UNIVERSITI PUTRA MALAYSIA

THE PROBLEMS IN IMPLEMENTING GREEN PROCUREMENT IN MALAYSIAN CONSTRUCTION SECTOR

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ABSTRACT

This paper examines the factors that relate Green procurement with the construction sector in Malaysia in terms of the potential of enhancing their performance in a green manner; the paper as well examines how to boost efforts to implement sustainable development in the construction sector by utilizing Green procurement via highlighting the benefits and importance of it in lessening the pollution to the environment and enhance building practices towards achieving the vision of Malaysia 2020 set by the government.

The expected findings of this paper are to analyze the relationship between different factors that affect Green procurement practices and how they relate to the green construction sector in Malaysia in an attempt to increase the number of GBI compliant buildings (a unique Malaysian environment friendly building system and code), and LEED code that deals directly with green engineering practices and sustainable development.

Key words:

Green Procurement, Construction Sector, Sustainable development, GBI (Green Building Index), LEED (Leadership in Energy & Environmental Design).

ABSTRAK

Karya ini mengkaji factor-faktor yang berkaitan dengan *pemerolehan hijau* dalam sector pembinaan di Malaysia untuk meningkatkan prestasi mereka dengan cara yang mesra alam, Karya ini juga mengkaji bagaimana menaikkan lagi usaha melaksanakan pembangunan yang mampan dalam sektor pembinaan dengan menggunakan pola *pemerolehan hijau*dengan mengetengahkan manfaat dan kepentingan dalam mencapai wawasan Malaysia 2020 yang ditetapkan oleh kerajaan.

Hasil kajian yang diharapkan dari karya ini adalah untuk menganalisis hubungan antara factor yang mempengaruhi amalan *pemerolehan hijau*dan bagaimana factor-factor tersebut berkaitan dengan sektor pembinaan hijau di Malaysia dalam usaha untuk meningkatkan bilangan bangunan yang mematuhi GBI (system bangunan mesra alam Malaysia) dan kod LEED yang mengatur secara langsung dengan amalan kejuruteraan hijau dan pembangunan yang mampan.

Kata kunci:

Green Perolehan, Sektor Pembinaan, Pembangunan mampan, GBI (Green Building Index), LEED (Leadership in Energy & Environmental Design).

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CONTENTS

Abstract i
Abstrak I
Acknowldegment II
Approval sheet IV
Declaration V
List of figures VIII
List of tables IX1

INTRODUCTION 1
1.1 Introduction....1
1.2 Problem Statement....3
1.3 Research objectives:....5
1.4 Research Questions:....5
1.5 Scope of the study....7
1.6 Limitations of the study:....7
1.7 Expected findings and contribution....7

LITERATURE REVIEW 9
2.1 Introduction....9
2.1 Construction and the environment:....11
2.2- Procurement and the environment:....13
2.2.1- Sustainable development:....13
2.2.2- Definition of procurement:....14
2.3 The Green movement in Malaysia....15
2.3.1 Green Building Index (GBI):....17
2.3.2 The Leadership in Energy and Environmental Designs (LEED)....17
2.4 Green Procurement:....18
2.4.1 Issues that face green procurement in Malaysia....19
2.5 Summary....22

RESEARCH METHODOLOGY 23
3.1 Introduction....23
3.2- Sampling Techniques....24
3.2.1 Scope and population....24
3.2.2 Sampling....25
3.3 Data Analysis....26
3.3.1 Variables identification....27
3.3.2 Data analysis technique....28
3.4 Research planning and time line....28

RESULT AND DISCUSSION 29
4.1 Introduction....29
4.2 Reliability test....30
4.3 Normality Test....30

4.4 Descriptive Analysis: 32
4.4.1- Years of Experience: 32
4.4.2 Education 33
4.4.3 Job Position 34
4.4.4: Company Size: 35
4.5 Variables computation 36
4.5.1 General insight on the extent of Green Procurement implementation 36
4.6 Problem related to green procurement 38
4.7 Regression Analysis and Correlation factors calculations 38
4.7.1 Government Policies and Regulations & Green Procurement implementation 38
4.7.2 Level of awareness of GP and Implementation 39
4.7.3 Cost (LEED & GPI implementation) and GP implementation 40
4.8 Discussion on the ishikawa diagram 41
4.8.1 LEED and GBI knowledge and application 41
4.8.2 Allocated budget and company size 42
4.8.3 Previous Knowledge and Level of Education 42
4.8.4 Cost and Green Procurement implementation 43
4.8.5 Level of awareness and GP implementation 43
4.8.6 Government policies and Green Procurement implementation 44
4.8.7 Green Procurement Implementation 44
4.9 Chapter Summary 45

CONCLUSION AND RECOMMENDATION 46
5.1 Introduction 46
5.2 Conclusion 46
5.2.1 Review of the Research Aim and Objectives 47
5.3 Recommendations for future research 48
5.3.1 General Recommendations 49
5.3.2 Research recommendations 49

REFERENCES 51
APPENDIX 54

LIST OF FIGURES

LIST		PAGE
Figure 2.1:	The extent of CO2 emissions	12
Figure 2.2:	Sustainable Development (Deng et al, 2011)	14
Figure 3.1:	Methodological steps of the research	24
Figure 4.1:	Histogram for Normality test	31
Figure 4.2:	Years of Experience Percentage of Participants	33
Figure 4.3:	Distribution of education	34
Figure 4.4:	The percentages according to job position	35
Figure 4.5	The distribution of company size	36
Figure 4.6:	The Pareto Chart for the extent of GP implementation	37
Figure 4.7:	Shows the Flow Chart and Ishikawa Diagram of results	40

LIST OF TABLES

LIST		PAGE
Table 3.1:	To find the right z-score	26
Table 4.1:	Summary of Cronbach's Alpha factor	30
Table 4.2:	Normality test	31
Table 4.3:	Respondents according to Years of Experience	32
Table 4.4:	Education Level distribution amongst respondents	33
Table 4.5:	Distribution of job position	34
Table 4.6:	Size of company	35
Table 4.7:	Extent of GP Implementation	37
Table 4.8:	Different factors that related to green procurement.	38
Table 4.9:	Correlation of Government Rules and Green Procurement Implementation	39
Table 4.10:	Correlation of Level of awareness and Green Procurement Implementation	39
Table 4.11:	Correlation of Cost and Green Procurement Implementation	40

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Green Construction is a term that has been garnering a lot of attention, as it was defined as the effective use of techniques in building and construction as to minimize the impact on the environment, to lessen the stress and strain laid on natural resources. This term includes considering all aspects of building, from procurement, purchase of raw material, transporting them, the use of pollution-causing machinery, and environment friendly operation of the buildings and constructions carried out (Ali, 2016).

Due to the high stress and strain on the environment as a result of development, it has caused the alarming levels of global warming, soil, water, and air pollutions. This necessitates the need for sustainable development to reduce the occurrence of these global issues. It is estimated that by the year 2032, seventy percent (70%) of the earth natural resources will be depleted. However, Developing countries such as Malaysia needs to adopt the concept of sustainability in order to sustain it natural resources (Bohari, 2015).

This stress has led to the increase of awareness in the importance of green construction and building towards achieving sustainable development. Sustainable development can be defined as the use of methods that positively impact the environment throughout the construction process that takes into account the environment, such as the procurement and purchasing of raw materials and transporting them with minimum negative impact on the environment (Ali, 2016).

Green procurement is the focal point of this research, thus we have to define procurement first to expand it further to green procurement definition. Procurement can be defined as the act of acquiring or obtaining services and goods. The process may look simple enough at first glance, however, it involves several systematic steps, starting from the purchase planning, determining the standards desired, then developing required specifications, financing the operation, and finally the actual purchase of the service or good (Wong, 2016).Green procurement on the other hand, refers to the use of the environment friendly practices in acquiring and purchasing of materials and resources needed, all the way from the raw materials extraction site, up the supply chain (Wong, 2016). This research will look into the status of green procurement in the construction sector in Malaysia as well as the green movement and green practices they implement to protect the environment and utilize current technology.

This research will focus on the procurement aspect of green practices in building and construction sector in Malaysia. The issues faced by the increased pollution accompanying the growth of the economy has to be analyzed to find out factors that influence green procurement and how to encourage them towards achieving sustainability, which in essence means achieving sustainable economic growth via tools and means that don't compromise the environment (Daley, 1990).

The benefits of Green Procurement in the public sector in general, and the construction sector in particular have been summarized in the following points: Reduction in natural resources depletion, Lower environmental impact from products and services, Enhanced product/service

life-cycle costing, Encouraging the spread of green development practices, Expand the market for environment friendly services and goods.

1.2 Problem Statement

The fact that the Malaysian population has increased to 28.3 million in the year 2010 as opposed to 23.8 million in the year 2000 indicates a rapid population increase. This has created large demand on building construction and development of infrastructure to keep up with the population increase. With Malaysia expected to become a high-income developed nation by the year 2020, there is an ever-increasing need to cater for those needs using a green path.

Deforestation and the difficulty to implement the laws dealing with the environmental issues associated with timbering is another obstacle in the way of green procurement in Malaysia. The lack of alternative sources of energy to compensate for the pollution incurred during the transportation and extraction of raw materials in the procurement process is a challenge that needs to be studied to rectify (Bohari, 2015).

The rapid increase in growth of the industrial and the building sector in Malaysia has put a great deal of strain on the environment, as pollution rates constantly rise with an obvious example in the haze that happens on annual bases, which puts more pressure on the government to adopt or enforce more green options of procurement, especially in the construction and building sector (Buniamin & Ahmad, 2016).

Green procurement has been regarded as an effective way to lower environmental burdens in product production and consumption (Green Council, 2010).

The process integrates environmental preferences into the purchase of products, work, and services (Günther and Scheibe,2006), and is necessary for an organization to assess the full costs and environmental effects of a product at its lifecycle stages, which include the purchase of raw materials and the manufacture, transport, storage, handling, consumption, and disposal of the products (Salam, 2008).

However, Malaysia has recently begun adopting these methods which urges more research to analyze the issues facing this adoption. In a sense this research will try to tackle the issue of adopting green procurement in the construction sector in Malaysia, such as the relative infancy as the first legislation dealing directly with this topic was issued in the year 1996.

Furthermore, it has become imminent that fossil-fuel based energy will eventually be depleted, leaving the world with no other options than to go green and enhance on the already existing protocols and regulations, such as the LEED and GBI, which both aim at enable more sustainable and green practices for the building and construction sector, especially in homes and neighborhoods, ensuring they are compliant with such protocol (Ismail & Abdul Rashid, 2014).

1.3 Research objectives:

The objectives of this paper are summarized below:

1- To study the general problems from literature related to green procurement practices.

2- To analyze the factors that affect the building and construction sector in Malaysia related to green procurement practices.

3- To study the factor that will contribute to enhance green procurement practices in the Malaysia construction sector.

1.4 Research Questions:

The research objectives are directly related to the questions asked, as this paper will attempt to answer the following questions in relevance to the building and construction sector in Malaysia. The research constructs and questions were extracted from research on the topic from previous literature, where very little evidence of research analyzing this topic exists, thus the research questions are as follows:

RQ1:

What are the factors that affect green procurement practices for the building and construction sector in Malaysia?

This question entails more sub-questions, such as: the role of LEED compliance homes in boosting green procurement efforts, the role of the government to encourage green procurement efforts, and how does GBI relate to this issue, this question will contribute to the existing knowledge by allowing more factors to be studied which affect Green procurement practices, which would help in bridging some of the gap in this field.

RQ2:

What are the steps that should be taken to encourage and increase Green Procurement Practices in the construction sector in Malaysia?

This question has a lot of details within, such as the existing protocols and regulations pertaining to green procurement practices in Malaysia, the extent of enable the law to take action against firms that do not comply with such codes, and the incentives taken by the government to encourage such practices. This question will help us understand how to develop and take green practices to the next step, as government support is essential to effectively implement such practices.

RQ3:

How does Green procurement affect the performance of companies in the construction and building sector in Malaysia?

This question is vital for the research in order to understand the seemingly positive effects of Green Procurement practices on the construction and building sector, as it was reported in several other developed and developing nations that it greatly enhanced performance and reduced cost at the same time (Wong, 2016).

This research will contribute greatly to the body of literature by analyzing the causes and factors of issues in the green procurement in the construction industry, a vital sector in the development of Malaysia towards achieving its aspiration, where few researches focused on studying

procurement alone as a factor contributing the pollution of the environment, where in Malaysia there is already a tremendous stress on it, therefore, this research will bridge the gap in the body of literature in the green procurement and how it influences the construction industry in Malaysia, where few researches focused on Malaysia solely.

1.5 Scope of the study

The scope of this study will cover construction and building companies in the Kuala Lumpur& Putrajaya area in Malaysia, the chosen sample will consist of 1500 companies located within the Kuala Lumpur& Putrajayaarea , as to collect the data required for completing this paper, as within these companies the questionnaires will be distributed and answered by people in the top and middle management, into addition to interviews to explain more about the questionnaire and how to answer it.

1.6 Limitations of the study:

The limitations of this study include cost and budget limitations which is due to the limited budget assigned for this research. It would be difficult to cover a wider scope to include the entirety of Malaysia to get more accurate data in order to generalize the results. Another limitation of this study was time limitation, due to the tight schedule and time frame given for the completion of this research, it was difficult to cover more companies as to get more accurate results and generalize them.

1.7 Expected findings and contribution

By the end of this study it is expected to have a good idea on how to attain sustainability in the building and construction sector in Malaysia, even if just partially, through an in-depth

knowledge of factors affecting green procurement and the green movement overall. Generally, there is always a room for enhancement in the construction sector, it is also expected form this research to set recommendations onto how to move towards green procurement in the construction sector in Malaysia to enhance performance and productivity with minimum damage on the environment, thus extending the already finite life span of natural resources. At last, this study is expected to contribute to the existing body of literature and knowledge on this topic, as very few studies discussed green procurement in the construction sector, especially in Malaysia, therefore, it is expected to find out more details and results on this topic paving the way towards more research and model construction that takes into consideration all the factors relating to green procurement and how can they enhance performance of construction companies in Malaysia.

CHAPTER TWO

LITERATURE REVIEW

2.1Introduction

The level of stress put on the environment due to pollution caused by the construction industry has been tremendous, however, it was estimated that this industry contributed by almost 3% to Malaysia's GDP in the year 2015, and this is expected to increase by 4.4% on annual basis, with an estimation of the need of a total of RM 230 billion in the development plan set by the government, out of which RM 138 billion will go towards physical construction and commitment from the government towards reducing the carbon fingerprint, the need for green procurement has become a necessity to minimize the impact on the environment (Xia, 2015).

The importance of procurement to developing countries such as Malaysia that aspires to achieve its vision 2020 of becoming an industrialized nation cannot be over emphasized (The international Institute of Sustainable Development, 2012).The government expenditures on procurement varies from as ordinary as buying office supplies, to complex projects such as utilities and infrastructure related construction operations. In industrialized nations, this amounts to between 12 to 20 % of the entire GDP, where in developing nations this can rise to range between 35 and 55 % of the entire GDP (The international Institute of Sustainable Development, 2012).

The same report shows that the shear amount the government is able to spend more than often can become a driving force towards implementing sustainable and green growth, including green procurement practices where the purchasing power of the public-sector expenditures was shown

to have helped European countries in the early 90's to achieve sustainable development through green procurement (The international Institute of Sustainable Development, 2012).

The Malaysian government procedures to protect the environment are considered substantial and great, however this effort can be undermined by the rapid increase in the construction sector, the major contributor to pollution and green gas emissions (Sharifah, 2016) thus this research will have objectives that deals with examining the status of Green procurement practices by the construction sector and Malaysia and how the government supports it as well as the factors that may hinder such progress and support.

The Leadership in Energy and Environmental Designs (LEED) sets the standard certification for ecology focused building and green practices for construction, it is one of the most popular green buildings certification worldwide and was developed by the U.S green building council to contains a rating system, under which the construction, design, maintenance, and operation of buildings to make them as green and environment-friendly as possible with the main goal of helping to implement environmentally responsible practices and use resources efficiently(Muhammad,2014).

A huge step towards achieving sustainability is the Green Building Index (GBI) set by Malaysia, which is according to their website it is: "The Green Building Index (GBI) is Malaysia's industry recognized green rating tool for buildings to promote sustainability in the built environment and raise awareness among Developers, Architects, Engineers, Planners, Designers, Contractors and the Public about environmental issues and our responsibility to the future generations. The GBI

rating tool provides an opportunity for developers and building owners to design and construct green, sustainable buildings that can provide energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery for their projects and reduce our impact on the environment." (Malaysia;s International Green Benchmark, 2015).

The real start of Green Procurement practices in the government sector in Malaysia started in 2014, where a report published by the World Bank defined the Natural Resource Depletion Index as: "the sum of net forest depletion; energy depletion; and mineral depletion. Net forest depletion is unit resource rents times the excess of round wood harvest over natural growth. Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime 25 years. It covers coal; crude oil; and natural gas. Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin; gold; lead; zinc; iron; copper; nickel; silver; bauxite; and phosphate") (Bank, 2014). The same report showed that the GNI % decreased from 13% in 2008, to 8% in the year 2014 that coincided with the start of implementing Green Procurement practices in the public sector.

2.1 Construction and the environment:

Construction exercises, which incorporate the acquiring and transport of building materials, expend endless amounts of harmful gases, which make emanations of a lot of greenhouse gasses, it is consequently nothing unexpected that the construction industry assumes a key part in the acknowledgment of a low-carbon society. In the course of recent years, the legislature has presented different strategy measures to accomplish supportable improvement and low-carbon

levels. One such imperative measure that is significant to the construction industry is a green procurement strategy, which requires different official divisions to consider ecological considerations during procurement (Wong, 2016).The below figure shows the extent of CO2 emissions caused by different industries in Malaysia to give an idea of the importance of saving the pollution caused by them.

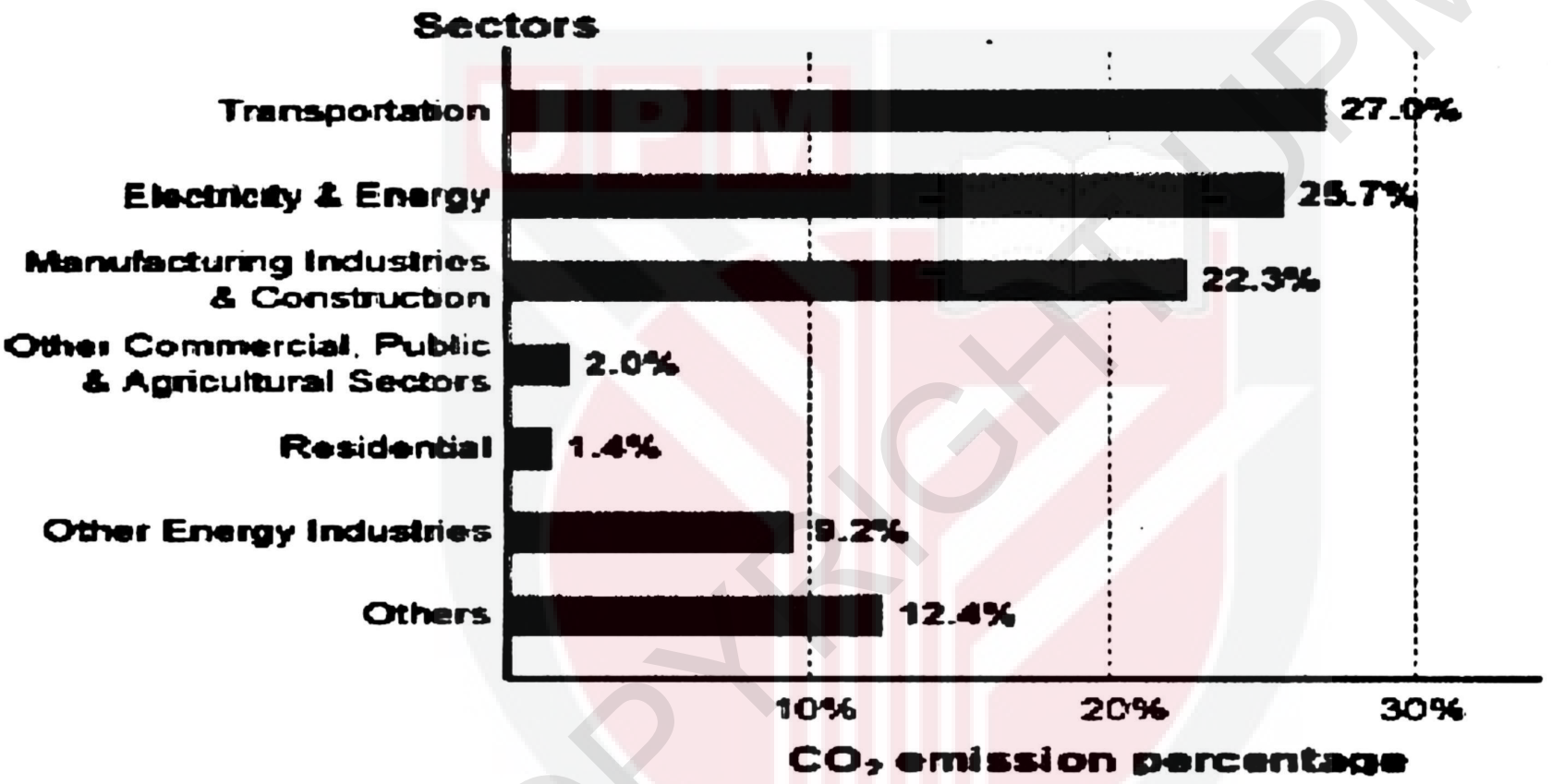

Figure 2.1: The extent of CO2 emissions

Source: http://www.ukm.my/lestari/wp-content/uploads/2013/04/Policy-Framework-for-Green-Econ_Hezri_Apr2013.pdf

The construction industry in Malaysia provides jobs to 800,000 people (Hamid, 2009), According to (Hamid, 2009) there is a huge need for Malaysia to shift towards renewable resources of energy which the construction industry depends on from oil and gas, not only do gas and oil run out, and they will, but they also cause pollution at tremendous rates, given the

exponential development rate, he suggests adopting the 3 R's methodology in the construction industry to minimize the impact on the environment; which are "Reduce", "Reuse", and "Recycle".The researcher described the construction industry waste as a plague to the environment (Hamid, 2009).

2.2- Procurement and the environment:

2.2.1- Sustainable development:

Sustainable development has recently gained a lot of attention due to the amount of pollution in the environment, it was defined according to (Daley, 1990) as the processes of attaining growth and development without compromising the environment or depleting the finite resources, while looking for new renewable and clean sources of energy.

The term Sustainable development when applied to construction projects would apply to all phases of the project's completion, or what we can refer to as the Project's Life cycle, this starts with the procurement processes, and ends with the final built project that use sustainable methods and means, such as the use of alternative clean energy sources such as solar panels, or green design concepts that take into consideration all aspects of the final project (Sterner, 2012).

The below figure shows how Green Procurement in a construction project can interact with several factors towards achieving sustainable development:

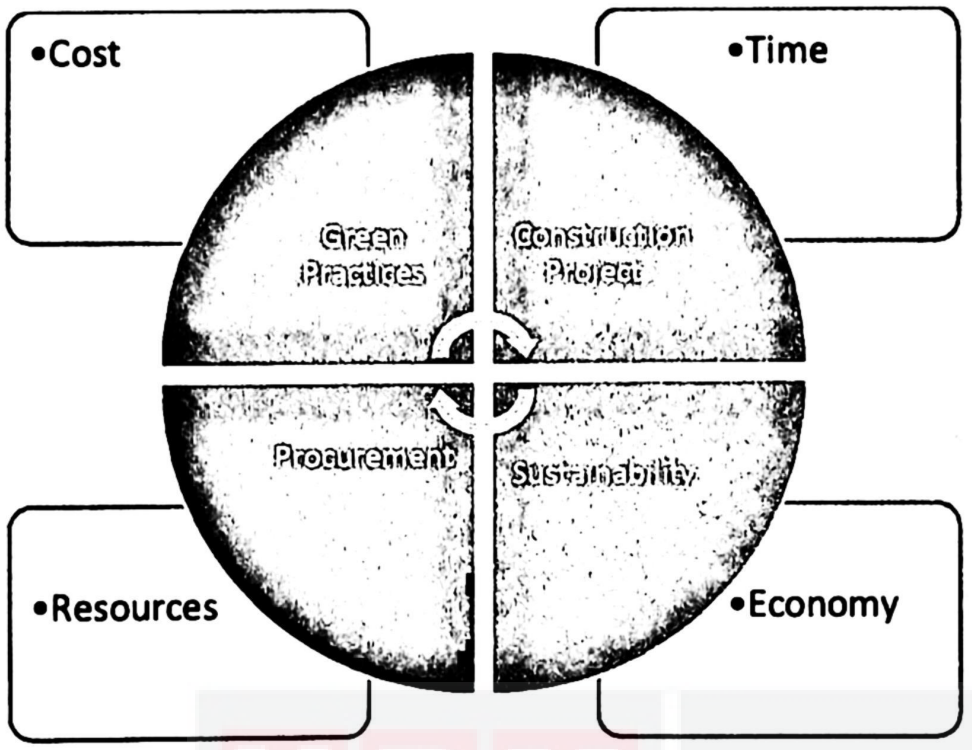

Figure2.2: Sustainable Development (Deng et al, 2011)

2.2.2- Definition of procurement:

Procurement is defined according to (Kidd, 2005) as: "Procurement is the business management function that ensures identification, sourcing, access and management of the external resources that an organization needs or may need to fulfill its strategic objectives". This definition may be expanded to cover all the aspects of the process such as planning, setting specifications, testing suitability, and the actual acquisition of resources and materials needed after conducting a supplier comparison. However, such definition is underestimating, or at least has not considered, environment.

Procurement can also refer to the management of different products and services during their lifecycle, this extended definition was adapted by many researches, especially those that apply the term in reference to Green development and practices, such as (Adnan, 2015) (Abu, 2013) (Bohari, 2015), where those researches support other findings that concluded that the first and

most important steps for applying Green Procurement practices should start with properly defining procurement as a process, where extending this definition to include public sector that deals with large construction projects can be key towards enhanced growth and development to accelerate the growth index of developing nations (Albine, 2009).

The Government being the largest purchaser in the economy, its large construction and building projects have an influential role in supporting green procurement practices, where the start of these practices taken effect on the governmental level started in Malaysia towards achieving the vision of 2020 of becoming one of the most developed nations in the world, where these efforts will be furthered explained in the next section.

2.3 The Green movement in Malaysia

At around 12-15 percent of the Malaysian government's open spending speaks to the greatest single patron to the country's Gross Domestic Product (GDP). This high acquiring force of the general population area denote a capable instrument for affecting the local market. GGP will permit the general population segment to show others how it's done and satisfy fundamental strategy destinations or vows like the 40 for each penny diminishment in per capita nursery gas (GHG) outflows by 2020, in light of 2005 levels (Adnan, 2015).

The green movement in Malaysia started to really manifest in the 1960's, where the government first publicly addressed the issues of development that relate to environment, however, it took almost a decade for the green movement to take the first step, manifesting in 1974 when the EQA act that deals with environmental issues, especially in the industry sector was federalized to

cover all states, as it was estimated according to the same source that the GDP income from green technology increased from 2% in the year 2009, to 8% in the year 2015 via the emphasis of the government on legislations that protect the environment, obviously seen in the establishment or rather, reconstruction of the Malaysian energy center to become the Malaysian Green Technology Center (Adnan, 2015).

The green movement in Malaysia has developed significantly over the past years, where the government in 2007 enabled the Waste Management and Renewable energy Act (Act 725,2011), followed by the registration of the Malaysian Green Building Confederation (MGBC) in the year 2009 , the initiation of an incentive program expressed in soft loans for businesses that innovate in the green technology, and finally the establishment of the GBI and compliance with LEED, where Green procurement practices in the public sector started to really prevail in the year 2014. Following the advice of the United Nations, the Malaysian government intends to develop a longterm GGP action plan. Beforehand, and in addition to already implemented programs like the MYHIJAU Procurement initiative, this short-term action plan will provide the basis for GGP implementation in Malaysia (Buniamin & Ahmad, 2016). The GBI and LEED are like international standard, so, this study limit itself to the green procurement practices of those standards. This may limit the result of this study as we could may found construction companies are familiar with other standards.

2.3.1 Green Building Index (GBI):

"The Green Building Index (GBI) is Malaysia's industry recognized green rating tool for buildings to promote sustainability in the built environment and raise awareness among Developers, Architects, Engineers, Planners, Designers, Contractors and the Public about environmental issues and our responsibility to the future generations.The GBI rating tool provides an opportunity for developers and building owners to design and construct green, sustainable buildings that can provide energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery for their projects and reduce our impact on the environment." (Malaysia;s International Green Benchmark, 2015).

2.3.2 The Leadership in Energy and Environmental Designs (LEED)

The Leadership in Energy and Environmental Designs (LEED) sets the standard certification for ecology focused building and green practices for construction, it is one of the most popular green buildings certification worldwide and was developed by the U.S green building council to contains a rating system, under which the construction, design, maintenance, and operation of buildings to make them as green and environment-friendly as possible with the main goal of helping to implement environmentally responsible practices and use resources efficiently (Ismail & Abdul Rashid, 2014).

The GBI is directly inspired and related by the LEED, where the standards set forth by the LEED has to be strictly followed and monitored by relative authorities; however, there are relatively very few LEED certificates given in Malaysia, as it was estimated according to GBIG (Green

Buildings Index Global) that there are only 63 LEED certificates given in Malaysia, and approximately 9,500 square meters of LEED certified properties and land (Cesare, 2016).

2.4Green Procurement:

Green procurement is a term that refers to acquiring of material and services that cause negligible negative effects on the environment, and little to no pollution. It consolidates human wellbeing and ecological concerns into the quest towards achieving sustainability at minimum cost and superior quality (Buniamin & Ahmad, 2016). Green procurement was also defined according to (UNDP, 2008) as "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

It is widely agreed that procurement in construction projects is very important to manage the environmental impact of the entire project, this management that pays attention to all aspects that may negatively affect the environment during the acquisition of necessarily raw materials and or special design that endorse sustainability during their lifecycle can be referred to as Green Procurement (WCED , 2014).

Furthermore, the policies the Malaysian government have taken are the perfect opportunity to pro-actively mainstream policies which will bring about a "switch" to Sustainable Consumption and Production (SCP) patterns. In this context the Malaysia Government is conducting in the framework of the project "Sustainable Consumption and Production – Policy Support, Malaysia" consultations over a period of four years (2012 – 2016) which shall materialize in a comprehensive National SCP Policy Framework in form of a SCP Blueprint and input to the

11th Malaysia Plan (11MP; 2016-2020), which both shall guide the country over a longer period to achieve sustainability of industry and consumer patterns and behavior, i.e. SCP. Government Green Procurement (GGP) is considered a milestone on this way forward to sustainability (Adham, 2014).

2.4.1 Issues that face green procurement in Malaysia

The issues that face the public sector in the procurement processes have been mentioned by (Albine, 2009), where the cost associated with the transformation could be quite high, especially when integrating more management tools in the procurement processes to ensure compliance with green standards, where it is estimated that at first stages of the switch procurement cost could increase as much as 20%, especially when the need arises to adopt new technology or even develop them to accommodate the transformation, furthermore he pointed out that resist to change is a natural human trait that needs behavioral alteration, such as increasing awareness of the importance of these changes in order to achieve more benefits.

Although the Malaysian government has already taken steps towards achieving sustainable development, it is believed that these steps at the moment could not be satisfactory to shift from fossil fuel based economy into green economy; the steps taken especially in the construction sector are a good sign of the seriousness of these efforts, as in the construction industry which is considered vital for a nation like Malaysia that aspires to become a developed nation that has high income in the year 2020, the effective use of resources and alternating between fossil based construction and green clean construction is more important than ever (Ismail & Abdul Rashid, 2014).

The issues and challenges that face green procurement in the construction sector in Malaysia according to (Adnan, 2015) are numerous; they include the overdependence on fossil fuel, where it was estimated that there will be a 90% increase in fossil fuel energy consumption from 63 million TOE (TOE is the amount of energy gained from burning one ton of crude oil) in the year 2005 to 123 million TOE in the year 2020, where Malaysia imported 22 million TOE in the year 2015 out of which more than 30% was allocated to the procurement in the construction sector, majorly in transportation and extraction of raw materials needed. The same source was cited to mention that the energy consumption per capita in Malaysia is around 1535 million TOE, a number that looks scary as it is expected to become 2654 million TOE in the year 2020.

Green procurement in Malaysia faces some challenges, according to (Ali, 2016), the biggest issue the sole dependence on fossil fuels, an issue that can be solved by diversifying energy sources that drives the construction industry in general, and the procurement in particular, the second issue is the imbalance in the supply-demand energy efficiency, where a lot of energy is wasted during the procurement processes that not only increase cost, but increase the rates of pollution.

It was stated by (Hamid, 2009) that although there are incentives and initiatives supported by the government, implementation hasn't been widely applied, this was attributed to the lack of awareness by the society at large, and people in charge of the construction industry and other vital sectors, as well as the relatively high cost of applying green procurement due to the technology barrier as it is relatively new.

These issues facing green procurement in the construction sector can be resolved according to (Bohari, 2015) via a series of systematic steps taken by the government, which the economy is already witnessing signs of, such as the statement in the Tenth Malaysian plan pertaining to decoupling; as it was quoted from the plan: "the Government will be guided by sustainable production practices to decouple economic growth from environmental degradation". This decoupling along with initiation of the National Energy Efficiency Master plan; which is still in progress will aid into implementing green procurement in the construction industry, as incentives already exist for companies that build LEED compliant houses manifesting in tax exemptions to some extent, soft-interest-free loans and support from the government (Xia, 2015).

Further solutions to the issues facing green procurement in the construction sector were stated by (Buniamin & Ahmad, 2016), as it was stated in her research that a deeper policy intervention is needed, which can be undertaken by restricting the construction industry, and by default the procurement processes associated with it, as well as integrating policies towards more sustainable development in the public sector, which can become contagious to include the entire economy only if the government further promotes the importance of green development and sustainability to drive growth without compromising the environment, as well as the efficient use of energy which in term saves money and time, thus indirectly increase the GDP and profitability of the construction sector (Adnan, 2015).

2.5 Summary

From the literature review, it is obvious how important the construction industry for Malaysia's development, the fact that the government has already taken steps into implementing sustainable development is a positive sign that Malaysia is on the right path towards achieving that, however, there are several issues that face green procurement implementation in the construction industry, as the lack of awareness and research on this topic makes it more difficult for companies to implement, as well as the relative high cost of shifting towards green procurement, in summary the literature review showed the status of the sustainable economy in Malaysia, especially in the construction sector, as well as the issues and factors that affect it which will be discussed in details in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter is comprised of five sections; the first section describes the sampling techniques used in the implementation of the research paper along with the justification of using the specific technique. The second part contains the data collection means that will be used in collecting relevant data to the topic of the research with a description and justification of the method used, followed by a preliminary basis for the data analysis techniques to be used to extract empirical results after collecting the data. The fourth section will contain the Gantt chart for planning the research timeline and activities to be carried out until the completion of the research. Finally, a summary of the chapter is presented with a brief on the contents of the chapter.

This paper will take a holistic approach that includes a questionnaire and a survey distributed to a sample of building and construction companies in Malaysia, most probably in the Kuala Lumpur & Putrajayaarea. The questionnaire will be superseded by a pilot study and survey constituting of a simple questionnaire with basic questions distributed to professors and people of vast experience in the filed in order to determine the validity of the questions, as the questions will be based on previous literature and empirical data collected via research, and then afterwards the questionnaire will be constructed with the aid of the literature survey and feedback from the pilot study, then data collected will be put under reliability and validity tests, to make sure the results will give accurate enough results to base the conclusion on. The below figure shows the methodological steps to be taken into conduction this study.

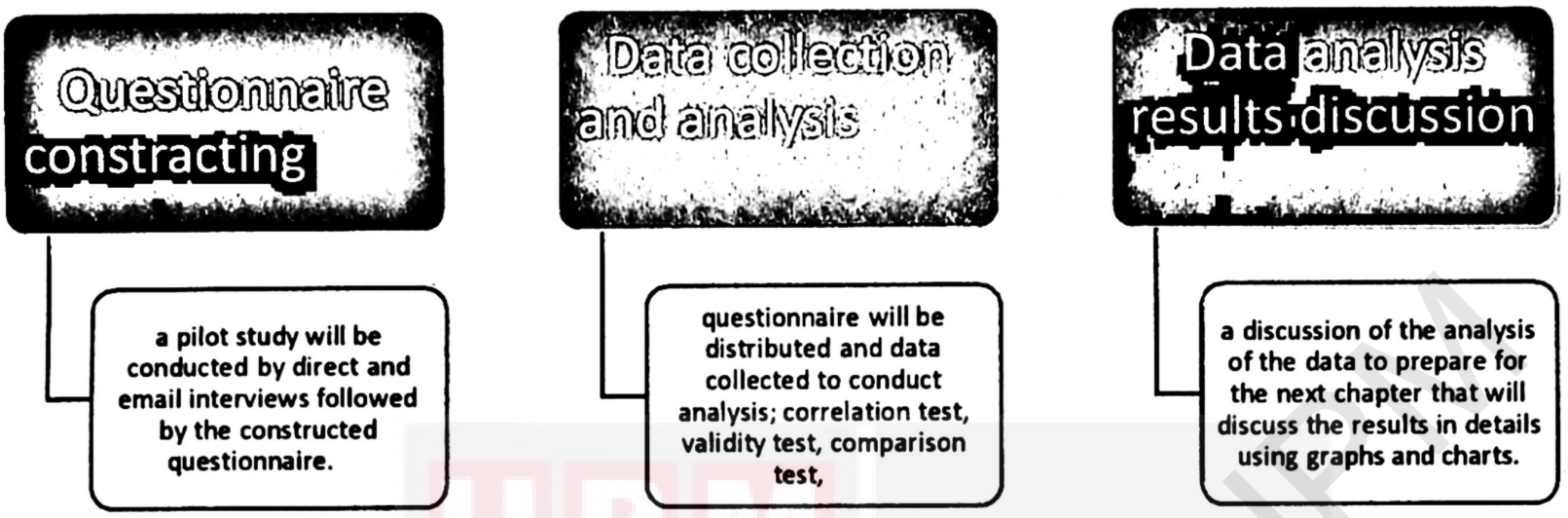

Figure 3.1: Methodological steps of the research

3.2- Sampling Techniques

3.2.1 Scope and population

The research paper will focus on construction and building companies in Kuala Lumpur & Putrajaya area. The population will include construction and building firms that have adopted or are in the process of adopting green procurement and building techniques. The reason of narrowing the scope is to simplify the data analysis to meet the purpose of this paper.

3.2.2 Sampling

The research will adopt the sampling technique by using the sample size formula to calculate how many questionnaires that need to get back, then a survey will be distributed amongst them in order to collect to data related to the extent of the effects of green procurement on their operations and how to enhance the status of it in Malaysia in general.

The steps for the sampling technique are as follows:

1- Defining the population (building and construction firms in Kuala Lumpur & Putrajaya.

2- Choosing simple size (41respondents).

3- Listing of the population.

4- Assigning numbers to each company.

5- Finding random numbers.

6- Selecting the sample.

Based on the total number of contractor in Kuala Lumpur & Putrajaya area, sample size was calculated in order to know how much questionnaire to be distributed and how much expected the questionnaire will get in return. The calculation process was based on (Kadam & Bhalerao, 2010) using the following formula:

$$\text{Sample size} = = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1+\left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

Where: *Population Size = N , margin of error = e, z-score = z, p= 0.46*

The z-score is the number of standard deviations a given proportion is away from the mean. To find the right z-score to use, refer to the table below:

Table 3.1: To find the right z-table

Desired Confidence Level	Z-score
80%	1.28
85%	1.44
90%	1.65
95%	1.96
99%	2.58

- Confidence level : 90%
- Margin of error : 13%
- Population size : 1499
- Sample size : 39

From the formula above, with the confidence level of 90%, the margin of error of 13% and the population size of 1499 companies that were distributed by emails and handing the questionnaires face to face meeting, the sample size that need to get back is 39 respondents from each company.

3.3Data Analysis

The research will adopt a quantitative survey-based data analysis method because surveys as a research instrument have the benefits of being inexpensive to carry out, a quick data acquisition method, and they are able to provide accurate data that represents the population being sampled (Panacek, 2008).

The survey design will follow general rules where the focus of the questions will be on the research questions, and will all relate on green procurement and building and factors affecting it. Secondly, the purpose of the survey and the research will be clear in order to get transparent data from participating companies and to showcase the importance of this research to them. Furthermore, the design of the survey will be based on previous techniques used, into addition to auxiliary supporting methods such as interviews as supportive tools, as survey-based research is considered the method of choice for novice researchers and university students alike (Panacek, 2008).

3.3.1 Variables identification

In order to carry out the data analysis, the variables of the research must be identified first. There are two types of variables hypothesized in this research paper; Independent Variables and Dependent Variables. Starting with the independent variables, this research defines the following:

1- GBI and LEED compliance

2- Extent of green procurement application.

3- Government Policies

The three independent variables defined contribute to the dependent variable of this research; which is the performance of building and construction companies in Kuala Lumpur & Putrajaya.

These variables were chosen based on previous literature and research, where the majority of them defining those factors as the most influential on performance.

3.3.2 Data analysis technique

The research will adopt correlation analysis to analyze data after it has been collected in order to extrapolate the relationship between the independent and dependent variables using SPSS software. This analysis technique is the most suitable for the research question as correlation analysis is able to show how strongly are the variables being studied are related to each other.

Furthermore, the correlation analysis will be the basis on which a model can be built in order to generalize the results amongst building and construction companies in Kuala Lumpur & Putrajaya, and after the model have been developed it will be tested for validity and reliability using appropriate tests in order to verify the results obtained.

3.4 Research planning and time line

This research paper will be carried out on the span of two academic semester, in the first semester the theoretical basis and the first part of the graduation project will be carried out, and in the second semester the survey and questionnaire will be designed and distributed, and the actual data analysis will be carried out.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis techniques adopted for the purpose of this research, where the variables identified in the research are three IV's and one DV; the three IV's are government policies and regulations, Green procurement application and awareness, and LEED and GBI cost and compliance, consequentially the DV is Green Procurement application and its benefits.

Statistical methods will be used to interpolate results from answers acquired, as the data collection instrument used in the research is Questionnaire, where the results will be entered into IBM's SPSS statistics version 23, and several statistical measures will be applied on data to extract meaningful results; these are:

1- Mean, Frequency, Standard Deviation: To give indications of participant's demographics and general information.
2- Pearson's Coefficient: to measure the type and strength of relationship between different variables.
3- Cronbach's alpha factor: to measure the internal consistency of variables used.
4- Normality test: to determine whether the sample is normally distributed or otherwise.
5- Correlation and regression analysis: to measure strength and type of relationship and predict the value of DV when changing the IV

4.2 Reliability test

The reliability test is important for the research as it gives a measure of the internal consistency of the variables and items used in the questionnaire, where it indicates the level of ability of the items selected for asking questions to answer to the objectives of the research, for the purpose of this research the Cronbach's alpha factor (Laerd) will be calculated using SPSS then discussion will follow through; below are the results as per SPSS for the questionnaire items, including IV's and DV's.

The Cronbach Alpha Factor calculated for the questionnaire showed that it is 0.677 which means that the consistency and reliability of items used are high, however, it's not very high as it's not very close to 1, which means the items used could stand more refining in order to increase the factor and give more relevant results.

Table 4.1: Summary of Cronbach's Alpha factor

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.677	.667	21

4.3 Normality Test

This test is carried out to examine the distribution of data and whether it fits the normal (bell) distribution or not; this would help in predicting the values of correspondent variables, and the degree of change in one variable compared to another by using the distribution tables; the results from SPSS are shown below followed by a discussion:

Applying the test for the DV's in relation to the IV's showed the following:

Table 4.2: Normality test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Levelofgreenandsustainable	.253	41	.000	.894	41	.001

a. Lilliefors Significance Correction

From the above tables the statistical significance from Zero according to both normality tests done by SPSS is more than 0.5, which indicates that the data distribution in our research almost conforms to the normal distribution as shown in the histogram below:

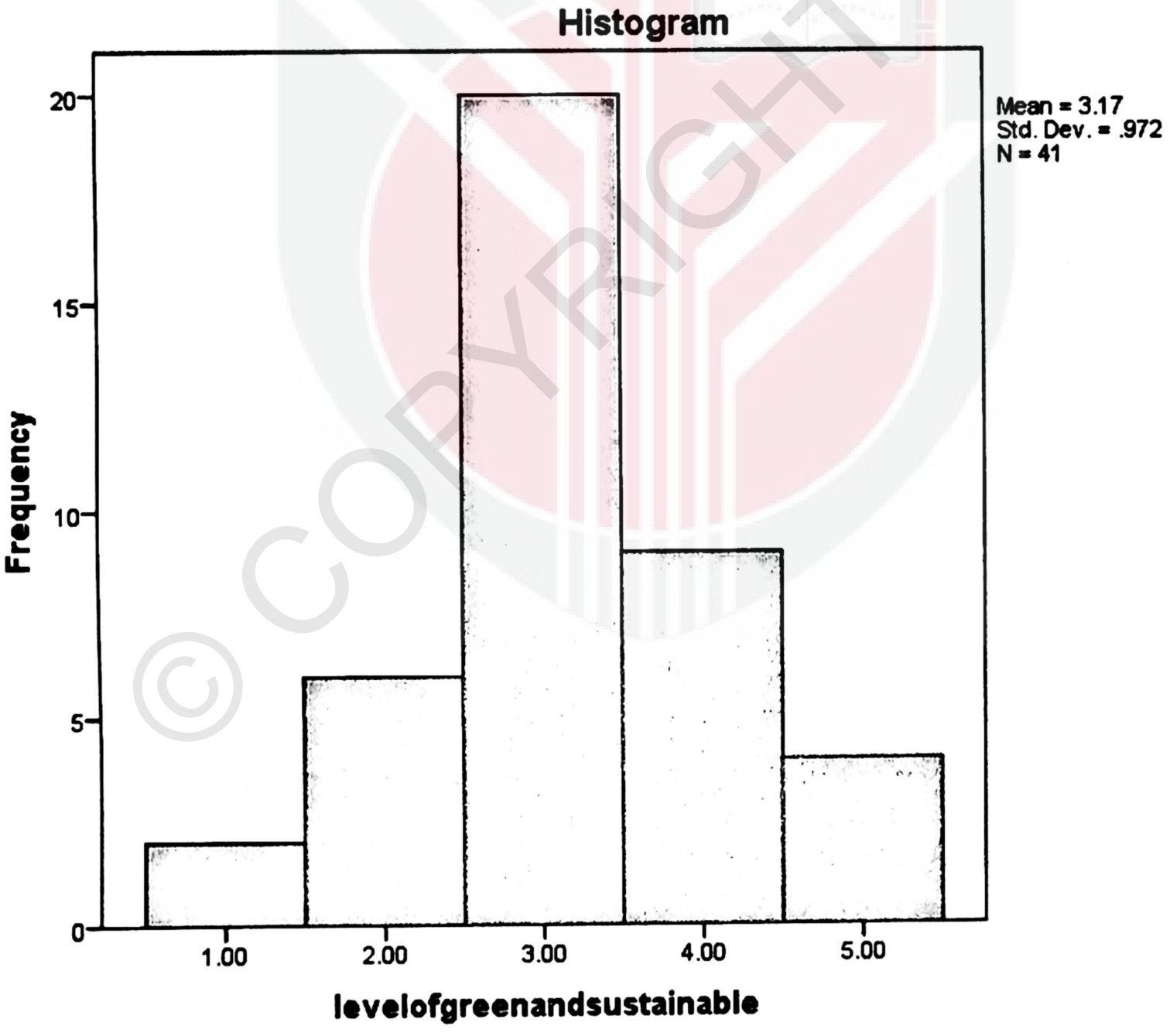

Figure 4.1:Histogram for Normality test

4.4- Descriptive Analysis:

In this section a description of the profile of participants including years of experience, education, job position, and company size are described and discussed.

The questionnaire was distributed to 40 companies in person, about 1499 people in charge in companies in Malaysia through online (google docs) means, social media, and in person, there are 41 respondents from the companies that were subject to the questionnaire all have a relation in one way or another to green procurement or traditional procurement and the selection criteria was previously explained in chapter 3, the answers acquired from the questionnaire and the results will be discussed in the following sections.

4.4.1- Years of Experience:

The first question asks the years of experience of the respondents, and it helps identify their market experience and the authenticity of their answers, the results show that 23 respondents amounting to 56.1% had between 0 to 5 years of experience, followed by 26.8% with 5 to 10 years' experience, and 12.2% have 10 to 20 years' experience , and finally only 2 respondents amounting to 4.9% had more than 20 years of experience; the table below is copied from SPSS and shows a summary of the results:

Table 4.3:Respondents according to Years of Experience

	Frequency	Percent
0 to 5 years	23	56.1
5 to 10 years	11	26.8
10 to 20 years	5	12.2
more than 20 years	2	4.9
Total	41	100.0

Below is the pie chart that shows the distribution of respondents based on years of experience:

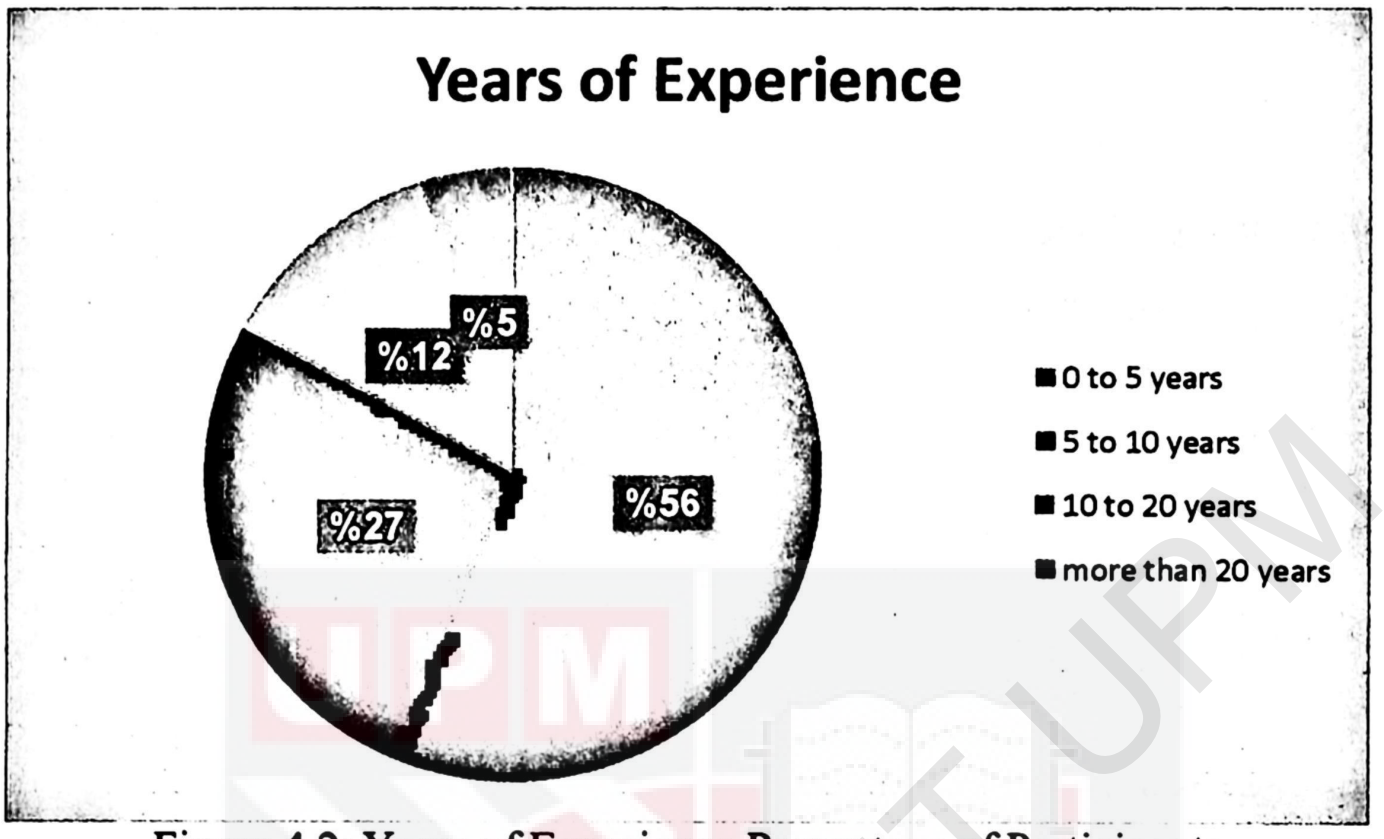

Figure 4.2: Years of Experience Percentage of Participants

4.4.2 Education

The second question deals with the level of education of participants, it shows that the majority of respondents have a bachelor's degree amounting to 61%, followed by 22% who hold a diploma, and 17.1% hold a master's degree, it is noteworthy that none of the participants hold a PhD degree, which indicates a lack of advanced knowledge in the topic being studied.

Table 4.4: Education Level distribution amongst respondents

	Frequency	Percent
Diploma	9	22.0
Bachelors	25	61.0
Masters	7	17.1
Total	41	100.0

The pie chart below shows a visualization of distribution of education among respondents

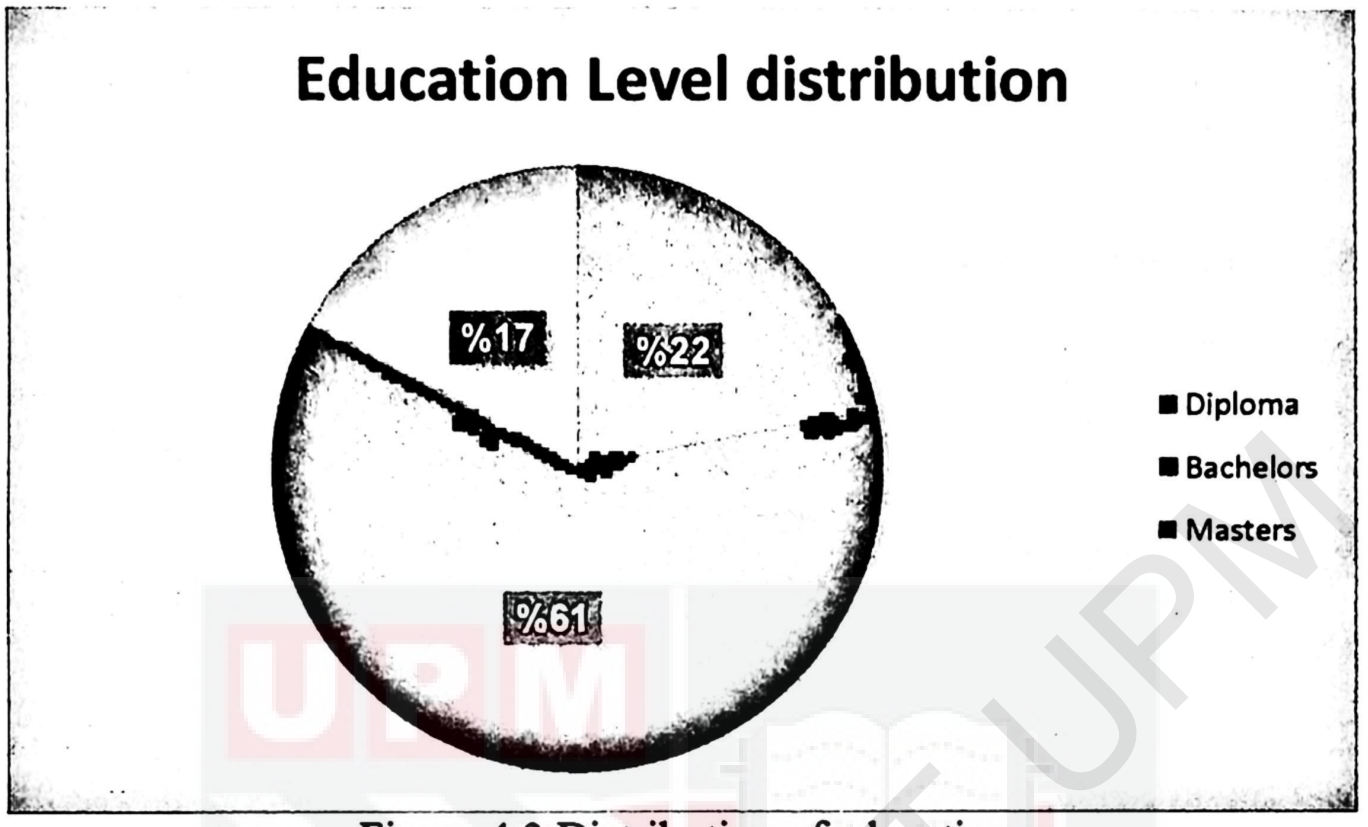

Figure 4.3:Distribution of education

4.4.3 Job Position

The third question asks the job position of the respondents, where the majority of respondents of were supervisors amounting to 51.2%, followed by Contractors amounting to 29.3%, and finally Managers who amounted to 19.5%, surprisingly there were zero suppliers amongst the respondents which indicates lack of integration between suppliers and companies in this field; the table shows the results as obtained from SPSS.

Table 4.5: distribution of job position

	Frequency	Percent
Manager	8	19.5
Supervisor	21	51.2
Contractor	12	29.3
Total	41	100.0

The pie chart below shows the visualization of the percentages according to job position amongst respondents:

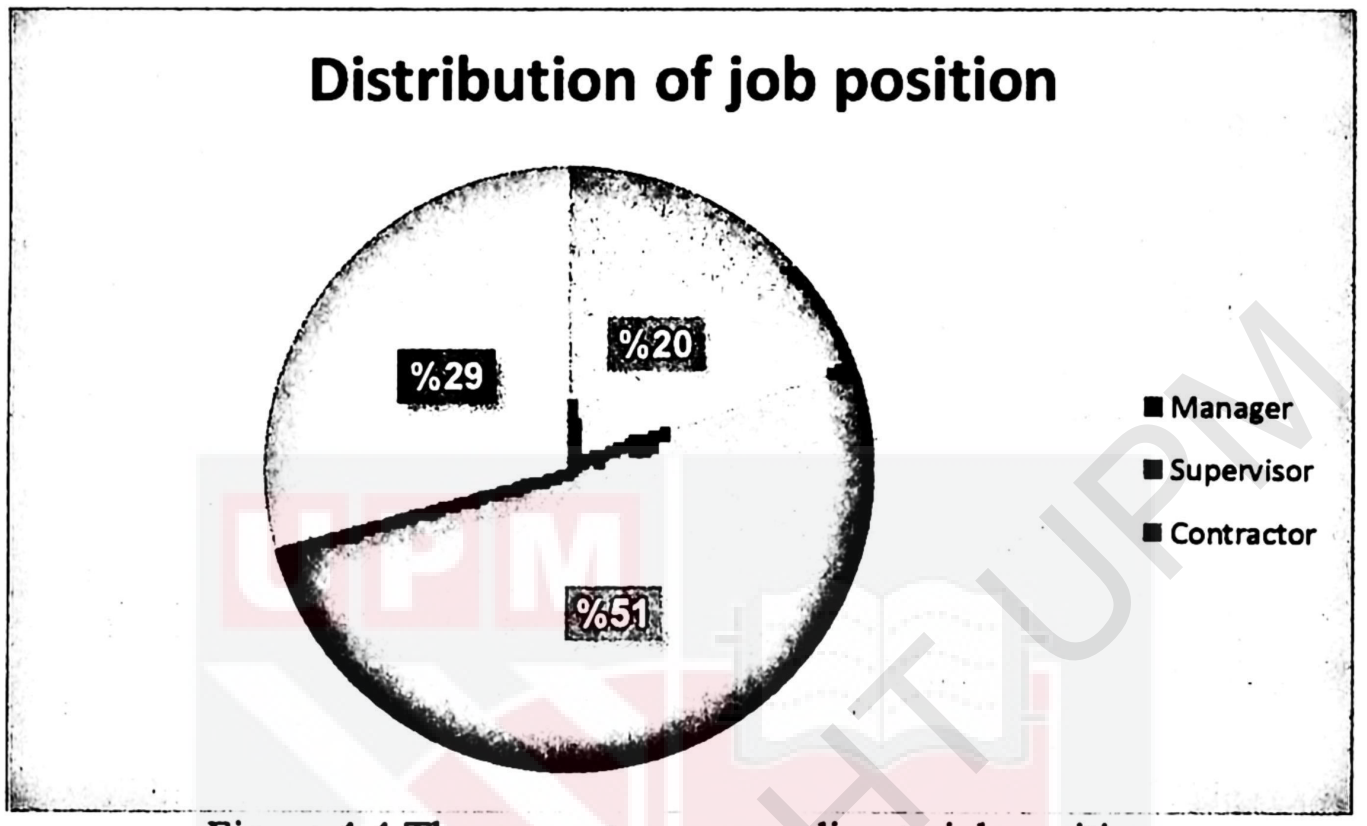

Figure 4.4:The percentages according to job position

4.4.4: Company Size:

The fourth Question deals with the company size, it is important as the number of employees largely control the availability of human resources and allocations; the results showed that about 50% of companies participating had more than 100 employees, followed by 24.4% who have 20 to 50 employees, 19.5% have below 20 employees, and 7.3% have 50 to 100 employees; the table below shows the results as per SPSS.

Table 4.6:Size of company

	Frequency	Percent
0 to 20	8	19.5
20 to 50	10	24.4
50 to 100	3	7.3
more than 100	20	48.8
Total	41	100.0

Below is the pie chart for the distribution of company size of respondents:

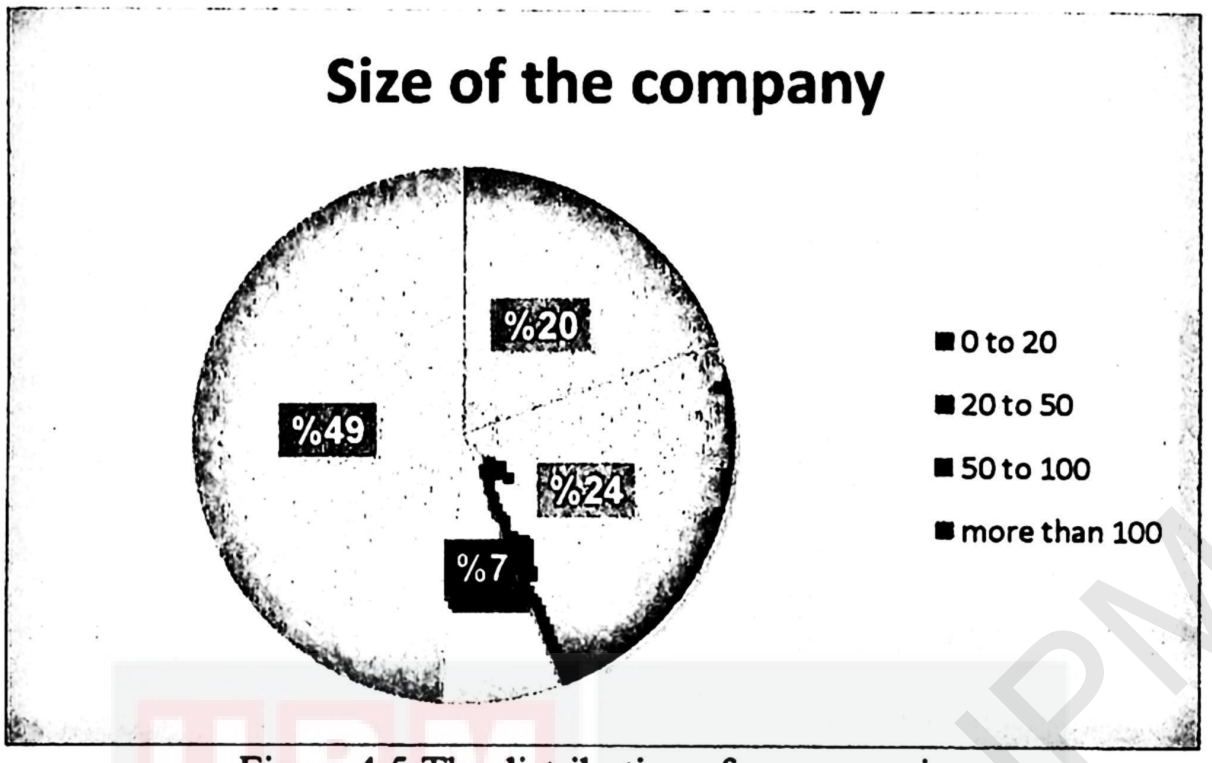

Figure 4.5:The distribution of company size

4.5 Variables computation

The research have 3 IV's and 1 DV, using SPSS and the results obtained from the questionnaire, the computations for each variable was conducted, and the results are shown and discussed below:

4.5.1General insight on the extent of Green Procurement implementation

The question is designed as to get a general insight on the level of Green Procurement implementation in the participating companies; where when asked the answers showed that 48.8% of participants were neutral, meaning that there is no specific answer or knowledge about the extent of implementation, followed by 22% who agree that there Green Procurements actually implemented and used by their companies, 14.6% disagree that their companies implement Green Procurement, and finally 4.9% disagree and seem to strongly object implementation of Green Procurement.

The table below obtained from SPSS shows the answers:

Table 4.7: Size of company

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	4.9	4.9	4.9
Disagree	6	14.6	14.6	19.5
Neutral	20	48.8	48.8	68.3
Agree	9	22.0	22.0	90.2
Strongly Agree	4	9.8	9.8	100.0
Total	41	100.0	100.0	

The Pareto Chart for the extent of GP implementation was done using SPSS

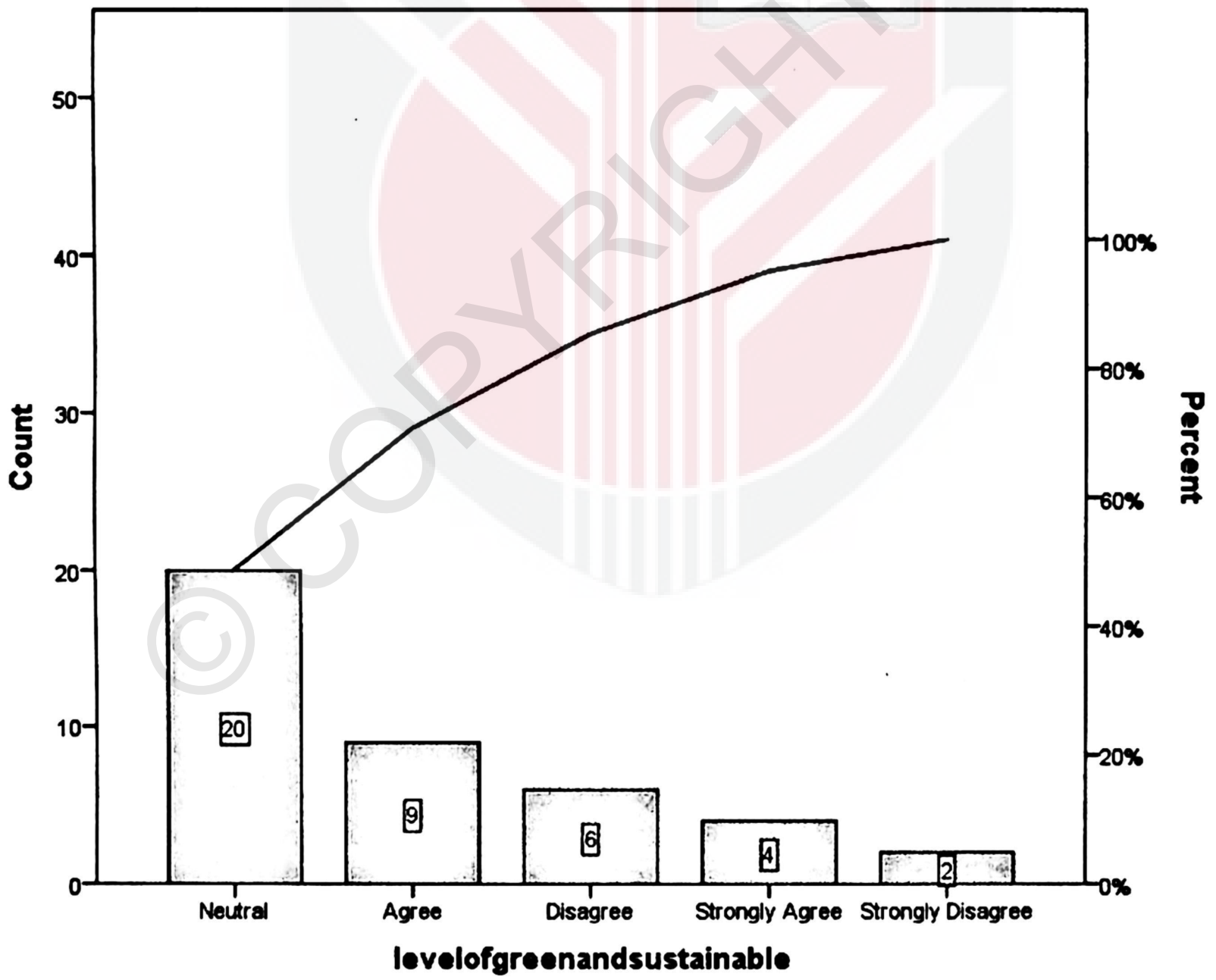

Figure 4.6:The Pareto Chart for the extent of GP implementation

4.6 Problem related to green procurement

Table 4.8: Different factors that related to green procurement.

Factors	References
Awareness of green procurement	Wong et al., 2016 Zhu et al., 2015
LEED and GBI cost	Blome et al., 2014 Bohari et al., 2017
Government policies and regulations	Simcoe and Toffel, 2014 Smith et al., 2016

Based on the previous literatures it was shown that most factors that discussed related the green procurement are Awareness of green procurement, LEED and GBI cost and Government policies and regulations. In this study, these factors were discussed in most of the Malaysian companies sector. The factors found from the previous paper were confirmed the significant results found in this paper. For example, the cost of LEED and GBI was found to be positive strong correlation with the green procurement application with R2 of 0.852. This finding was in agreement with the previous work (Simcoe and Toffel, 2014). The authors reported the strong relation between cost and the green procurement application.

4.7Regression Analysis and Correlation factors calculations

In this section, the regression analysis is conducted between the IV's and DV in the research, as well as the Pearson correlation factor is calculated to determine the nature and strength of the relationship between the different variables and the results are shown below:

4.7.1 Government Policies and Regulations & Green Procurement implementation

Calculating the Pearson Correlation factor for all the questions that deal with the first IV (Government policies) and the level of Green Procurement implementation showed that the pre-

existing rules with GP Pearson coefficient is 0.684, which means there is a direct and relatively strong relationship between

Table 4.9:Correlation of Government Rules and Green Procurement Implementation

		Extent of GP implement	Gov Rules and Reg
Extent of GP implement	Pearson Correlation	1	.684
	Sig. (2-tailed)		.057
	N	41	41
Gov Rules and Reg	Pearson Correlation	.684	1
	Sig. (2-tailed)	.057	
	N	41	41

4.7.2 Level of awareness of GP and Implementation

The results for testing the second hypothesis shows a correlation factor between GP awareness and implementation to be 0.747 which dictates a positive and strong relationship between GP awareness and GP implementation.

Table 4.10:Correlation of Level of awareness and Green Procurement Implementation

		Extent of GP implement	GP Awareness
Extent of GP implement	Pearson Correlation	1	.747
	Sig. (2-tailed)		.012
	N	41	41
GP Awareness	Pearson Correlation	.747	1
	Sig. (2-tailed)	.012	
	N	41	41

*. Correlation is significant at the 0.05 level (2-tailed).

4.7.3Cost (LEED & GPI implementation) and GP implementation

The results obtained show that correlation coefficient between cost of GP implementation in terms of LEED and GBI compliance & GP implementation is 0.852 which indicates a very strong and positive relationship between them, the results obtained from SPSS are shown in the below table:

Table 4.11: Correlation of Cost and Green Procurement Implementation

		GP Implement	Cost of GP
GP Implement	Pearson Correlation	1	.852
	Sig. (2-tailed)		.012
	N	41	41
Cost of GP	Pearson Correlation	.852	1
	Sig. (2-tailed)	.012	
	N	41	41

Flow Chart and Ishikawa Diagram of results:

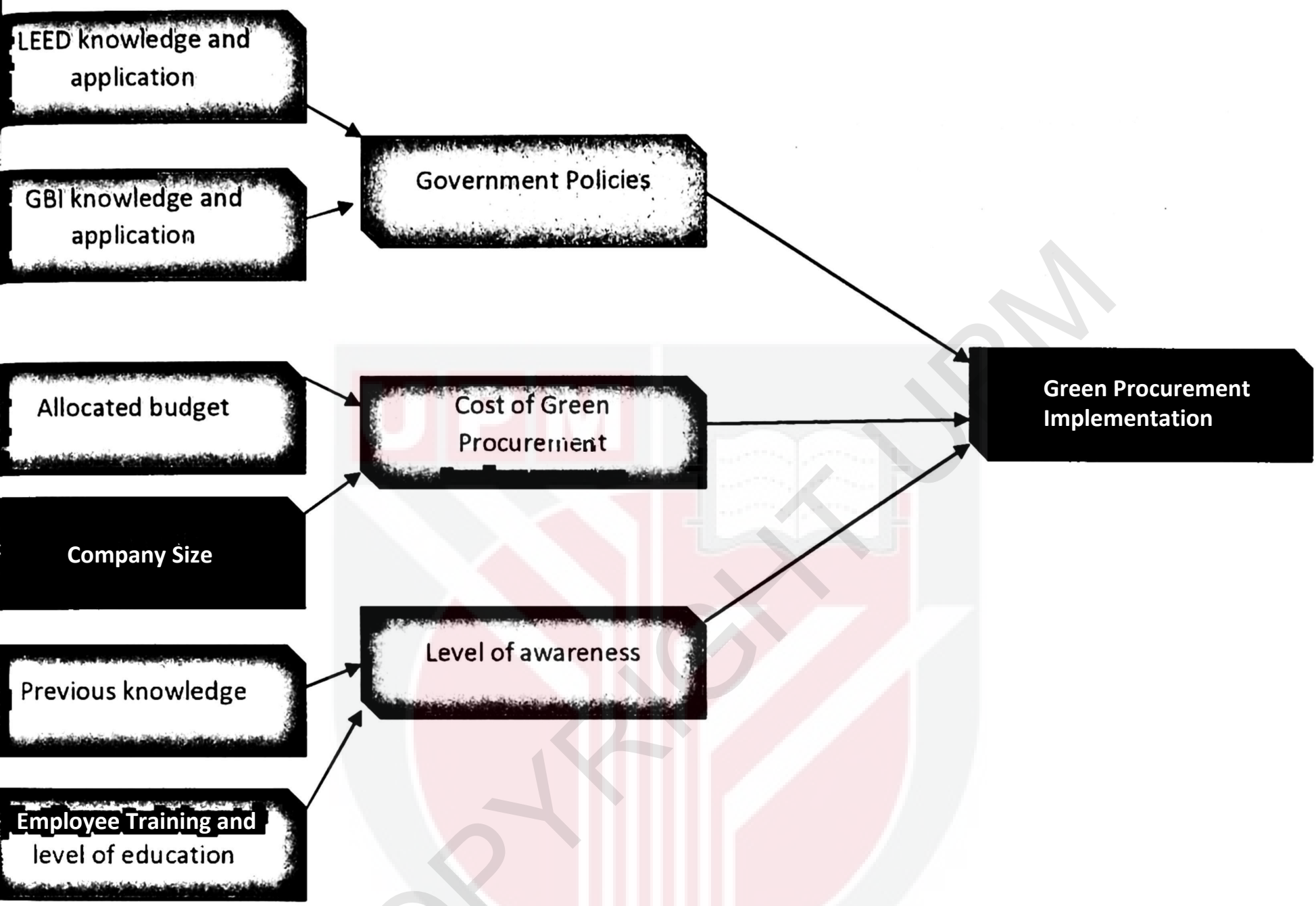

Figure 4.7: Shows the Flow Chart and Ishikawa Diagram of results

4.8Discussion on the ishikawa diagram

4.8.1 LEED and GBI knowledge and application

As the government policies is one of the most important independent variable to the green procurement implementation so there are factors in this IV which will help to increase the level of knowledge and enhance the application toward implementing the green procurement so by taking the mean of the research questions which are related to the knowledge and application, the

result showed that there is a lack of knowledge of the rules and regulations. On the other hand, government policy is quite necessary to motivate the companies to practice green procurement. Moreover, increasing awareness of Green Procurement importance and applications with relevant terms and codes, especially to companies and firms directly involved in procurement practices this would help to ease the government policies to implement the green procurement.

4.8.2 Allocated budget and company size

From the previous results on the company size it showed that about 50% of companies participating had more than 100 employees, it is important as the number of employees largely control the availability of human resources and allocations. On the other hand, the allocated budget associated with the cost of Green Procurements also detrimental for the existence of the company, as in the initial phases the cost could be high which may affect profitability of the company but by adopting the green procurement it can be improved and the allocated budget of the company will be high so this will be in the ease the cost of green procurement to the companies and will help to implement the green procurement.

4.8.3 Previous Knowledge and Level of Education

From the result obtained to know the level of education for the respondents, it shows that 32 of respondents have a bachelor's degree and master which shows that the level of education is high but still there is a lack of knowledge about green procurement. On the other hand, to practice green procurement, employees play critical role so, based on the result of this study, employee's awareness positively related to procurement practices. Employee's awareness increases the efficiency of practices.

4.8.4Cost and Green Procurement implementation

Cost associated with Green Procurement has been shown to be direct and strong, where most of the cost associated with implementing Green Procurement was revealed to be directly associated with LEED and GBI compliance codes, this indicates that the cost of implementation is a major drive factor for Green Procurement implementation, where in most cases change of systems and codes may be required, as well as acquiring new technology which would facilitate Green Procurement implementation.

The cost associated with Green Procurement implementation is also detrimental for the existence of the company, as in the initial phases the cost could be high which may affect profitability and operation, where some cut backs may be necessary in order to keep up the same level of operations.

4.8.5 Level of awareness and GP implementation

The second IV that was tested is how awareness of Green Procurement affects its implementation, and the results from the questionnaire showed a positive and direct relationship between both where the higher the awareness the most effective the implementation.

The research discussed this aspect of the issue from the perspective of employees, management, and the populous in general, where being aware of the importance of Green Procurements thought not to be enough to conform a sound judgment, rather having deep knowledge and proper training would aid in making such implementation successful, as respondents were asked if they allocate any time or budget to train and teach staff on Green Procurement and why is it

important (in companies that apply it) and it is thought that in general there is a lack of awareness of Green Procurement and its requirements, as well as funds allocated for training and education purposes.

4.8.6Government policies and Green Procurement implementation

This IV is thought to be one of the most important, where the relation with Green Procurement implementation was tested and shown to be positive and direct, as not only is this result logical, but it is also required, where admittedly there are already existing laws and regulations for Green Procurement implementation in Malaysia, and codes that deal directly with this matter entailing all the details.

The results also showed lack of knowledge of the rules and regulations especially from top management responsible to incur change across the organization, as although the laws and regulations do exist, it is not mandatory or obligatory to apply Green Procurement, and in most cases resistance to change plays a major rule in such enforcement if it ever happen, where the concerns of benefits against implementation are ever-existing.

4.8.7 Green Procurement Implementation

The research main objective is to find out what exactly affects Green Procurement implementation, where the concept was described as relatively new in a country like Malaysia, where most people don't have a full understanding of the concept, what is it used for, and what the benefits of Green Procurement implementation are.

Furthermore, after conducting this research and doing the literature survey to build up the theoretical basis of the paper, it was revealed and then assumed that there are three major influencing factors, which all have been proven to be directly and positively related to Green Procurement implementation, where the factors of cost, awareness, and government policies were directly linked to it, and several other factors that could affect those were revealed in the questionnaire and through literature, the sections below discuss each one of these factors in details.

4.9 Chapter Summary

From the results obtained from the statistical analysis, it is obvious that the reliability is severely affected by the chosen confidence interval and number of respondents, although the reliability level of the research is acceptable, it can stand further refining and improving.

Furthermore, from the results it is obvious that the cost has the most significant impact on Green Procurement implementation where the correlation of the level of Green Procurement implementation shows strong and positive relationship, indicating the higher the cost the lower the implementation, followed by the level of awareness, where it was measured on employees, company, and country levels which means there is a room to further promote awareness of Green Procurement, and finally the government laws and policies scored the lowest expectedly, as there is already existing laws and regulations for Green Procurement in effect in Malaysia.

In summary, this chapter presented the statistical analysis methods used to analyze the data, and the results, including reliability, normality, and correlations.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the conclusion of the findings and recommendations for future research, where this research aims to analyze the relation between green procurement implementation and the factors that affect it in Malaysia, into addition to analyzing these factors and the profile of the level of influence on green procurement implementation and how it influences LEED and GBI Compliance in Malaysia.

5.2Conclusion

This research presented a discussion of the major findings in this research, where it discussed each variable that have been subject to the questionnaire, as well as how these variables have been connoted by the respondents, followed by a flow chart of the major issues of the problem statement and how they work together towards Green Procurement implementation and what might have been the cause, concluding with a set of recommendations for future research and based on the findings of the study to further aid in Malaysia's vision for the 2020 to become one of the developed nations worldwide through adopting sustainable development and protecting resource depletion.

Finally, this research is thought to be important as it will contribute, even if by little, to the existing body of literature on Green Procurement practices in Malaysia, and forms a nucleus for further research on the future that would build upon it.

5.2.1 Review of the Research Aim and Objectives

The main aim of this research is to find out the problems in implementing the green procurement in Malaysian construction sector. To gain the research aim, three objectives were created:

1- **To study the general problems from literature related to green procurement practices.**

From the literature reviews it was found that companies in Malaysia sector are having issues in their procurement section. This problem is summarized in applying the green procurement in order to enhance the performance of the companies in Malaysia. The major issues are related to the green procurement and their application include there are no clear and strict policies and regulation from the government, less awareness related to green procurement, and high cost of LEED and GBI. Therefore, this study highlighted those issues in order the companies in Malaysia can take positive action so they can improve and enhance their performance as well as they will stand in front of their competitors.

2- **To analyze the factors that affect the building and construction sector in Malaysia related to green procurement practices.**

From the results obtained, the results it is obvious that the cost has the most significant impact on implementing the green procurement in Malaysian construction sector so it can be seen that the higher the cost the lower the implementation, followed by the level of awareness, which can be seen that there is a lack of awareness of Green Procurement and its requirements, as well as funds allocated for training and education purposes, and, finally the government laws and policies scored the lowest expectedly, as there is already existing laws and regulations for Green Procurement in effect in Malaysia.

3- **To study the factors that will contribute to enhance green procurement practices in the Malaysian construction sector.**

From the results found from this study, which conducted and covered with three factors include; government policies and regulations, green procurement application and awareness, and cost of LEED and GBI. The results of these factors were promising and telling the direct way to enhance the company for their sustainability. Therefore, the factors that can directly contribute to enhance green procurement practices in the construction sector towards attaining sustainability can be summarized in reducing the cost, build the wariness among the employees as well as the have clear and strict rules and regulation from the government.

In summery to all of the mentioned objectives, understanding the importance of green procurement and its benefits can enhance and improve the building and construction companies. Since that can increasing the time spending for the non-green procurement materials and the not knowing the most effective procurement strategies can increase the cost of the companies. Consequently, that can cost the companies a lot and may be that can make them fail in front of their competitors. Thus, understand the importance of green procurement and its benefits is very crucial for improving and enhancing the companies.

5.3Recommendations for future research

The following sections are comprised from several recommendations for future research that would build on this one, they are explained in points form; they are divided into two parts as below:

5.3.1 General Recommendations

1- Expand the scope of the study population to include more geographical areas covering cities and provinces outside heavily populated areas which would dramatically enhance the overall accuracy and reliability of the research.

2- Inclusion of a longer time frame which would help in increasing the number of respondents, which in turn will significantly affect the accuracy of the results.

3- The use of more than one tool for data acquisition and collection to be used in tandem with questionnaire, these include in-depth interviews, large scale surveys, and empirical experimental studies.

4- Application of more advanced statistical analysis techniques and methods as supplementary tools, which would ensure better results that reflect reality more.

5- Study of mediating factors that correlate different specified variables in the research with the inclusion of different set of independent variables which would give a deeper insight on the topic and more relevant results.

5.3.2 Research recommendations

1- Increasing awareness of Green Procurement importance and applications with relevant terms and codes, especially to companies and firms directly involved in procurement practices.

2- Explaining the importance of implementing Green Procurement practices in terms of cost, and deviating from the school of thought of expenses, where in most cases the cost and return on investment is justifiable but on the long term, which would contribute to open more investment opportunities in Green Procurement in the future.

3- Enacting rules and regulations that govern Green Procurement practices in general, and sustainability in particular, where the environmental effects of operations are neglected in most companies, which puts a heavy toll on resources.

4- Expanding the scope of Green Procurement application to include different types of industry, where little research has been conducted on other companies to determine how they might be affected should they choose to apply Green Procurement.

6- Spreading awareness of Green Procurement practices and coming up with incentives for companies who adopt it, such as tax incentives, moral incentives etc.

7- Established a nation-wide database for Green Procurement protocols and practices in different types of industries which would help in future sustainable development.

8- Inclusion of environmental studies in the education system in all stages, from primary to secondary all the way to college which would help raise a generation that is environmentally aware of importance of keeping resources and sustainable development.

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APPENDIX

of Questionnaire FYP

QUESTIONS RESPONSES 45

Section 1 of 2

Questionnaire Survey

Form description

Demographic

Description (optional)

How long have you worked at your current job?

- 0-5
- 5-10
- 10-20
- 20 and above

What is the highest level of education you've achieved?

- Diploma
- Bachelors

- ○ PHD

Job Position ?

- ○ Manager
- ○ Supervisor
- ○ Contractor
- ○ Supplier

What is the size of the company you work at (In terms of employee'

- ○ 0 to 20 employees
- ○ 20 to 50 employees
- ○ 50 to 100 employees
- ○ More than 100 employees

Are you familiar with the concept of Green Procurement?

- ○ Yes
- ○ No

How often do you have green procurement supply contracts?

- ○ Very Often
- ○ Often
- ○ Never

Is Green Procurement relevance to your company's operation ?

Please rank the following factors that enhance green procurement practice in your company (1= strongly disagree, 2= disagree, 3= neutral 4= agree, 5= strongly agree).

1	2	3	4	5
○	○	○	○	○

I think that the Company's procurement operations is Green and

1	2	3	4	5
○	○	○	○	○

After section 1 **Continue to next section**

Section 2 of 2

Section title (optional)

Description (optional)

Factors that enhance green procurement practice

Please rank the following factors that enhance green procurement practice in your company (1= strongly disagree, 2= disagree, 3= neutral 4= agree, 5= strongly agree).

The cost of procurement can be decreased by adopting Green

1	2	3	4	5

○ ○ ○ ○ ○

The term Green Procurement resonates and there is general awareness of its importance in your company

1 2 3 4 5

○ ○ ○ ○ ○

The governments have sufficient rules and regulations to encourage reen Procurement in the construction sector?

1 2 3 4 5

○ ○ ○ ○ ○

There are enough laws to catalyze and ease adopting Green rocurement and other sustainable methods in the construction

1 2 3 4 5

○ ○ ○ ○ ○

There will be a great social and economic benefits if the construction industry adopt Green Procurement?

1 2 3 4 5

○ ○ ○ ○ ○

Procurement practice increases the company profitability and reduces procurement cost?

1	2	3	4	5
○	○	○	○	○

Factors that affect green procurement practice

Please rank the following factors that affect green procurement practice in your company (1= strongly disagree, 2= disagree, 3= neutral 4= agree, 5= strongly agree).

The employees are aware of the concept of Green Procurement and Sustainability

1	2	3	4	5
○	○	○	○	○

Do you believe that there is a general awareness in Malaysia on the importance of Green development/procurement and Sustainability?

1	2	3	4	5
○	○	○	○	○

think that my company's procurement operations have minimum effect on the environment?

1	2	3	4	5
○	○	○	○	○

The traditional procurement methods are better replaced by more sustainable procurement processes?

1 2 3 4 5

Green Procurement is affected by availability of infrastructure for transformation to Green means?

1 2 3 4 5

Green Procurement is affected by the profitability of the company after switching to Green technology?

1 2 3 4 5

Green Procurement is affected by the Government Policies ?

1 2 3 4 5