# SPATIAL DATA INFRASTRUCTURE (SDI) READINESS : A CASE STUDY OF STATE GOVERNMENT AGENCY IN MALACCA

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**A dissertation submitted in partial fulfilment of the requirements for the award of the degree of Master of Science (IT-Management)**

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**JANUARY 2014**

TO MY BELOVED

FATHER, MOTHER AND WIFE

ASSOCIATE PROF. DR. HARIHODIN BIN SELAMAT

FAMILY MEMBERS

BEST FRIENDS

# ACKNOWLEDGEMENT

First and foremost, all praises to Allah S.W.T, who gave me strength, ability and aptitude to do this research.

Secondly, I would like to express heartfelt gratitude to my supervisor Prof. Madya Dr. Harihodin bin Selamat for her constant support, encouragement, guidance, and critics during my study in preparing this research. His willingness to motivate and contributed tremendously to this research.

I would like to thank the authority of Universiti Teknologi Malaysia for providing us the good environment and facilities.

Unfortunately, it is not possible to list all of them in this limited space. I am grateful to all my family member, colleagues and friends for their support in contributing ideas and advice towards this research.

# ABSTRACT

Spatial Data Infrastructure (SDI) is a concept developed for Spatial Data adjustment between government and non-governmental agencies. It provides the infrastructure and facilities for data sharing. The main goal of the implementation of SDI is to overcome the problem of duplication of data collection between agencies. This leads to the wastage of financial funds and time. SDI is currently developed at the global, regional, national, state, as well as local levels. Malaysia Centre Geospatial Data Infrastructure (MaCGDI) is the agency responsible for the development of SDI at the national level in Malaysia. Over the past two years, Malacca has taken the initiative to develop SDI at the state level. These steps are taken to meet the needs of agencies in Malacca to retrieve data more easily and efficiently. Unit Perancang Ekonomi Negeri (UPEN) and Jabatan Perancang Bandar dan Desa (JPBD) are the agencies responsible for the development of SDI in Malacca. Even though SDI in Malacca has been developed since 2011, but the level of its readiness is not yet known. This study aims to investigate the factors involved in measuring the SDI readiness and to assess the level of Malacca SDI readiness. Theoretical framework derived from Delgado, a well known framework which is widely used by the researchers, is also utilised for this research. The end product of this research is a framework which is hoped to be able to determine the SDI readiness in Malacca. This study suggest a SDI factor to be improved. This study also benefit the implementation of SDI in Malacca and make easier to them in further improve the SDI concept developed.

# ABSTRAK

Infrastruktur Data Spatial (IDS) merupakan konsep yang dibangunkan untuk peyelarasan Data Spatial di antara agensi-agensi kerajaan dan bukan kerajaan. Ia menyediakan infrastruktur dan kemudahan bagi perkongsian Data. Matlamat utama pelaksanaan IDS adalah untuk mengatasi masalah pertindihan kutipan data di antara agensi. Pertindihan kutipan data menyebabkan pembaziran dana kewangan dan masa. IDS dibangunkan di peringkat Global, Serantau, Negara, Negeri, dan tempatan. Di Malaysia, Pusat Infrastruktur Data Geospatial Negara (MaCGDI) merupakan agensi yang bertanggungjawab di dalam membangunkan IDS di peringkat Negara. Sejak 2 tahun kebelakangan ini, Melaka telah mengambil inisiatif membangunkan SDI di peringkat Negeri. Langkah ini diambil, bagi memenuhi keperluan agensi-agensi di Melaka mendapatkan data dengan lebih mudah dan effisyen. Agensi yang bertanggungjawab di dalam membangunkan IDS di Melaka adalah Unit Perancang Ekonomi Negeri (UPEN) dan Jabatan Perancang Bandar dan Desa (JPBD). Walaupun IDS di Melaka telah dibangunkan sejak tahun 2011, namun tahap kesediaannya masih belum diketahui. Kajian ini bertujuan mengukur tahap kesediaan IDS di negeri Melaka. Kaedah yang digunakan adalah dengan mengenalpasti faktor-faktor yang terlibat di dalam mengukur kesediaan SDI. Kerangka yang diperolehi dari Teori Delgado telah digunakan dan ianya merupakan satu kerangka yang terkenal dan banyak digunakan oleh para penyelidik. Hasil akhir kajian ini merupakan satu kerangka yang dapat menunjukkan kesediaan IDS di negeri Melaka. Kajian ini mencadangkan faktor IDS yang perlu ditingkatkan. Kajian ini juga memberi benefit kepada pelaksanaan SDI di Melaka dengan memudahkan mereka untuk membangunkan konsep SDI.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Overview

A Spatial Data Infrastructure (SDI) is a data infrastructure implementing a framework of geographic data, metadata, users and tools that are interactively connected in order to use spatial data in an efficient and flexible way. Another definition is the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data.

In Malaysia, Malaysia Geospatial Data Infrastructure (MaCGDI) is Spatial Data Infrastructure at National Level. It is an initiative by the government to develop a geospatial data infrastructure to enhance the awareness about data availability and improve access to geospatial information. This can be fulfilled by facilitating data sharing among participating agencies.

Spatial Data Infrastructure (SDI) development is important for a number of reasons. It allows, for example, Spatial Data sharing among government and municipal agencies, thus reducing redundancy in Spatial Data collection by these various agencies. This will definitely save both time and money. Recognizing the importance of not only Spatial Data collection but also Spatial Data management, Malacca state government took the initiative in establishing an efficient SDI. It is important to note that Malacca was in fact the first state in Malaysia which develops SDI at the state level. In 2011, two Malacca state government agencies, Unit Perancang Ekonomi Negeri (UPEN) and Jabatan Perancang Bandar dan Desa (JPBD), established an SDI.

The present study aims to examine several factors that determine the Readiness of SDI development in Malacca. As such, this study will administer a survey to both the agencies and individuals involved. A brief yet meaningful comparison of SDI developments in selected countries will also be discussed in order to shed some light on this problem.

Besides that, this study will also propose a suitable SDI readiness framework for further SDI development in Malacca. This will not only help the state government to determine their SDI readiness but also to help them to manage their Spatial Data effectively.

## 1.2 Problem Background

Recent developments in Information Technology allow many government and private agencies to use GIS for non-decision making. Malaysia is also not left behind. There are in fact a lot of GIS users in Malaysia. Penang GIS, Kedah GIS, Pusat Infrastruktur Data Geospatial Negara (MaCGDI), Jabatan Ukur dan Pemetaan Malaysia (JUPEM), and Jabatan Perancang Bandar dan Desa (JPBD), for example, are some of the Malaysian government agencies who use GIS.

Spatial Data is usually obtained from a land survey field work performed by a Land Surveyor. Overlapping collecting data or redundancy means a same data have been collected in the field. Redundancy in data collection occurs when two or more agencies collect exactly the same data in a given area. This is definitely a waste of money and time since the whole procedures are not only expensive but also take a long time to accomplish. It is important to note that this situation is not merely hypothetical. It is bluntly evident that Spatial Data of water resource, for example, is collected by both Jabatan Pengairan dan Saliran (JPS) and Jabatan Ukur dan Pemetaan (JUPEM) – two government agencies in Malacca. Other GIS users in Malacca include Unit Perancang Ekonomi (UPEN), Jabatan Perancang Bandar dan Desa (JPBD), Jabatan Kerja Raya (JKR), and the District Council.

The factor in the SDI Readiness Framework influence to SDI development. From measuring the factor of SDI Readiness we can suggest to improve the SDI in Malacca. The importance are to make the concept of SDI success. The concept of SDI is to sharing Spatial Data among the agency.

The main objective of developing an SDI in Malacca is to reduce redundancy in Spatial Data collection by these various agencies using effective Geospatial technologies. The basic idea here is to enable the sharing of Spatial Data between these government agencies. In other words, this will allow these government agencies to gain access to the Spatial Data they need without having to collect those data. Since the data obtained at this state level is more detailed in nature, there is no doubt that a greater development of SDI at the state level will definitely lead to a better development of national SDI at large.

## 1.3 Problem Statement

The current situation, implementation of SDI in Malacca are by Unit Perancang Ekonomi Negeri (UPEN) and Jabatan Perancang Bandar dan Desa (JPBD) that is geared to meet the needs of these two state agencies. It should be noted, that the requirements of SDI development are closely observed by these agencies and SDI development in Malacca is still in its early stages. The exactly problem in SDI Malacca is we still unable to determine SDI readiness. For the solution, this study aims to determine the SDI readiness in Malacca.

## 1.4 Research Questions

This research aims to address the following questions:

1. What are the factors involved in determining Malacca SDI readiness?
2. How is the relationship between SDI readiness and its implementation in Malacca?
3. How can we improve Malacca SDI?

## 1.5 Research Objectives

In order to have a better understanding of this problem, this research will attempt to achieve the following objectives:

1) To investigate the factors of SDI readiness
2) To propose a Framework to measure the Readiness of SDI in Malacca.

## 1.6 Research Scope

Over 80% of government data In Malaysia has a locational basis – ranging from local to national, regional and global scale – which addresses activities such as land-use planning and zoning, environmental regulations, economic development and emergency relief.

The need for geospatial data is becoming increasingly important. This study focuses on the assessment of Malacca SDI Framework as well as selected SDIs. The final goal here is to wrap up a Framework for determining Malacca SDI readiness.

## 1.7 The importance as well as the benefits of this research

1) To measure the SDI readiness that allow government State of Malacca improve the SDI concept.
2) To suggest improving factor in Malacca SDI.
3) To keep the Malacca state government informed of their SDI readiness thus allowing the government to make informed decisions in monitoring as well as improving their SDI.
4) To use the proposed concept to facilitate geospatial data sharing between agencies.
5) To promote greater use of geospatial data at the state level.
6) To raise awareness of the importance of geospatial data as well as relevant technological developments.

## 1.8 The structure of the thesis

This thesis is structured as follows:

1) Chapter One gives a general introduction to the thesis. This is followed by the description of the problem statement, objectives of the study, research questions, research methodology as well as the structure of the thesis.

2) Chapter Two reviews relevant literature. This chapter also presents a general introduction of SDI as well as its definitions, framework, hierarchy and history. Not only that, SDI initiatives in selected countries (i.e., Victoria, Australia; Delhi, India; Tehran, Iran, and; Malacca, Malaysia) are also explored and compared.

3) Chapter Three discusses the methodologies used for data collection in the field study.

4) Chapter Four presents and discusses the data collected from the field.

5) Chapter Five summarizes and concludes this thesis. The limitations of this thesis as well as recommendations for future research will also be included in this chapter.

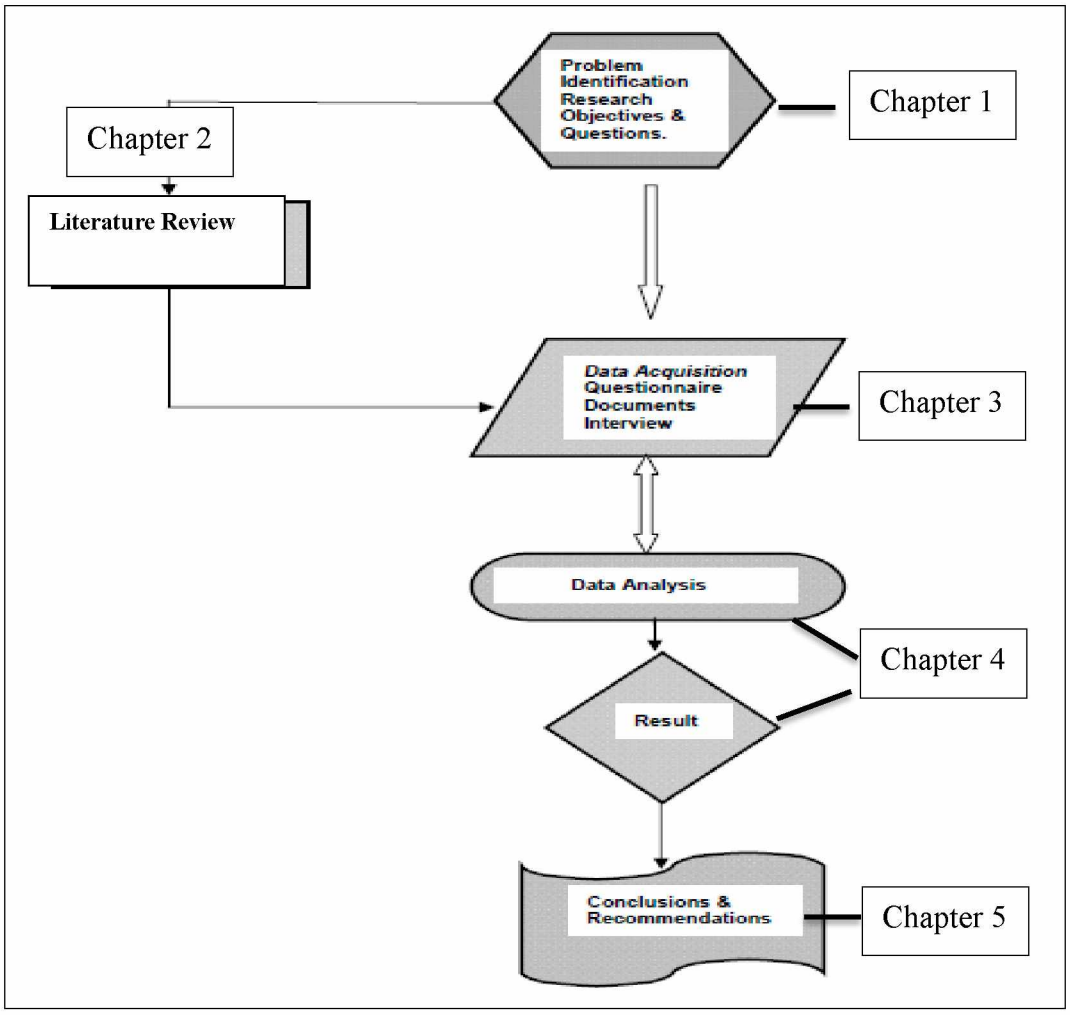


**Figure 1.1 : Structure of the thesis**

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