

IMPLEMENTATION CHALLENGES OF GREENING INDUSTRY
IN PASIR GUDANG

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A thesis submitted in fulfilment of the
requirements for the award of the degree of
Master of Philosophy

Faculty of Built Environment and Surveying
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JULY 2019

DEDICATION

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time. And to Shira, thank you for being with me through thick and thin.
I love you all.

ACKNOWLEDGEMENT

In preparing this thesis, I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my main thesis supervisor, Professor Dr. Ho Chin Siong, for encouragement, guidance, critics and friendship. I am also very thankful to Dr. Gabriel Ling Hoh Teck and Mr. Chau Loon Wai for their guidance, advices and motivation. Without their continued support and interest, this thesis would not have been the same as presented here.

My fellow postgraduate friends should also be recognised for their support. My sincere appreciation also extends to all my colleagues and others who have provided assistance at various occasions. Their views and tips are useful indeed. Unfortunately, it is not possible to list all of them in this limited space. I am grateful to all my family member.

ABSTRACT

Green industry is viewed as a potential alternative to promote energy efficiency, low-carbon, low waste, non-polluting activity and safety among industries in Malaysia especially Pasir Gudang. Despite that, Pasir Gudang is far behind in implementing greening of industries from other successful industrial cities around the globe such as Japan. In response to this, implementation of greening of industry in Malaysia needs to be emphasised in a comprehensive manner specifically related to sustainability. Besides, many recent studies related to greening of industry focused on industrial activities and not on the relationship between type of industry and implementation of the greening of industry itself. Thus, this study examined the association between the awareness status of greening of industry among industries in Pasir Gudang based on type of industry. This study identified the relationship between focus areas of greening of industry, encouraging factors and enabling factors that are related to the type of industry. Self-administered and online surveys were distributed to a sample of 202 industry representatives in Pasir Gudang and analysed using chi-square analysis. The results showed that the type of industry did not influence the level of awareness for implementing greening of industry. Meanwhile, it was found that the focus area is highly associated with type of industry. Results also showed that the type of industry is highly associated with the identified encouraging factors such as incentive policies, enhance competitiveness and requirement from stakeholders. Five out of the six enabling factors, namely financial support; incentives support; investment in resource efficient infrastructures; laws, regulations and standards; and developing skills were not directly related to the type of industry. However, the seventh factor, supporting local action was highly associated with type of industry. Based on these results, aspects to be improved by considering the needs from each type of industry comprised focus areas, encouraging factors and one aspect from the enabling factors, which is supporting local action. On the other hand, other aspects from the identified enabling factors, namely financial support; incentives support; investment in resource efficient infrastructures; laws, regulations and standards; and developing skills can be improved without taking into account the specific needs of each type of industry. To conclude, the results and findings from this research can be used as evidence to support intervention, policy making as well as future research to improve the implementation of greening of industry in Pasir Gudang.

ABSTRAK

Industri hijau dilihat sebagai satu alternatif yang berpotensi untuk menggalakkan kecekapan tenaga, rendah karbon, kurang sisa, aktiviti yang tidak mencemarkan dan keselamatan dalam kalangan industri di Malaysia terutamanya di Pasir Gudang. Walaupun begitu, dapat dilihat bahawa Pasir Gudang masih jauh ketinggalan dalam melaksanakan penghijauan industri dari bandar-bandar perindustrian lain yang berjaya di seluruh dunia terutamanya Jepun. Sebagai tindak balas kepada ini, pelaksanaan penghijauan industri di Malaysia perlu ditekankan secara komprehensif yang mengkhususkan kepada kemampuan. Selain itu, banyak kajian terkini yang berkaitan dengan penghijauan industri yang memberi tumpuan kepada aktiviti perindustrian dan tidak kepada hubungan antara jenis industri dan pelaksanaan penghijauan industri itu sendiri. Oleh itu, kajian ini mengkaji hubungan antara status kesedaran penghijauan industri dalam kalangan industri di Pasir Gudang berdasarkan jenis industri. Kajian ini mengenal pasti hubungan antara kawasan tumpuan penghijauan industri, faktor penggalak dan faktor yang membolehkan yang berkaitan dengan jenis industri. Soal selidik tinjauan sendiri dan dalam talian telah diedarkan kepada 202 sampel wakil industri di Pasir Gudang dan dianalisis dengan menggunakan analisis chi-square. Hasil daripada status kesedaran penghijauan industri menunjukkan bahawa jenis industri tidak mempengaruhi tahap kesedaran untuk melaksanakan penghijauan industri. Sementara itu, didapati kawasan tumpuan sangat berkait dengan jenis industri. Keputusan untuk faktor penggalak menunjukkan bahawa jenis industri sangat berkait dengan faktor penggalak yang telah dikenal pasti seperti polisi insentif, meningkatkan daya saing dan keperluan daripada pemegang taruh. Lima daripada enam faktor yang membolehkan iaitu sokongan kewangan; sokongan insentif; pelaburan dalam infrastruktur cekap sumber; undang-undang, peraturan dan piawaian; dan pembangunan kemahiran tidak berkait secara langsung dengan jenis industri. Walau bagaimanapun, faktor ketujuh, menyokong tindakan tempatan sangat berkait dengan jenis industri. Berdasarkan keputusan ini, aspek yang perlu ditambah baik dengan mengambil kira keperluan dari setiap jenis industri yang terdiri daripada kawasan fokus, faktor penggalak dan satu aspek dari faktor-faktor yang menyokong tindakan tempatan. Selain itu, aspek daripada faktor yang telah dikenal pasti iaitu sokongan kewangan; sokongan insentif; pelaburan dalam infrastruktur cekap sumber; undang-undang, peraturan dan piawaian; dan pembangunan kemahiran boleh ditambah baik tanpa mengambil kira keperluan khusus dari setiap jenis industri. Untuk menyimpulkan, keputusan dan penemuan dari kajian ini dapat digunakan sebagai bukti untuk menyokong campur tangan, membuat dasar dan penyelidikan masa hadapan untuk menambahbaik pelaksanaan penghijauan industri di Pasir Gudang.

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LIST OF ABBREVIATIONS

AFOLU	-	Agriculture, Forestry and Other Land Use
API	-	Air Pollution Index
DOE	-	Department of Environment
EPU	-	Economic Planning Unit
GDP	-	Gross Development Product
GEC	-	Global Environment Centre Foundation
GHG	-	Greenhouse Gases
IRDA	-	Iskandar Regional Development Authority
KeTTHA	-	Ministry of Energy, Green Technology and Water
MITI	-	Ministry of Trade and Industry
MPPG	-	Pasir Gudang Municipal Council
OECD	-	Organisation for Economic Co-operation and Development
SMEs	-	Small and Medium Enterprises
UNEP	-	United Nations Environment Programme
UNFCCC	-	United Nations Framework Convention on Climate Change
UNIDO	-	United Nations Industrial Development Organisation

LIST OF SYMBOLS

t	-	Tonne
kt	-	Kilo Tonne
MLD	-	Million Litre per Day
MW	-	Mega Watt

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CHAPTER 1

INTRODUCTION

1.1 Background

In 2004, the Government of Malaysia identified a number of regions to be developed as the key economic development corridors in the country. The objective of setting up these development corridors is to help Malaysia to become a developing country which focuses on increasing its economy towards realizing the status as a developed nation in 2020. One of the corridors is Iskandar Malaysia (IM) which was formerly known as Wilayah Pembangunan Iskandar. IM established five flagships zones as development focal points and one of them is Flagship D – Pasir Gudang, which has the industry as the main economic activities.

With 426 factory premises in Pasir Gudang operating various types of heavy and medium manufacturing activities, the industrial sector is the highest carbon emitter not only in Pasir Gudang, but also IM. The industrial sector contributes to more than 30 percent of the total CO₂ emissions in the region in the year 2005 (IRDA, 2013). Although the carbon emission is relatively high, it cannot constraint the development of this country general and Iskandar Malaysia especially. In this context, Pasir Gudang still needs to expand its industrial activity to lessen poverty, deliver services and goods, create jobs, and improve living standards.

Green industry is a concept that encourages sustainable patterns of production and consumption which focus on resource and energy efficiency, low-carbon environment, non-polluting and safe environment. As a concept, green industry is seen as the best strategy for Pasir Gudang to avoid adverse environmental impact and resource depletion. In addition, the development of green industry also emphasise on the production that are sustainably managed throughout their process of production and consumption (DOE, 2010).

Above all, the main principle for the implementation of green industry will improve the way in handling resource usage and production as well as taking care of their surrounding environment. This concept is also aimed at transforming the industrial sector towards sustainable development and environment without affecting their activity and production.

1.2 Problem Statement

In a recent speech in 2018, the seventh Prime Minister of Malaysia, Tun Dr. Mahathir Mohamad, stated that Malaysia hopes to promote the potentials and prospects of green industries and jobs opportunities in the Association of South East Asian Nations (ASEAN) member countries (Veena B., 2018). Malaysia will focus to take labour sector forward by incorporating green jobs and skills into the industrial sector. ASEAN also looks forward to working with China, Japan and South Korea in advancing meaningfully for the future of green jobs and skills in the region. In line with this, Dr Mahathir is confident that ASEAN's labour sector will witness a significant outcomes in the greening of industries, related jobs and skills. In fact, he also noted that employment across ASEAN's green economy grew by 3.2% over the past two years, compared to the overall economic growth of 5% to 6%. (Veena B., 2018).

Towards achieving green industry, Malaysia's Department of Environment (DOE) reassure the industrial sector to implement initiatives which are related to cleaner production. However, green initiatives have not been fully implemented to the whole industrial operational activities, especially in the context of energy usage. This was evident when the United Nations Industrial Development Organization (UNIDO) reported that in 2011, a worldwide industrial sector contribute to 33 per cent of the total energy consumption which is equal to 40 per cent of carbon emission compared to other sectors such as Agriculture, Forestry and Other Land Uses (AFOLU) and transportation.

In the local context, Pasir Gudang has yet to be recognised as a successful industrial city that is at par with other industrial cities around the world especially in European countries (IRDA, 2013) despite the fact that green industry is being widely discussed and a number of policies related to sustainable development outlined. Thus, the industrial sector in Pasir Gudang must be encouraged to implement green industry in order to achieve sustainable development throughout the city.

Globally, although industries make a significant contribution to the economic welfare and development of a country, pollution from industrial activities can also negatively affect people and the environment. As the main contributor to economic development and growth in Malaysia, the successful growth of industrial sector is very crucial as they provide necessary inputs to other sectors of the economy such as housing, transport, services and infrastructures which makes it possible for other sectors to operate and contribute to development (EPU, 2011). This leads to the needs to emphasise sustainable operational pattern for industrial sector towards becoming a developed nation in 2020.

Located in IM, Pasir Gudang, an area in Southern Peninsular of Malaysia was chosen as the study area. To attract the investment throughout the region, Iskandar Regional Development Authority (IRDA) plays an important role to bring the investors to invest in this region. With an estimation of more than 320,000 of population by the year 2025, the industrial sector can take advantage of available labour. Thus, there is an important need to focus on developing industrial premises throughout the region especially in Pasir Gudang, a city with a significant number of industrial parks in IM. Nonetheless, the rapid development of industrial sector in Pasir Gudang must decouple the environmental pollution from economic growth. Furthermore, Pasir Gudang aims to reach RM 30mil as their Growth Domestic Products (GDP) by the year 2025, making it hard for the policy makers in wanting the economic growth but at the same time focusing on the protection of the environment (IRDA, 2013).

1.3 Research Questions

Four research questions have being outlined based on the issues and problems discussed in Section 1.2. The research questions are:

- (a) What is the awareness status among industries on the implementation of greening of industry in Pasir Gudang?
- (b) What are the focus area of existing industries in Pasir Gudang in implementing greening of industry?
- (c) What are the enabling factors for industries to implement greening of industry?
- (d) What are the recommendations for implementing greening of industry in Pasir Gudang?

1.4 Research Aims

This study will focus on the current situation as well as major challenges in implementing greening of industry in industrial parks in Pasir Gudang. Hence, the goal of the study is to study the challenges of greening of industry in Pasir Gudang industrial parks.

1.5 Research Objectives

Several objectives have been formulated for this study, namely:

- (a) To examine the awareness status of greening of industry among industries in Pasir Gudang based on type of industry.

- (b) To identify the focus area of implementing greening of industry based on type of industry.
- (c) To identify the aspects that encourage the industries to implement greening of industry.
- (d) To examine the enabling factors which influence the implementation of greening of industry in Pasir Gudang based on the type of industries.
- (e) To recommend ways on how to enhance the implementation of greening of industry in Pasir Gudang.

1.6 Scope of Research

In order to achieve a thorough understanding of this study, the extent of this study are as follows:

- (a) Understand the concept of greening of industry towards achieving sustainable development.
- (b) Identify the status and awareness of implementation of greening of industry among existing industries in Pasir Gudang.
- (c) Identify the challenges and actual potential of the greening of industry implementation in Pasir Gudang.
- (d) Propose the best suggestions on how to improve greening of industry in the study area.

1.7 Research Limitation

Several limitations have been outlined for this study. Study area selection has been identified as the first limitation, the overall concept of greening of industry as the second limitation and the overall expected findings of this research as the third limitation. As for the study area, Pasir Gudang, a primary industrial area in Johor and Iskandar Malaysia, has being chosen as the case study area. This will help policymakers and stakeholders to use the findings of this study to get a better understanding of future development of greening of industry for other industrial parks and cities in Malaysia. It is also suitable by using similar methodology for future research by choosing other case studies depending on the objectives of the research.

This research is also limited since the focus of greening of industry is based on the concept highlighted by the UNIDO. The greening of industry has become a core element to promote sustainable growth as well as to achieve economic competitiveness. It can also be concluded that improving efficiency gives industries a competitive advantage since the inputs of resources have a significant representation for the production cost of the industries. The greening of industry also plays an important role in a city development, through promoting sustainable production and consumption as well as reducing costs while increasing the productivity.

Thirdly, future recommendations and overall expected findings of this research consist of suggestion for future research, as well as reasonable improvement of enabling factors according to the localized context of greening of industry concept to the Malaysian industrial parks.

1.8 Thesis Organisation

This thesis has identified a total of five stages and each stage is written accordingly into six chapters. The overall thesis structure is as follows (Figure 1.1):

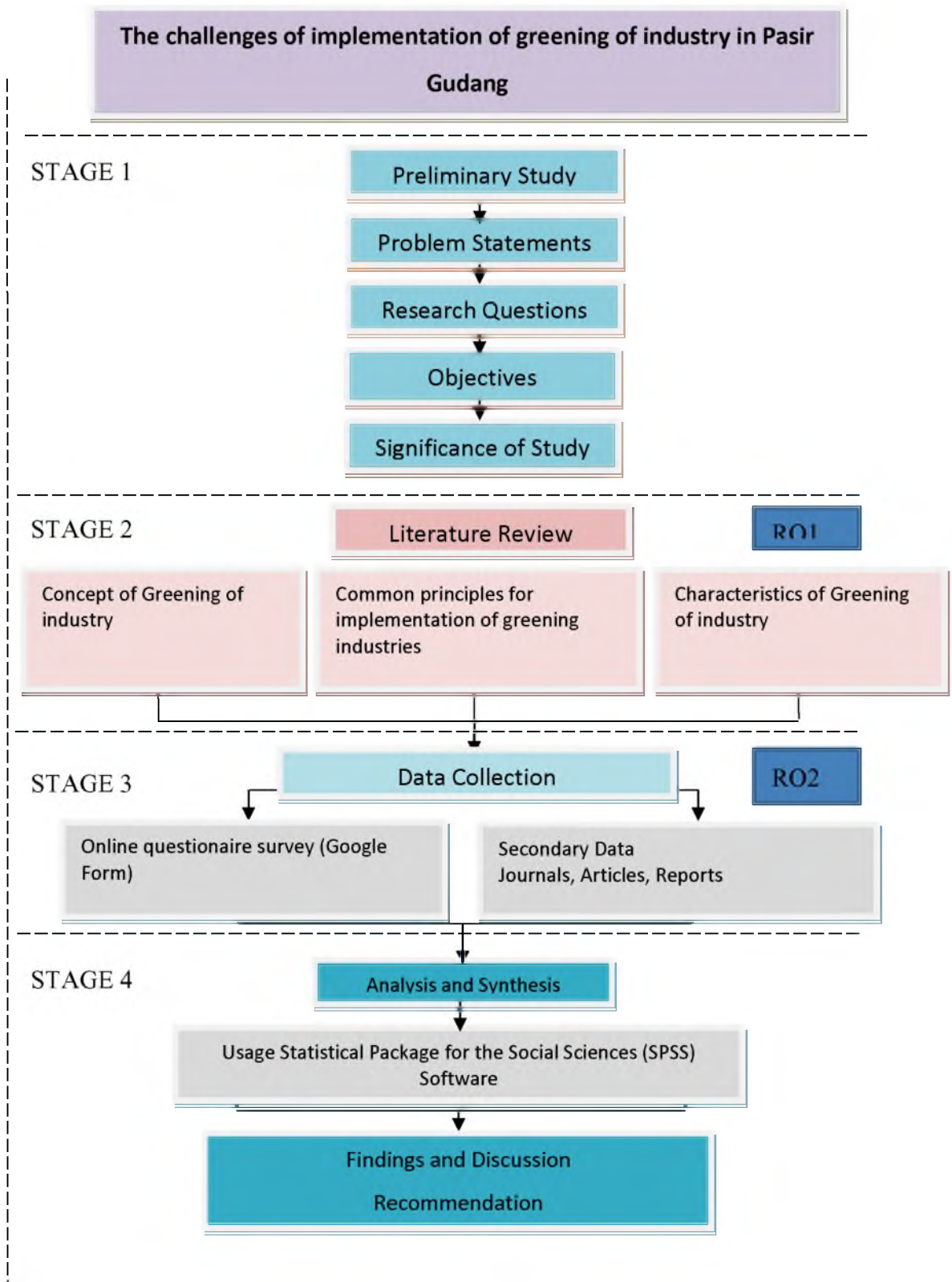


Figure 1.1 Research Design

Chapter 1 of this study presents the background of greening of industry globally and locally especially in the context of Pasir Gudang. This chapter will also provide the formulation of problem statements which are mainly derived from the current situation of implementing greening of industry and the main barriers for Pasir Gudang to implement such concept. Research objectives, questions, scope, study area, limitation, significance, and expected findings are also outlined in this chapter.

Meanwhile, Chapter 2 and Chapter 3 present the findings of various previous studies on topics that encompasses the realisation of greening of industry including detailed definitions, characteristics and importance. It also reviews the enabling factors of greening of industry based on a number of worldwide policies as well as several case studies.

The fourth chapter (Chapter 4) responds to the issues and aims to explore the relationship between the implementations of greening of industry and the industries in Pasir Gudang respond towards it. This chapter will also outline the research approach and design, hypotheses, sampling method, sampling size and analytical strategy in order to get the results.

Chapter 5 discusses the results and findings of the survey that is conducted based on the research methodology described in Chapter Four. It provides an understanding of the present greening of industry implementation in both Pasir Gudang Industrial Park and Tanjung Langsat Industrial Park. The outcomes drawn from this section is essential in establishing initial suggestions for pursuing a more efficient greening of industry in Chapter Six.

The last chapter, Chapter 6, presents the conclusion and recommendations of the research. This chapter summarises the findings from theoretical review and the empirical case study as well as put forward future recommendations in order to promote greening of industry in Pasir Gudang. The future research direction is also included in this chapter.

1.9 Research Significance

This research identifies the policy strategies that need to be implemented by the Pasir Gudang Municipal Council (MPPG), the State Government of Johor and the Government of Malaysia to facilitate the implementation of greening of industry in-line with UNIDO's policies on developing countries which is to develop their economic via greening of existing industries. This study also assesses the effectiveness of the current implementation of greening of industry among industrial players in the study area based on the types of industries and the main issues that may need to be considered towards crafting a specifically dedicated policy on implementing greening of industry. The findings of this study cover a wide range of issues, which involves various type of stakeholders, highlighting the need for strong role by the authorities and stakeholders supported by a series of policy initiatives.

1.10 Expected Findings

The expected findings of this study contain these features:

- (a) Examining the causes of obstacles for greening of industry implementation and how to overcome them through improvements.
- (b) Assisting the administrators, stakeholders and policymakers in identifying the contributions that can be given to the parties involved.
- (c) Identifying the suitability of implementation of greening of industry in local context (Pasir Gudang).
- (d) Improvement on the enabling factors of greening of industry to suit the local context of industrial parks in Malaysia.

It is also hope that this study will assist the MPPG and policy-makers to get a better understanding of the actual barriers and needs from the perspective of industrial players as well as on the importance of implementing the greening of industry in Pasir Gudang area.

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