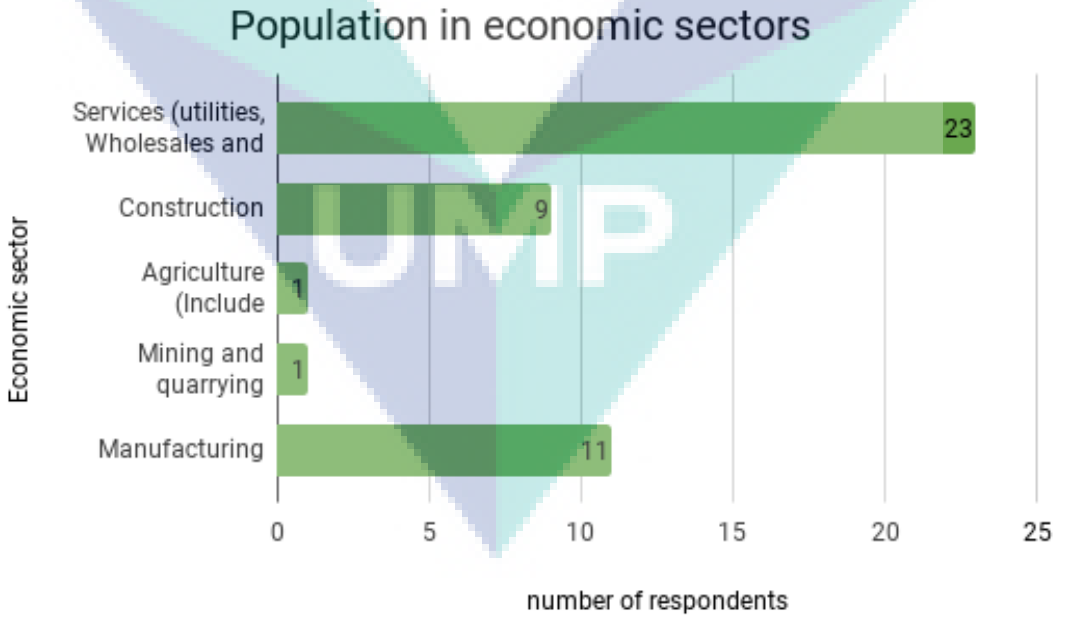


Figure 5.2 Population of respondent in different economic sector

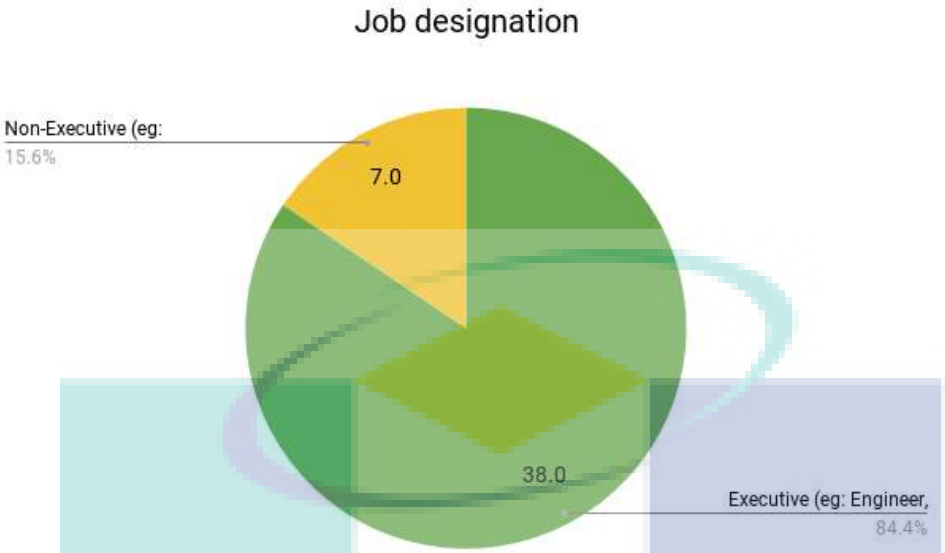


Figure 5.3 Population of respondent in their job designation

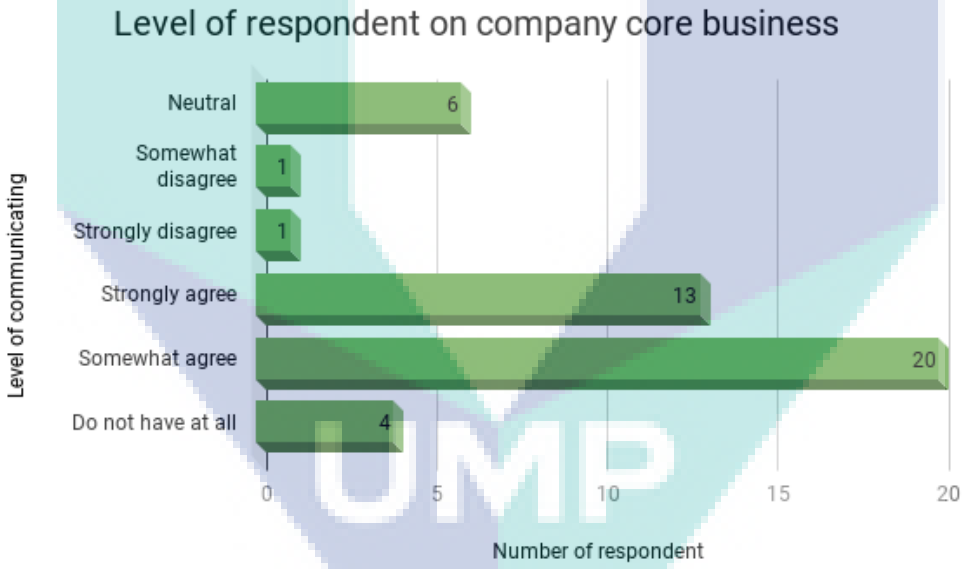


Figure 5.4 Population of respondent for sustainability in their Business

Table 5.1 Communication categorizing

Categorized communicate	**Number of respondent**
Have and communicate	33
Have but not communicate	8
Do not have	4

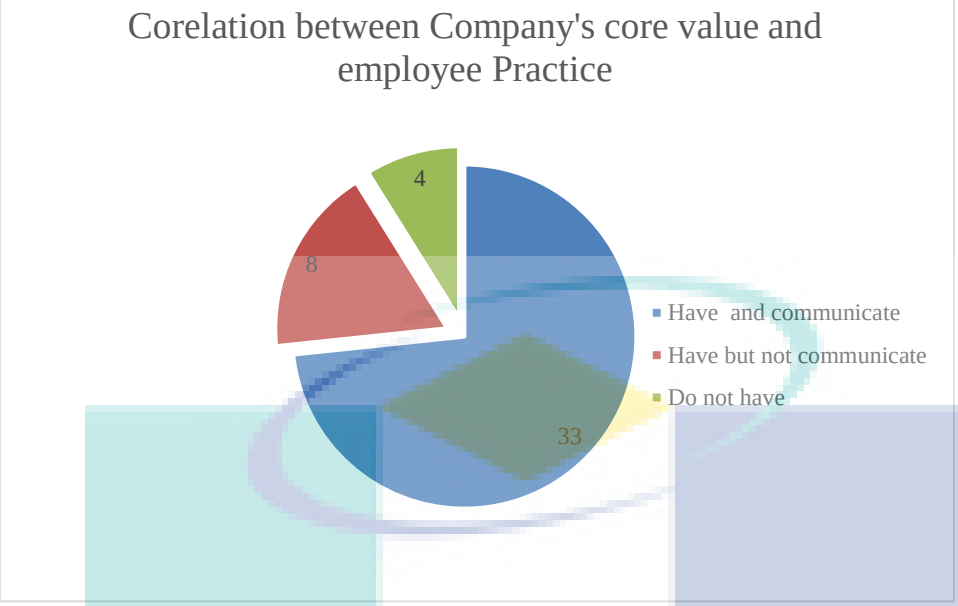


Figure 5.5 Population of respondent in different economic sector

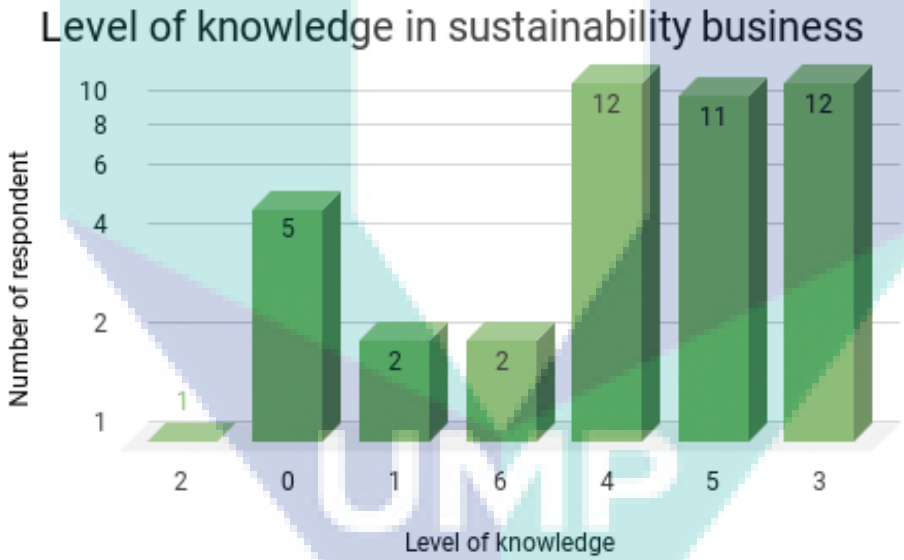


Figure 5.6 Level of knowledege in sustainability business

Table 5.2 Knowledge of categorizing

Categorized of knowledge	**Number of Respondent**
Zero knowledge	5
Less knowledgeable	38
Knowledgeable	2

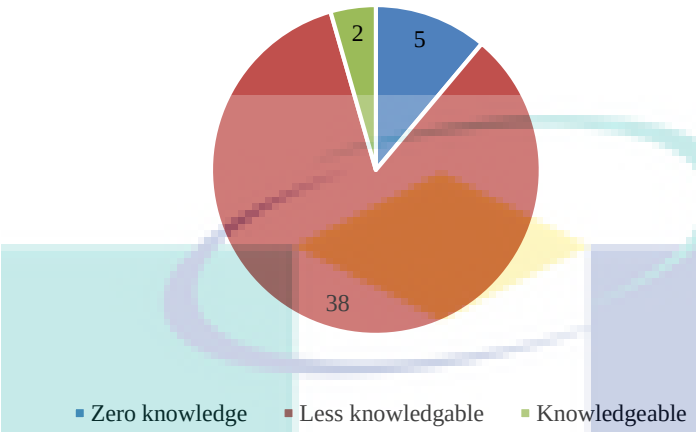
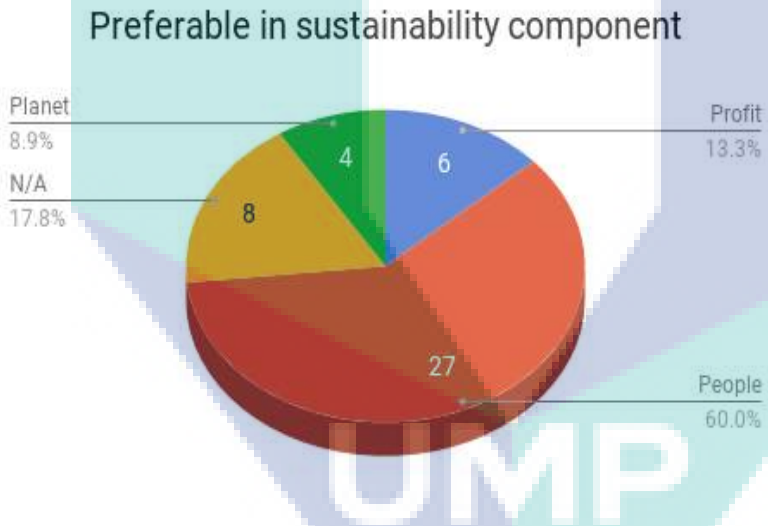
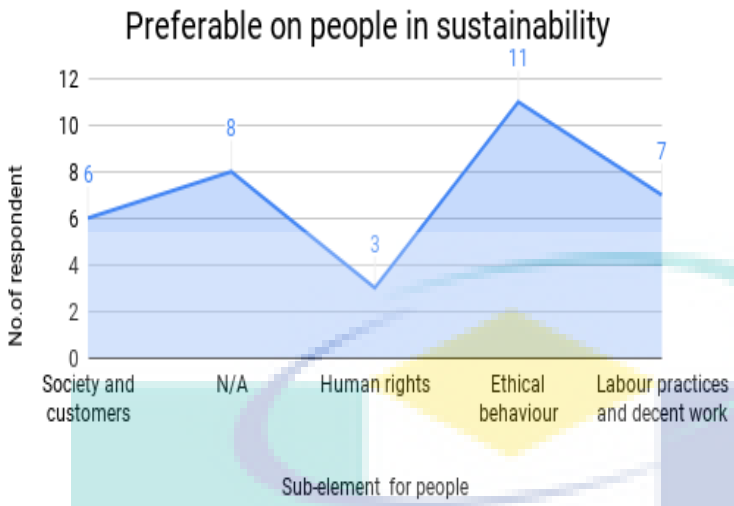


Figure 5.7 Level of knowledege in sustainability business



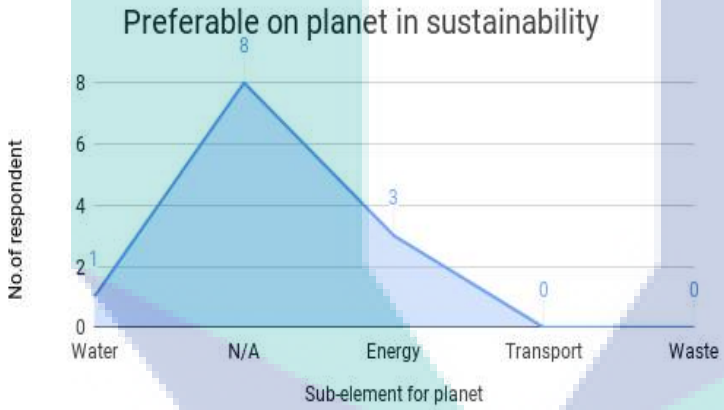
1. People = 27
2. Planet = 4
3. Profit = 6
4. N/A = 8

Figure 5.8 Preferable in sustainability component/elements



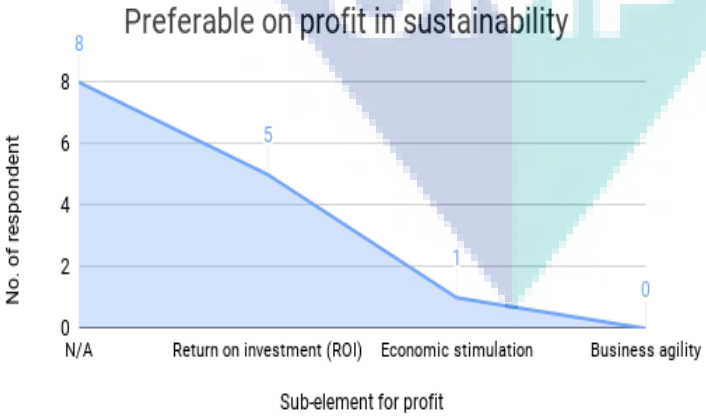
1. Labor practices & decent work = 7
2. Society & customers = 6
3. Human Rights = 3
4. Ethical behavior = 11
5. N/A = 8

Figure 5.9 Preferable in sub elemet of people



1. Transport = 0
2. Energy = 3
3. Water = 1
4. Waste = 0
5. Materials & procurement = 0
6. N/A = 8

Figure 5.10 Preferable in sub elemet of planet



1. ROI = 5
2. Business Agility = 0
3. Economic stimulation = 1
4. N/A = 8

Figure 5.11 Preferable in sub elemet of profit

APPENDIX F
THE VALIDATION SPREADSHEET USING EXPERT ELICITATION METHOD

EXPERT DETAILS

optional to fill the name except the expertise and the experience part.

* Required

1. **Email address** *

2. **Name**

3. **Involvement in Sustainability Knowledge/Practices?** *
   Mark only one oval.
   - yes
   - No

4. **Job Designation** *
   A detail job designation is more better (example : Economist in Islamic Banking at Maybank Berhad, Senior Engineer in Process Engineer, etc.)

5. **Year of Experience** *
   Check all that apply.
   - 2-4 years
   - more than 5 years

Motivation for Answering

This simple questionnaire is to validate the research outcome from the expert as my conclusion part. The selection of the expert was determined by using expert elicitation method. Here I attached the overview of the research and the outcomes through the objectives without bias on this validation.

The details and the outcomes of this research for further understanding as in second section. this preparation before an expert response the question in section three later. if any further explanation, kindly contact to this email/phone number: Nur Soliha Binti Sahimi (solehasahimi93@gmail.com or 010-7025765)

Thank you for the time to verify this research

Description of Research

*Title:

Business Sustainability Practice (BSP) Profile Assessment in Malaysia Economic Sectors Using K-Mean Clustering Approach

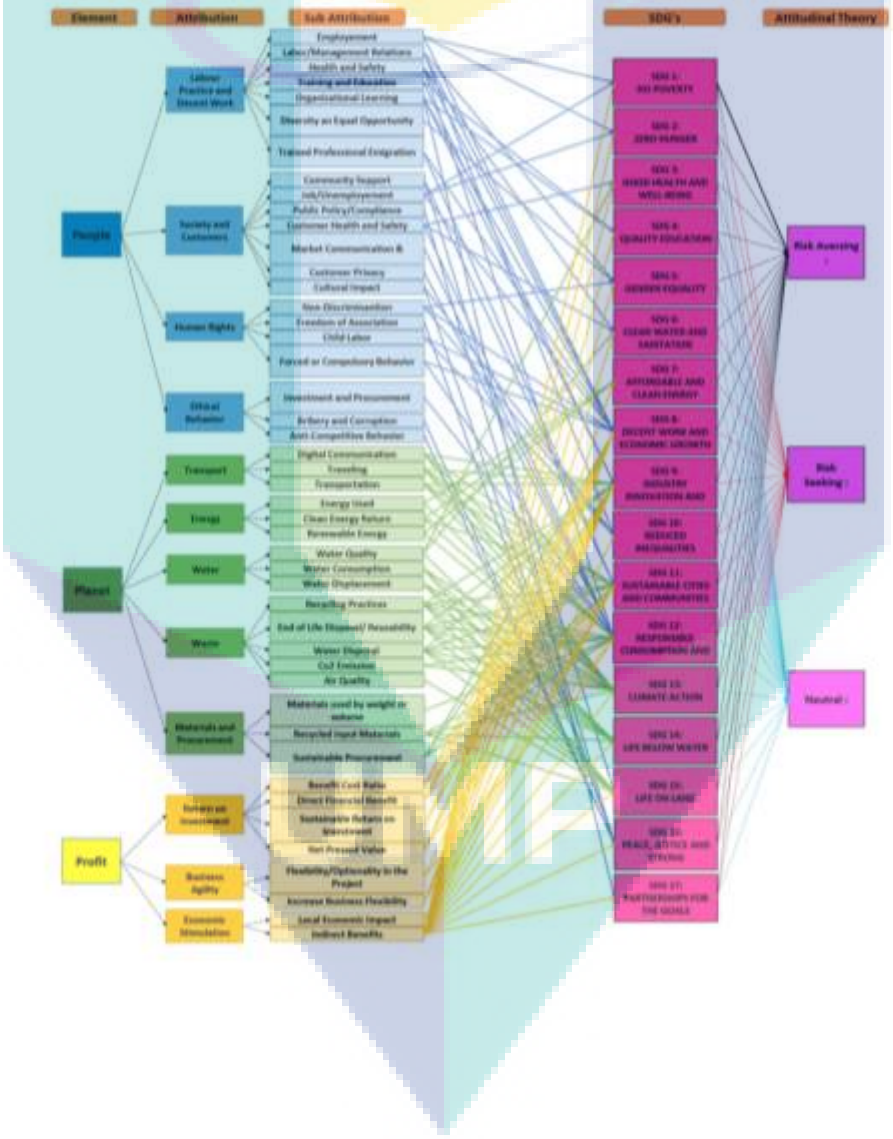
*Objectives:

1. To propose an Integration technique of Business Sustainability Practice (BSP) in Malaysia context
2. To assess BSP Profile performance using K-Mean Clustering approach

*Scope:

The scope for this study is applicable suited to Malaysia context and will implement the concept of Green Project Management (GPM) P5, Sustainable Development Goals (SDG), attitudinal theory, and economic sector in Malaysia. The data were taken at different sectors that represent the population in Malaysia. There are specific attributions, parameters, and elements that were integrated in general survey question and selected respondent were determined

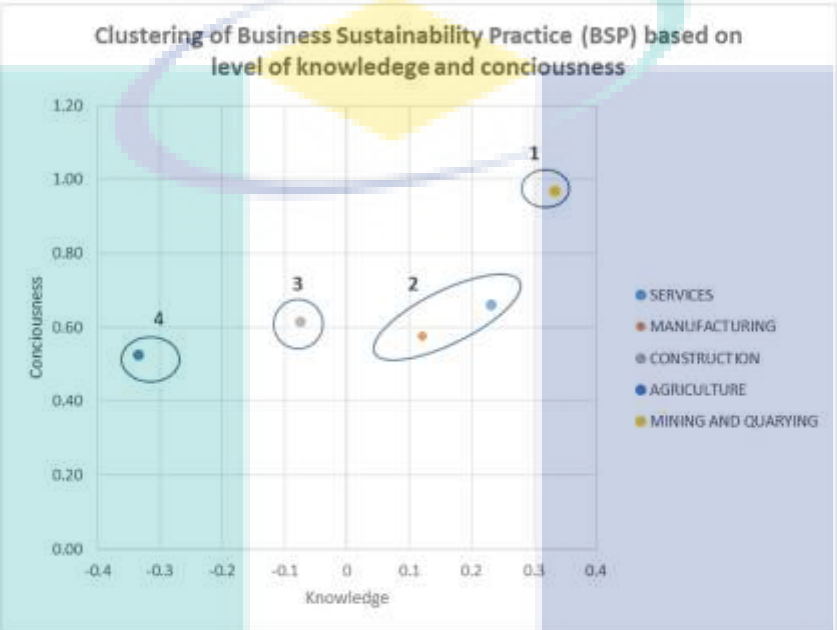
Outcome 1: An integrated system for Business Sustainability Practice (BSP)



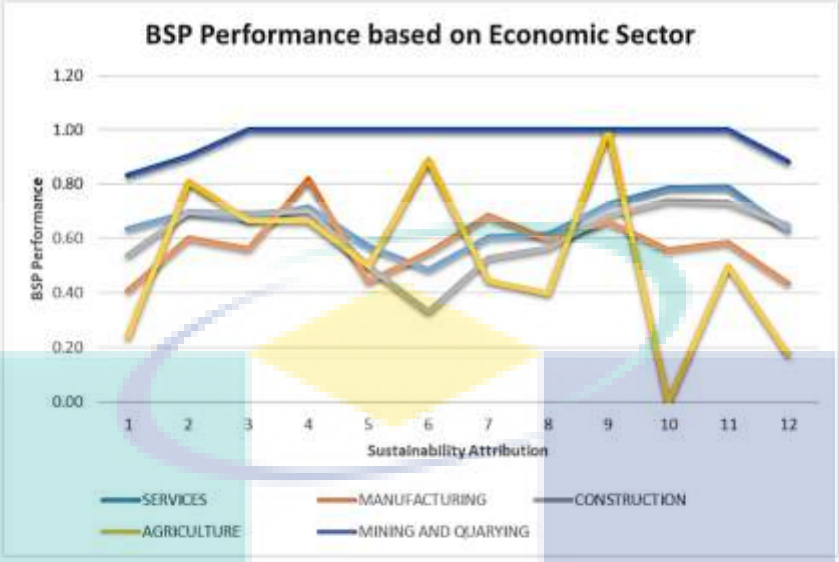
Outcome 2: BSP profile based on economic sector using K-Mean clustering approach

Evaluate the performance of Business Sustainability Practice among Sectors in Malaysia in second outcomes. Thus, a competitive edge can be formed among each sector to increase the profitability thus achieving Sustainable Development Goals.

1. The clustering of Business Sustainability Practice (BSP) Performance



2. BSP performance based on the twelve attribution in sustainability



Survey Questions (Feedback)

Could you give your highest plausible bound for my research outcomes in my title research: "Business Sustainability Practice (BSP) Profile Assessment in Malaysia Economic Sectors Using K-Mean Clustering Approach", where you would be happy assigning your agreement for this statement by tick the column yes and not agree at column no.

6. **1. Is the Malaysian economy in a good condition?** *
   Mark only one oval.
   - ◯ YES
   - ◯ No

7. **2. Is the Malaysian economy based on national and world goals through the sustainability concept?** *
   Mark only one oval.
   - ◯ No
   - ◯ yes

8. **3. Is the BSP system that has been issued in the findings 1 give a true picture of the current solution to Malaysian Economic Performance?** *
   Mark only one oval.
   - ◯ no
   - ◯ yes

9. **4. Does the BSP profile on the second outcome give an actual trend/picture of level performance of sector in Malaysia?** *
   Mark only one oval.
   - ◯ Yes
   - ◯ No

10. **5. Is it important that sustainability is applied through the economy of an existing sector in Malaysia?** *
Mark only one oval.

- ◯ yes
- ◯ no

11. **6. Is the necessity of consciousness and knowledge necessary in any action towards the sustainability of the country?** *
Mark only one oval.

- ◯ Yes
- ◯ No

12. **7. Is the study contribute to competition edge among Malaysian economic sector?** *
Mark only one oval.

- ◯ yes
- ◯ no

13. **8. If any comment or improvement should be done for the extended research, please write in the space below:**

Powered by Google Forms

APPENDIX G
PILOT RUN SURVEY FORMATION

SURVEY OF GREEN PROJECT MANAGEMENT (GPM) ON SUSTAINABILITY IN BUSINESS

The purpose of this research is to identify the perception of Green Project Management (GPM) on sustainability in Business. This research is being conducted by Sustainable Development Centre Group under Faculty of Manufacturing Engineering, University Malaysia Pahang.

You are welcome to participate in this survey and provide some information in order for me to complete my research.

The procedure involves filling an online survey that will take approximately 5 minutes. Your responses will be confidential. The results of this study will be used to calculate the sustainability in the specific sector by producing a mathematical model that can improve our business.

If you have any questions or suggestions about this research study. You may email at solehasahimi93@gmail.com / faizmt@ump.edu.my / kartina@ump.edu.my for any inquiries or further information.

* Required

1. **Email address** *

1. Demographic Information

In this section, the questions are related to your job background. Please answer all the questions.

2. **Which state are you working?** *

Mark only one oval.

- 01 - Johor
- 02 - Kedah
- 03 - Kelantan
- 04 - Melaka
- 05 - Negeri Sembilan
- 06 - Pahang
- 07 - Pulau Pinang
- 08 - Perak
- 09 - Perlis
- 10 - Selangor
- 1 - Terengganu
- 12 - Sabah
- 13 - Serawak
- 14 - Wilayah Persekutuan
- Other:

3. **What is your job designation? (Based on Job street Malaysia)** *

Mark only one oval.

- ◯ Accounting/Finance (audit, taxation, banking/Financial , Investment, Cost Accounting or any related)
- ◯ Admin/Human Resources (Top Management, secretarial, Clerical/Administrative or any related)
- ◯ Art/Media/Communication (Advertising, Entertainment, Public Relation or any related)
- ◯ Building/Construction (Architect/Interior Design, Civil Eng., Property/Real Estate, Quantity Surveying or any related)
- ◯ Computer/Information Technology (IT Hardware, Network/Sys/DB Admin, Software or any related)
- ◯ Education/Training
- ◯ Engineering (Chemical Eng., Electric Eng. Industrial Eng., Oil/Gas Eng. or any related)
- ◯ Healtcare (Doctor/Diagnosis, Pharmacy, Nurse/Medical Support or any related)
- ◯ Hotel/Restaurant (Food/Beverage, Tourism or any related)
- ◯ Manufacturing (Maintenance, Process Design & Control, Purchasing/Material Mgmt, QA or any related)
- ◯ Sales/Marketing (Merchandising, Retail sales, Sales-Eng/Tech/IT/Financial services, Telesales or any related)
- ◯ Sciences (Actuarial, Statistics, Agriculture, Aviation, Biotech, Chemist, Food tech/Nutritionist, Geology/Geophysics or any related)
- ◯ Services (Security, Armed Forces, Customer Service, Logistic/Supply Chain, Law/Legal Services, Personal Care, Social Services, Help desk Support or any related)
- ◯ Other: _____

4. **Based on Gross Domestic Product (GDP), currently which is economic sector you are involved?** *

Mark only one oval.

- ◯ Agriculture (Include Livestock and horticulture)
- ◯ Mining and Quarrying
- ◯ Manufacturing
- ◯ Construction
- ◯ Services (utilities, Wholesales and retail trade, food & beverage and accommodation, transport & storage, information & communication, finance & insurance, Real estate and business services, government services and other services such community service, private or non-profit services)

5. **Based on MASCO-08, What is your job designation?** *

Mark only one oval.

- 1. Management (eg: chief executive, senior officer, director and all manager in every sector)
- 2. Professional (eg: all engineer, architect, doctor, veterinary, lecturer, teacher, researcher, QA,QC, Quantity Surveyor, accountant, lawyer and etc.)
- 3. Technical and Pararofessional (eg: supervisor, administrative secretary, insurance agent and brokers, assistant in all sector, etc.)
- 4. Administration and administrative support (eg: any clerk in every sector)
- 5. Services and Sales (eg: personal assistant, cashier, makeup artist, chef etc.)
- 6. Skilled Agriculture, Forestry and Fisheries (eg: gardeners, breeder, hunter, fisherman, farmer etc.)
- 7. Skilled Workers and Carpentry (eg: machinery, hand carpenter, metal, tailor, cobbler, baker, butcher, etc.
- 8. Plant, Machine and Installation Operator (eg: operator, driver, sailor, installer etc.)
- 9. Basic Employee (eg: cleaner, maid, labor etc.)
- 10. Armed Force (eg: navy, police, air-force, etc.)
- Other: _____

6. **What is your job designation?**

Mark only one oval.

- 1. Manager (eg: chief executive, senior officer, director and all manager in every sector)
- 2. Professional (eg: all engineer, architect, doctor, veterinary, lecturer, teacher, researcher, QA,QC, Quantity Surveyor, accountant, lawyer and etc.)
- engineer
- QA,QC
- 3. Technician and Associate Professional (eg: supervisor, administrative secretary, insurance agent and brokers, assistant in all sector, etc.)

2. Business Development

This section contains 2 questions. Please choose based on your company background.

IF your company does not have the vision, mission and core value, please tick " Do not have at all" and you may not proceed to the next question. Thank you for your response.

7. **I am clear about the vision, mission and the core values of my company and it is clearly communicated to me.** *

Mark only one oval.

- Strongly Agree
- Somewhat Agree
- Neutral
- Somewhat Disagree
- Strongly Disagree
- Do Not Have At All *After the last question in this section, stop filling out this form.*

8. **Which of the following describes your company background? (can choose more than one)**
Check all that apply.

- [ ] Business strategic (eg: have a planning for future)
- [ ] Integrity (eg: operate within letter and spirit of the law)
- [ ] Ownership (eg: treat company assets as our own and company's long-term success in mind)
- [ ] Profit Oriented (eg: have target profit at certain period)
- [ ] Planet Oriented (eg: consider an upcoming consequences while using a large of logs)
- [ ] People Oriented (eg: Welfare on employee, customer satisfaction, respect among team members)
- [ ] Strategic management (eg: have a structural organisation)
- [ ] Other: _____

3. Sustainability Development

This section contains 5 questions related to the sustainability. Please answer the questions based on your understanding or knowledge.

9. **On the scale, please rate your knowledge about the Sustainability.** *
Mark only one oval.

	0	1	2	3	4	5	6	
zero knowledge	◯	◯	◯	◯	◯	◯	◯	Extremely knowledgeable

10. **Based on your perception, please choose ONE element as the best priority in the sustainability concept OR N/A if NONE is the priority.** *
Mark only one oval.

- ◯ People *After the last question in this section, skip to question 12.*
- ◯ Planet *After the last question in this section, skip to question 13.*
- ◯ Profit *After the last question in this section, skip to question 14.*
- ◯ N/A

11. **Based on your perception, please rate all these 12 items in sustainability related to your company operation.**
Mark only one oval per row.

	Extremely reliable	Very reliable	Some what reliable	Not so reliable	Not at all reliable
Labour practices and decent works					
Society and Customers					
Human Rights					
Ethical behaviour					
Transport					
Energy					
Waste					
Water					
Material and procurement					
Return on Investment (ROI)					
Business Agility					
Economic Stimulation					

12. **Would you agree on situations below.**
Mark only one oval per row.

	Yes	No
End poverty in all its forms every where	◯	◯
End hunger, achieve food security and improved nutrition and promote sustainability agriculture	◯	◯
Ensure healthy lives and promote well-being for at all ages	◯	◯
Ensure inclusive and equitable quality education and promote lifelong learning opportunity for all	◯	◯
Achieve gender equality and empower all women and girls	◯	◯
Ensure availability and sustainable management of water and sanitation for all	◯	◯
Ensure access to affordable, reliable, sustainable and modern energy for all	◯	◯
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	◯	◯
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	◯	◯
Reduce inequality within and among countries	◯	◯
Make cities and human settlements inclusive, safe, resilient and sustainable	◯	◯
Ensure sustainable consumption and production patterns.	◯	◯
Take urgent action to combat climate change and its impacts	◯	◯
Conserve and sustainably use the oceans, seas and marine resources for sustainable development	◯	◯
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss	◯	◯
Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.	◯	◯
Strengthen the means of implementation and revitalize the global partnership for sustainable development.	◯	◯

People

13. **Please choose only ONE as the preferable sub-elements in sustainability for People**
Mark only one oval.

- ◯ Labour practices and decent work
- ◯ Society and customers
- ◯ Human Rights
- ◯ Ethical Behaviour

Planet

14. **Please choose only ONE as the preferable sub-elements in sustainability for Planet**
Mark only one oval.

- ◯ Transport
- ◯ Energy
- ◯ Waste
- ◯ Water

profit

15. **Please choose only ONE as the preferable sub-elements in sustainability for Profit**
Mark only one oval.

- ◯ Return on Investment (ROI)
- ◯ Business Agility
- ◯ Economic Stimulation

APPENDIX H
LIST OF CONTRIBUTION

CONFERENCE PROCEEDING JOURNALS:

N. Soliha Sahimi**, Faiz Turan and Kartina Johan. Sustainability Competency Assessment in Marine Industry.* 11th International Conference on Marine Technology (MARTEC 2018), Kuala Lumpur, Malaysia. ***Published (Scopus)

Nur Soliha Sahimi** and Faiz, Mohd Turan and Kartina, Johan. Framework of Sustainability Assessment (FSA) method for industry in Malaysia.* International Conference on Innovation Technology, Engineering and Science (iCITES 2018), Pahang, Malaysia *(012079). ISSN 1757-899X.* ***Published (Scopus)

Nur Soliha Sahimi**, Faiz Mohd Turan and Kartina Johan. Development of Sustainability Assessment Framework in Hydropower Sector.* International Research and Innovation Summit (IRIS 2017), Malacca, Malaysia**. *Published (Scopus)

*Faiz Mohd Turan, **Nur Soliha Sahimi** and Kartina Johan. Development of Integrated Assessment System for Underground Power Cable Performance: A case Study.* International Research and Innovation Summit (IRIS 2017), Malacca, Malaysia. ***Published (Scopus)***

Nur Soliha Sahimi**, Faiz Mohd Turan and Kartina Johan. Development of sustainability assessment tool for environmental management in Malaysia hydroelectric project.* 1st Conference on Governance & Integrity (FGIC 2017), Pahang, Malaysia. ***Published (Scopus)

LIST OF AWARDS:

Silver Medal "SAC-I Integrated Sustainability Assessment Calculator**".** In Creation Innovation Technology & Research Exposition (CITREX) 2018, (RDU 151407), 7-8 February 2018, Sport Complex, UMP Gambang Campus, Gambang, Pahang Darul Makmur, Malaysia.

Gold Medal “Business Competitive Advantage for Sustainable Development (BCA-SiDE)”. Creation Innovation Technology & Research Exposition (CITREX) 2017 (RDU 151407), 15-16 March 2017, Sport Complex, UMP Gambang Campus, Gambang, Pahang Darul Makmur, Malaysia.