APPROVAL

‘I hereby acknowledge that I have read this and in my opinion this work sufficient in terms of scope and quality for the award of a Bachelor Degree in Technology Management and Technopreneurship (Technology Innovation)’

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MANAGING E-WASTE FOR ENVIRONMENTAL SUSTAINABILITY: A CASES STUDY AT DEPARTMENT OF ENVIRONMENT MALAYSIA (DOE) AND MERIAHTEK SDN BHD

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Report submitted in fulfilment of the requirement for the degree of Bachelor of Technology Management (Hons) in Technology Innovation

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MAY 2016

DECLARATION

"I hereby,declared that this thesis entitled "Managing E-waste For Environmental Sustainability: A Cases Study at Department of Environment Malaysia (DOE) and Meriahtek (M) Sdn Bhd" is the result of my own research except as I have been cited in reference.

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DEDICATION

This Final Year Project is dedicated to my parents for their loves, endless support, encouragement, attention and prayers.

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Date :

ACKNOWLEDGEMENT

All praise are due to Allah S.W.T who had given blessing and knowledge in finishing this research entitled ‘Managing E-waste for Environment Sustainability: A Cases Study at Department of Environment Malaysia (DOE) and Meriahtek (M) Sdn Bhd’ salam also propose to the Prophet Muhamad SAW, the Uswatun Hasanah for all Moslems.

I would like to thank to my supervisor, Dr Boon Cheong Chew who have given a valuable advice and continuous guidance from beginning until the final revision of this research. Besides, also thanks to my friends and other lecturer that helps me in giving suggestion and advice during the writing of this research

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ABSTRACT

Managing of this E-waste is very important and organization needs to managing with efficiency procedure and step because this E-waste contains more than 1,000 different of toxic substances. E-waste has hazardous substances that risky for the human health and the environment. In addition, this pollution has immense ill-impacts on the health of the workers engaged in the informal recycling units and overall of the environment. Hence, the Department of Environment has published a set of guidelines on E-waste that are known as "Guidelines for the Classification of Used Electrical and Electronic Equipment in Malaysia" in years 2008. The DOE is responsible to monitor and control the quantity of E-waste by authorizes a number of premises and companies to collect and segregate used and end-of shelf life electrical and electronic equipment (EEE) to recover precious material inside it. DOE use the online electronic scheduled waste information system (eSWIS) to help the stakeholder towards to compliance of the Environmental Quality (Scheduled Waste) Regulations 2005 and Environmental Quality Act, 1974 respectively. In summary, the proper handling of E-waste is important as a ways to control and minimize amount of E-waste. The researcher supports to the respondent view in the electric and electrical equipment it contains hazardous substances and this chemical will release greenhouse gasses and ozone depletion substances.

ABSTRAK

Pengurusan E-sisa ini adalah penting kerana organisasi perlu menguruskannya dengan cekap kerana E-sisa mengandungi lebih daripada 1,000 bahan-bahan toksik. E-sisa mempunyai bahan merbahaya yang berisiko kepada kesihatan manusia dan alam sekitar. Di samping itu, pencemaran ini memberi kesan ke atas kesihatan pekerja-pekerja yang terlibat di dalam unit kitar semula. Oleh itu, Jabatan Alam Sekitar telah menerbitkan satu garis panduan mengenai E-sisa yang dikenali sebagai "Garis Panduan Pengkelasan Peralatan Elektrik dan Elektronik di Malaysia" dalam tahun 2008. Jabatan Alam Sekitar bertanggungjawab untuk memantau dan mengawal kuantiti E-sisa dengan membenarkan beberapa premis dan syarikat-syarikat untuk mengumpul dan mengasingkan peralatan elektrik dan elektronik digunakan dan akhir-hayat (EEE) untuk mendapatkan kembali bahan berharga di dalamnya. DOE menggunakan talian elektronik berjadual sistem maklumat sisa (eSWIS) untuk membantu pihak berkepentingan untuk mematuhi Akta Kualiti Alam Sekeliling (Buangan Terjadual) 2005 dan Akta Kualiti Alam Sekeliling, 1974. Secara ringkas, pengendalian yang baik terhadap E-sisa adalah penting sebagai cara untuk mengawal dan mengurangkan jumlah E-sisa. Penyelidik menyokong pandangan responden bahawa setiap peralatan elektrik dan elektrik mengandungi bahan-bahan merbahaya dan ia akan menyebabkan pengeluaran gas-gas rumah hijau dan bahan-bahan penipisan ozon.

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CHAPTER 1

INTRODUCTION

1.1 Introduction and Background

Malaysia one of the largest e-devices consumes according to Bakri (2014) with a vision 2020, there are many challenges that need to be facing to realize the vision. Many organizations today created various types of electronic devises such hand phones, MP3 players, laptops, digital watch, and many more products to attract consumer to buy their product without thinking affected that could be occurred in the future.

Based on Huisman (2014) that stated electronic waste (E-waste) is a term used to cover items of all types of electrical and electronic equipment (EEE) and its part that have been discarded by the owner as waste without the intention of re-use. As a consumer, it is very important to identify all type of EEE and how to manage the E-waste when is due to failure or not longer useful for them. Khalid (2010), it is one of the fastest growing waste streams in the world due to the wide use of this equipment, tool, devises or other electronic part both in developing countries as in Malaysia, nowadays, it have negative impact on human life and environment.

Managing of this E-waste is very important and organization needs to managing with efficiency procedure and step because this E-waste contains more than 1,000 different substances which are toxic, such as lead, mercury, arsenic, cadmium, selenium, hexavalent chromium and brominated flame retardant. Besides that, E-waste has hazardous substances

such as lead, mercury, PCB, asbestos and CFC's that risky for the human health and the environment. In addition, this pollution has immense ill-impacts on the health of the workers engaged in the informal recycling units and overall of the environment like a water issues and soil pollution

An effective of managing E-waste is important to reduce and control the pollution of the environment and in this research, the researcher had recovered from the Department of Environment (DOE) and Meriahtek (M) Sdn Bhd. The DOE is the government organization while Meriahtek (M) Sdn Bhd as Prescribed Premises licensed by DOE that are responsibility in managing E-waste disposal with more effectively and in a line of concept of green in Malacca city.

1.2 Problem Statement

In an aspect for sustainable the environment, Malaysia have facing with E-waste pollution. According to Skinner (2010) stated nearly 80 per cent of E-waste generated in the developed countries ends up in developing nations of Asia such as China, India, Pakistan, Malaysia, Philippines, Singapore, Sri Lanka Vietnam and Thailand and African countries. United Kingdom is a one of developed countries provided a effectiveness in managing s E-waste by enforces new labeling of equipment with a symbol of a crossed-out wheelie bin to indicate that the goods should not be discarded alongside municipal waste (A Zero Waste UK, 2012). Generation of E-waste has been estimated to be about 652909 tonnes in 2006 and was extrapolated to reach around 706 000 tonnes in 2011 and about 1.2 million tonnes in 2020 in Malaysia (Bakri, 2014). There is the problem of gap between developed countries such as Malaysia. The problem arises because inefficiency managing of E-waste emerging serious issues that effected the environmental.

An efficiency of E-waste managing is important to reduced and control the pollution for environmental sustainability. The researcher need to identify the factor rendered of managing E-waste for the environmental sustainability. Hence, Malaysia is necessary breakthrough the gap between our nation and developed countries.

1.3 Research Question.

Based on the problem arise through managing E-waste, there are three Research Question that involved the factor, processes and some of innovative solution provided from the Department of Environment (DOE) and Meriahtek (M) Sdn Bhd. In this research, it focus on how their Department of Environment managing the E-waste. The research question is:-

i. What are the factors rendered the E-Waste Management?
ii. What are the processes involved in E-Waste Management?
iii. What are the innovative solutions to foster E-Waste Management for Environmental Sustainability?

1.4 Research Objectives

In this Research Objective is describing the aim of researcher that arises through problem formulation. Based on the action from Department of Environment (DOE) and Meriahtek (M) Sdn Bhd., the researcher will implement and study the process of managing E-waste by identify the:-

i. To examine factors rendered the E-Waste Management.
ii. To investigate the process involved in E-Waste Management.
iii. To suggest the innovative solutions to foster E-Waste Management for Environmental Sustainability.

1.5 Research Scope, Limitation and Key Assumption of Study

The scope of this research is to environmental sustainability in managing E-waste. Firstly, the researcher need to identify the factor rendered the E-waste management. Secondly is about the processes involves during manage E-waste. Lastly, the research is about innovative solutions to foster E-Waste management for environmental sustainability. The researcher will study and collecting the data at the Department of Environment (DOE) and Meriahtek (M) Sdn Bhd that responsibility in managing E-waste.

The researcher have three limitation occurred during design the project of E-waste. Firstly, the Department of Environment (DOE) and Meriahtek (M) Sdn Bhd could generalized on the

similar industry and not to compare with other organization. Secondly is assumed through the respondents who those not gave honest answer at the end of interview process and this is because no knowledge of awareness about managing E-waste.

The key assumption is the researcher assume that Department of Environment (DOE) and Meriahtek (M) Sdn Bhd have been done in their campaign to managing E-waste around the household in the Malacca city. As a consumer, throw the electrical and electronic devices that need to dispose in a right way for environmental sustainability.

1.6 Research Significance

This project research is very attractive ways that consult from the government to improve in managing E-waste and gave more advantages to the communities for better health environment. Other than that, it also will reduces the water and soil pollution. In this research significance, is it divide by two categories through communities in Malacca and organization of Department of Environment (DOE) and Meriahtek (M) Sdn Bhd.

i. Department of Environment (DOE)

Respondent is focus in the Department of Environment that responsibility to conduct and manage the E-waste with effective ways. The factor rendered of waste is highly important to identify and find a suitable solution to manage the E-waste. The innovative solution that provided from the government is through the Environment Quality (Scheduled Waste) Regulation in 2005. According to the scheduled, it has classified as a scheduled waste under the code SW110, while for the specified E-waste that contributed from batteries, lead acid batteries and fluorescent lamps are coded as SW103, SW102 and SW109 respectively. However, managing the E-waste not focuses on the factor, but it's also required an efficiency process to control water and soil pollution.

ii. Meriahtek (M) Sdn Bhd

Respondent is focus in Meriahtek organization which is one of Prescribed Premises licensed by the DOE to managed and process of E-waste. Meriahtek used machine with high technology to separate and categories each type of E-waste part. The Meriahtek used online

system known as eSWIS to record and update actual amount of E-waste collected until to disposed process.

iii. Consumer/ Communities

As a consumer, they need to identify what type of EEE and how to manage if it is are not longer useful in their daily life. Nowadays, as a responsible communities, tried to adopt awareness campaign that provided by the government. In addition, this preventive action is important to protect the people from health impact and environmental pollution for better life in long-term period.

1.7 Summary

As a view, the combination from the people population growth and economic project that contributed from all society, the volume of waste electrical and electronic (WEEE) in our Malaysia's is increased slowly and will effected our environment in the future and required the effective ways to managing of this E-waste to ensure is it in under control by the government (Government of Malaysia, 2011).

In this research aimed to close the awareness level and practices from all communities regarding E-waste management. Based on the idea from Guo (2010), mentions that E-waste stream contained both highly toxic substances, which bring a dangerous problem to the health and environment. The researcher agree with this statement because if want to life in freedom of pollution, its must together and adopt the alternatives ways that have provided.

Besides that, the Department of Environment (DOE) and Meriahtek (M) Sdn Bhd need to provided an attractive E-waste awareness program among their community. As a summary, effective managing of E-waste is importance to reduce critical issues that involved water and soil pollution. Some alternative provided by the government and as a consumer, changes of behavior is needed and adopt by people through a campaign of awareness program about E-waste management in Malaysia.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Rapid progress in standard of living and advances in information and communication technology according to Ahmad et al (2014) state that generated an enormous amount of end of life electrical and electronic equipment which eventually become E-waste. E-waste is an electric or electronic part that is not longer useful and functioning for the human and it is a global problem that negatively impacts human health and the environmental and exporting lost opportunity to recover valuable resources from E-waste (Adrian, 2013).

In addition, poor management and disposal of E-waste will contributes a huge impact for human. According to research by Kiddee et al (2013), human impact occurred by two ways which include a food chain issues and directed impact on worker who labor in primitive recycling area. The food chain issues occurred through contamination by toxic substances from disposal and primitive recycling processes that products entering the food chain and thus transferring to humans while the direct impact is occurred to labor when they are in area that exposure to toxic substances and affected in long term for the human health.

Moreover, Bakri (2014) has suggests that an efficiency managing of E-waste is important because it will reduce waste generation while reduction of hazardous materials will ultimately lead to reduce of the waste generated quantity with the advent of inventory management with efficiency ways for environment sustainability.

2.2 Definition of Electronic Waste (E-Waste) Management

Compared with other waste management, an electronic waste (E-waste) has different process of disposed. According to Duan (2011) highlights that policies for waste management is differ from the policies which is apply for traditional waste types cause the E-waste stream contained both highly toxic substances, which bring a dangerous problem to the health and environment. An efficiency management of E-waste is imperative in order to recover valuable components and properly manage hazardous and toxic components (Namias, 2013).

In managing E-waste, Dev (2013) states that have several step to E-waste disposal process by identification and collected of E-waste, shorted of electronic part, reducing and reusing of E-waste, recycling E-waste, and disposal part not longer useful. Therefore, an efficiency managing E-waste are important to tackle this issue for sustain environmental for secure the certainty for an enriched environment in the future.

2.2.1 Recycling of E-Waste Management in Malaysia

Recycling of E-waste in Malaysia is managed in two divisions and according to Dolan et al (2013), E-waste management is separation by formal sector and informal sector. The formal sector consists a licensed from recycled firms who either fully or partially recover e-waste. In addition, the organization involves in the formal sector appropriately handled E-waste that authorized to guidelines and regulations by Department of Environment (2012), while for the informal sector, the organization handled E-waste recycling by uses lower efficiency techniques in processing and extracting valuable components (Heart et al, 2012).

Most of this E-waste is produces by informal sector because some factors influences such as monetary incentives, regulation gaps, economic interdependence and their social reality (Chi et al, 2011). In addition, this is a challenge for government to deal with informal sector activities and out of control this serious issues will impact the environmental and human health. Conversely, the formal sector whose have a licensed to recycling of E-waste could do with responsible manner to manage E-waste in their actions.