AN ASSESSMENT OF MELAKA AS GREEN TECHNOLOGY CITY STATE USING MELAKA GREEN CITY ACTION PLAN (GCAP)

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This thesis is submitted in partial fulfilment of the requirements for the award of Bachelor of Technology Management (High Technology Marketing) with Honours

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APPROVAL

I/We hereby declare that I/We have read this dissertation/report and in my opinion, this dissertation/report is sufficient in terms of scope and quality as a partial fulfilment the requirements for the award of Bachelor of Technology Management (High Technology Marketing) with Honours

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DECLARATION OF ORIGINAL WORK

I hereby declared that this report entitled
"AN ASSESSMENT OF MELAKA AS GREEN TECHNOLOGY CITY STATE USING MELAKA GREEN CITY ACTION PLAN (GCAP)"
is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

SIGNATURE : ……..

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DATE : ……..

DEDICATION

I would like to dedicate the appreciation to mv family who gives moral support to me no matter in terms of spiritual or financial, my respected supervisor and panel who willing to lead and guide me throughout the journey of completing this research study and beloved course mates who helped me during the process of doing this research.

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ABSTRACT

Melaka was declared to become a Green Technology City State by the year 2020 by the Malaysia government. To achieved this vision, the Melaka state government has promoted six major areas through Green City Action Plan (GCAP) which are water management; energy efficiency and renewable energy; green transportation; zero waste; cultural heritage and tourism; urban forestry and agriculture. The extent of the vision towards Green City may be investigated by studying the perception and awareness of the public towards GCAP initiatives. It is known that the side effect of irresponsible human activities had become a popular topic among the public and thus Malaysia is adopting an indicator of a voluntary reduction of up to 40% in terms of emissions intensity of GDP by year 2020. The research was conducted in University Technical Malaysia Melaka (UTeM) among the students of Faculty of Technology Management and Technopreneurship (FPTT), Faculty of Engineering Technology (FTK) and Faculty of Mechanical Engineering (FKM). The questionnaire was used as an instrument to measure the implementation of GCAP initiatives. Literature research and pilot test were carried out and appropriate variables in the GCAP were extracted. Using factor analysis, 29 variables were used for the study from an initial 46 variables. The questionnaire uses the 5-point Likert Scale. 391 respondents was analyzed from students' perception and all six areas in GCAP have high reliability index value which is between 0.726-0.962. It is found that the highest factor loading is in Water Management which is 0.932 and the lowest factor loading is in Urban Forestry and Agriculture. To promote urban forestry, one way is to promote tree planting programs". The result shows that Melaka has long way to go for implementation of green city.

Keyword *– Green Technology City State, green city, GCAP, UTeM students, factor analysis*

ABSTRAK

Melaka diisytiharkan menjadi Bandar Teknologi Hijau pada tahun 2020 oleh kerajaan persekutuan. Untuk mencapai visi ini, kerajaan negeri Melaka telah mempromosikan enam bidang utama melalui Pelan Tindakan Bandar Hijau (GCAP) yang merupakan pengurusan air; kecekapan tenaga dan tenaga boleh diperbaharui; pengangkutan hijau; sifar sisa; warisan budaya dan pelancongan; perhutanan bandar dan pertanian. Tahap penglihatan ke Green City boleh disiasat dengan mengkaji keutamaan dan kesedaran orang ramai terhadap inisiatif GCAP. Adalah diketahui bahawa kesan sampingan aktiviti manusia yang tidak bertanggungjawab telah menjadi topik popular di kalangan orang ramai dan oleh itu Malaysia mengamalkan penunjuk pengurangan secara sukarela sehingga 40% dari segi pengeluaran emisi KDNK menjelang tahun 2020. Penyelidikan ini dijalankan di Universiti Teknikal Malaysia Melaka (UTeM) di kalangan pelajar Fakulti Teknologi Pengurusan dan Teknopreneurship (FPTT), Fakulti Teknologi Kejuruteraan (FTK) dan Fakulti Kejuruteraan Mekanikal (FKM). Soal selidik itu digunakan sebagai instrumen untuk mengukur pelaksanaan inisiatif GCAP. Penyelidikan literatur dan ujian perintis telah dijalankan dan pembolehubah yang sesuai dalam GCAP telah diekstrak. Dengan menggunakan analisis faktor, 29 pembolehubah digunakan untuk kajian daripada 46 pembolehubah awal. Soal selidik menggunakan Skala Likert 5-mata. 391 responden dianalisis dari persepsi pelajar dan kesemua enam bidang dalam GCAP mempunyai nilai indeks kehandalan yang tinggi antara 0.726-0.962. Telah didapati bahawa beban tertinggi adalah Pengurusan Air iaitu 0.932 dan pemuatan faktor terendah adalah dalam Perhutanan Bandar dan Pertanian. Pada pendapat saya, seronok untuk menyertai program penanaman pokok "dan keputusan yang diperoleh membuktikan bahawa instrumen kajian ini mempunyai kebolehpercayaan dan kesahan yang tinggi. Hasilnya menunjukkan bahawa Melaka telah lama pergi untuk melaksanakan bandar hijau.

Kata kunci *– Green Technology City State, bandar hijau, GCAP, pelajar UTeM, analisis faktor*

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LIST OF ABBREVATIONS

GHG	Greenhouse Emissions
UNESCO	United Nations Educational, Scientific and Cultural Organization
GDP	Gross Domestic Product
OECD	Organization for Economic Cooperation and Development
GC	Green City
MGTC	Melaka Green Technology Corporation
GCAP	Green City Action Plan
UTeM	University Technical Malaysia Melaka
FPTT	Faculty of Technology Management and Technopreneurship
FTK	Faculty of Engineering Technology
FKM	Faculty of Mechanical Engineering
ADB	Asian Development Bank
IMT- GT	Indonesia-Malaysia-Thailand Growth Triangle
EPU	Economic Planning Unit
UI GreenMetric	Universitas Indonesia GreenMetric
SPSS	Statistical Package for the Social Sciences
EFA	Explanatory factor analysis
PAF	Principal Axis Factoring
KMO	Kaiser- Meyer- Olkin
LED	Light-emitting diode
UPEN	State Economic Planning Unit
EPC	Energy Performance Contract
FiT	Feed in Tariff
COMOS	Cohesive Mobility Solution

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

According to the World Economic Forum (2016), the statistic of the Global Risk 2016 report shows that the world is facing issues of climate change and showed that Asia is going to experience major natural disasters with extreme weather events. The climate change is caused by the over-exploitation of natural resources and the dependence on fossil fuels which drains natural resources and raise greenhouse emissions (GHG).

There are many experts and researchers searching the solutions for environmental and green issues. Thus, the Malaysia government also start to focus on adaptation strategies to ensure sustainable growth. Based on The Star online (2016), Melaka is a UNESCO World Heritage Site and become one of Malaysia's most popular tourist destination which attracts more than 14 million visitors every year from both domestic and overseas tourists. Manufacturing in Melaka is strong which has about 45% GDP (Asian Development Bank, 2014). Melaka also rich in natural areas which have nearly 2/3rd of Melaka is categorized as Environmentally Sensitive Areas. The population of

Melaka has forecasted to increase from 830,900 to 952,500 between 2011 and 2020 stated by ADB in Melaka Green City Action Plan (GCAP).

The increasing of population and tourists boosts the demand for mobile units such as road transportation, railway, flight and transportation on water (WRI, C40 and ICLEI, 2014). This also can cause resource consumption and GHG emissions increase. Melaka is also experiencing some existing challenges such as traffic congestion especially during the weekend, public and school holiday (Asian Development Bank, 2014), (BERNAMA, 2014) and (Syakir Amir Abdul Rahman, et al., 2017). Moreover, Melaka also facing some water quality worsens. The climate change caused to flash flood and the hotter environment in Melaka results in loss of tourism opportunities.

On 17th December 2009, Malaysia former Prime Minister Dato Seri Najib Abd Razak stated that Malaysia is looking for a voluntary indicator to reduce at least 40% of GDP emissions by the year 2020 compared to level on 2005. Besides that, the indicator will receive technology transfer and financing support. On 20th October 2010, Malaysia former Prime Minister Dato Seri Najib Abd Razak has declared Melaka as a Developed State using Organization for Economic Cooperation and Development (OECD) Indicators (K. Shah., 2014).

This has led to Melaka has set a vision to become a Green Technology City State and be a “green city” by the year 2020 (M. Carvalho and A. Lai., 2010). The aim of Green City (GC) is to reduce the carbon footprint of the city or state by improving the livability (J. Bunning, et al., 2013).

1.2 Problem Statement

To achieve the Green Technology City State, Melaka has established the Melaka Green Technology Corporation (MGTC) on 1st October 2013 to lead the green development initiative in Melaka. On 22nd April 2014, Melaka Green City Action Plan (GCAP) is launched and listed down six areas which can enhance the green city development in Melaka. The areas focus on water management; energy efficiency and renewable energy; green transportation; zero waste; urban agriculture and forestry; cultural heritage and tourism (G. Krishnan, et al., 2014).

Melaka is known as a well-known historical city and the city with a mixture of cultures and the place for relaxation. However, there is a lack of awareness of the status of Melaka as a city of green technology and is on the path of sustainable growth to achieve its vision to become Green Technology City State. The Melaka government are unable to reach the goal by becoming the Green Technology City State by 2020. There should be more research to carry out to deal with this problem.

The aim of this research is to set a direction for Melaka to become Green Technology City State. Thus, this research attempt to study Melaka, where the government has directed Melaka to follow the Green City Action Plan to become Green Technology City State. This research selects the attributes of Green City and investigates the perception of Melaka as a Green City among the students using questionnaire. The lists of Green City attributes or variables are reviewed and collected from the literature, which is presented to a sample of UTeM students for rating and comments. In order to determine the attributes or factors, the questionnaire should be reliable and valid to ensure the accuracy of the findings (Mariah, M., & Mohammad, A. H., 2015).

1.3 Research Questions

i. What are the plans that are designed by Melaka to become Green Technology City State using the Green City Action Plan (GCAP)?

ii. What are the factors for a successful implementation of Green City?

iii. What are the instruments to measure the performance of GCAP?

1.4 Research Objectives

i. To investigate the plans that are designed by Melaka to become Green Technology City State using the Green City Action Plan (GCAP).

ii. To determine the factors for a successful implementation of Green City.

iii. To recommend an instrument to measure for GCAP.

1.5 Significant of Study

The result may show the construct of and factors leading to a successful Green Technology City State as believed by UTeM students. The findings of the study can bring impact to the government; local authority; local community and the public. For the government, the assessment can help to evaluate the city performance and improve services for the public. As for the local authority, the research can help to identify problems or issues and addressing those issues. For local community and public, it can help to realize the implementations and efforts done by the government.

1.6 Scope and Limitation of Study

This research is focused on the study of the Melaka government's implementations and planning to become Green Technology City State. The research has covered University Technical Malaysia Melaka (UTeM) students of Faculty of Technology Management and Technopreneurship (FPTT), Faculty of Engineering Technology (FTK) and Faculty of Mechanical Engineering (FKM). Because of the time limitation, the researcher has decided to take this area as a representative sample. Other than that, there is a resource limitation where the researcher faced the problem in getting the data from the government and the interviews for this research are limited.

1.7 Organization of Thesis

The thesis is organized in six chapters and appendix and references in brief as follows:

Chapter 1 Introduction: the chapter introduces the background of the study, including the current situation of the Melaka and vision of Melaka to become Green Technology City State. This chapter also outlines the problem statement, research objective, the research questions, scope and limitation of the study, significant of study and the structure of the thesis.

Chapter 2 Literature review: this chapter shows the previous studies that related to the thesis topic, including the definition of green city and related definitions and theoretical framework of a green city.

Chapter 3 Research Methodology: the chapter describes the research method, the qualitative and quantitative research in more details, including the way to collect data and the process of data analysis.

Chapter 4 Results and discussions: this chapters discuss the results shown in data analysis.

Chapter 5 Conclusions and recommendations: the chapter indicates the key findings related to research questions.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents literature related to the topic under study, apart from defining the key concepts it is also presenting theoretical and empirical studies related to the topic such as Green City Concept, Green City challenges, Melaka Green City Action Plan and development of the conceptual framework for factor analysis.

2.2 Green City Concept

In the research, there are many definitions of “Green City” that have been reviewed from several literature sources. These definitions have been analyzed to determine relationships among similar terms and to give a definition to each term. The terms “Eco-city” or “Sustainable city” have the same meaning as “Green City” in this research.

Definitions of “Green City”:

- “Eco-cities, or sustainable communities, represent a goal, a direction for community development. The ‘Eco-cities’ is dependent and it is located in a many related variations that are very complex such as sustainable development, sustainable urban development, sustainable communities, sustainable cities, bioregionalism, community economic development, appropriate technology, social ecology, green movement, green cities and communities” (Roseland, M., 1997)

- “Green cities is the city with fresh air and water with beautiful streets and parks. Green cities can solve natural disasters and have low infectious disease outbreak. Moreover, green cities support green behavior such as the use of public transportation and practice the activities that produce a low impact on the environment” (Kahn, M. E., 2006)

- “Green cities are defined as environmentally friendly. The greening of cities must have the control of diseases and health burden, reduction of chemical and physical hazards, development of high-quality urban environments, low environmental costs outside the city areas and the progress towards sustainable consumption” (UNEP, 2011)

- "The Green City is the future model which form an environment that is a life-quality urban city. The sustainable green development of cities is a continuous development which integrated and coordinated with all disciplined activities" (European Landscape Contractors Association, 2011)

- "The concept of 'Green City' or 'Green Development' are existing which expressed in the word 'sustainable development' and seeking for an integrated environment, social, and economic within the development process in the cities. The "Green City" or "Green Development" is further of understanding of this concept with the city's action taking and how the actions can bring to a city or urban area in green initiatives. Green Development is focused on the ways to improve and manage the water, air, and land quality and health in urban areas. Moreover, the development is relevance to the hinterlands and wider systems which will benefit the environment and the people who live in the city" (Lewis, E., 2015)

- "A Sustainable city or Eco-city is a city designed that take into account on environmental impact which required to minimize the energy use, water and food, waste output of heat, air pollution like CO_2, methane, and water pollution among the people live in the city" (Wikipedia, 2018)