

**TOURIST-ISLAND ACCESSIBILITY BY PUBLIC TRANSPORT:
A COMPARATIVE STUDY OF BALI ISLAND – INDONESIA, CRETE ISLAND –
GREECE, AND MALLORCA ISLAND – SPAIN**

THESIS

A thesis submitted in partial fulfillment of the requirements for
the Master Degree from Institut Teknologi Bandung and
the Master Degree from the University of Groningen

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DOUBLE DEGREE MASTER PROGRAMME



**MAGISTER OF TRANSPORTATION
SCHOOL OF ARCHITECTURE, PLANNING, AND POLICY DEVELOPMENT
INSTITUT TEKNOLOGI BANDUNG**

AND

**ENVIRONMENTAL AND INFRASTRUCTURE PLANNING
FACULTY OF SPATIAL SCIENCES
UNIVERSITY OF GRONINGEN**

2013

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PREFACE

Transport is an important element in tourism industry development. Without a transport network, tourist will not able to reach the tourism destination. Since they do not provide their own transport, the tourists are very dependent on local transportation services to support their activities. Proper public transport will influence the tourism industry development. Therefore, provision of good public transport in tourism area is important in supporting the tourist and non-tourist activities, no exception in the tourism island. Lack of accessibility by public transport is a serious problem in Bali Island. Public transport in Bali Island is still not well developed. If this issue continues to occur, it will further hinder tourism development. In this case, recommendations are made for Bali Government in order to improve accessibility by public transport for tourism and non-tourism activities. Recommendation is made by comparing accessibility by public transport in other tourist islands.

Public transport issue especially in tourism is very interesting for me since I was born and grew up in Bali. Bali as my hometown has many potential in tourism, e.g. culture, nature, and history. Before working as civil servant in the Ministry of Transportation, I was helping my father as a driver for tourist services. During my travel experience and my conversation with tourists, I realized that Bali still lack in public transport. Within the conversation during trips, I also know that tourists are preferring travel by public transport than private car. I believe that tourists in Bali will be increasing, if the tourists only served by private cars, the road capacity will not enough. I am wondering how to improve the public transport in Bali. Therefore I choose to explore the public transport in other tourist islands. Crete Island – Greece and Mallorca – Spain become my case study since they have better public transport.

In finishing this thesis, I receive many supports. Therefore, in this time I want to express my gratitude. First of all, I want to thank to Ida Sang Hyang Widhi Waca for all He gives to me. Secondly, I would like to convey my great appreciation to Dr. Eva Heinen, and Ms. Puspita Dirgahayani who always encourage me, and guide me in order to keep my thesis on the right track. Thirdly, I want to say my gratitude to Mr. Ir. Heru Purboyo H.P, DEA, Ph.D as the head of study program the Magister of Transportation and Prof. dr. Johan Woltjer as the



coordinator of the Master Environmental and Infrastructure Planning, the originator of the double degree program for Magister of Transportation. Furthermore, I want to say my gratitude to my institution of Ministry of Transportation for approving me to study master program. In this occasion, I want to express my gratitude to all of my colleagues in Double Degree Program ITB-RuG 2012 for all their supports. Most of all, I would like to convey my great gratitude to my beloved parents (I Gusti Ketut Subrata and Ni Gusti Ayu Sudiani), my lovely wife (Cok Istri Dewiyani Cakrawati), my little princess (I Gusti Agung Pragya Prameswari), my brother (I Gusti Ngurah Sudiantara), my father-in-law and mother-in-law (Cokorda Nyoman Sudarsana and Ni Komang Sri Sugesti), my friends in Directorate General of Civil Aviation, Ministry of Transportation, and my big family in Indonesia for supporting me during my study, and also Mas Ronny, Tante Indah, Om Yon, and Mbok Tut Nik for being my family in Groningen. Finally, I want to express my thanks to all people who have supported me in writing this thesis that I cannot mention one by one.



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ABSTRACT

TOURIST-ISLAND ACCESSIBILITY BY PUBLIC TRANSPORT: A COMPARATIVE STUDY OF BALI ISLAND – INDONESIA, CRETE ISLAND – GREECE, AND MALLORCA ISLAND – SPAIN

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Transport is an important element in tourism industry development. Since they do not provide their own transportation, the tourists are very dependent on local transportation services to support their activities. Provision of good public transport in tourism area is important in supporting the tourist and non-tourist activities, no exception in the tourism island. Bali is the name of a tourist island in Indonesia which is famous for its natural beauty and cultural charm that are still well preserved. The number of tourists visiting Bali has been increasing every year. Lack of public transport as an accessibility in order to support tourist and non-tourist activities is a serious problem in Bali Island. Therefore, the provision of public transport to support the tourist and non-tourist activities is necessary in Bali Island. The main aim of this research is to propose recommendations for improving the accessibility by public transport for the tourism and non-tourism activities in Bali Island. A comparative analysis is used in order to take lessons from other tourist islands that have already proven their success in accessibility by public transport. The Crete Island – Greece, and Mallorca Island – Spain are taken as the comparator island that will be explored since both islands have better accessibility by public transport quality. This research finds that the five dimensions of public transport in Bali, Crete, and Mallorca are provided in different way. Crete and Mallorca have better public transport than Bali. Bus as one of the public transport in Crete and Mallorca are able to service the passenger to the entire island. Accessibility by public transport in Crete and Mallorca can be transferred to Bali through a lessons learned processes.

Keywords: Accessibility, public transport, tourism.



CHAPTER I

INTRODUCTION

I.1. Background

Tourism is an industry that continues to experience growth. The development of tourism has affected the world economic growth in positive ways. According to the UNWTO (2012), international tourist arrivals grew by 4.6% to reach 983 million worldwide in 2011, up from 940 million in 2010, which was able to create an income of USD 1.030 billion. The international tourism industry also employed over 231 million people indirectly and generated over 10 per cent of world GDP (Page, 2009). Prospects for tourism in the future are providing great opportunities, especially when seeing the estimation number of international travelers by UNWTO (2012) that reach 1.8 billion people in 2030.

Growth of tourism industry is not only dominated by mainland tourism. In some countries, the tourism island contributes over 40% of national GDP (UNWTO, 2012). According to GID (2010), the Earth is home to more than 130,000 islands which host more than 500 million people. GID (2010) explains that an island has the advantage not shared by the mainland. An island has huge assets in their natural beauty with unique wildlife and varied landscapes and seascapes. Island collects many of the world's most unique and vulnerable plants, animals and ecosystems. Moreover, island plays an important role in the health, welfare and cultural diversity of the people living there. Island maintains and enriches culture and traditions. Therefore, many tourists are willing to spend the time to enjoy the exoticism of an island.

The development of tourism is accompanied by significant challenges (UNEP, 2011). One of the most important challenges in tourism industry is the provision of the appropriate transportation services in order to create accessibility to the tourism destinations as well as to support the tourist activities (McElroy, 2003). Meanwhile, Page (2009) reveals that one consistent problem from which transport for tourism suffered was a lack of space to deal with issues associated with the interface between



transport and tourism. If this problem continues to occur, it will hinder the development of tourism in the future.

Transport is an important element in tourism industry development. Since they do not provide their own transportation, the tourists are very dependent on local transportation services to support their activities. Page (2009) emphasizes that the transport and tourism industry are very closely linked. Without transport network, tourist cannot reach the tourism destination. Transportation in tourism destination is not only for tourism purpose, other community also uses the facilities for their activities. Page (2009) argues that there is no distinction between public transport users for tourist or non-tourist activities, both are defined as passenger. Provision of public transport services where tourist and non-tourist can travel together in mass quantities would result in a considerable reduction in the number of vehicles on the road (Litman, 2012). Proper public transport will influence the tourism industry development (Albalade and Bell, 2009). Better public transport performance heightens comfort and efficiency during a tourist's stay, in other hand, tourist may well seek alternative destinations if the ability of tourists to travel to a preferred destination is hampered by inefficiencies in the transport systems. Therefore, provision of good public transport in tourism area is important in supporting the tourist and non-tourist activities, no exception in the tourism island.

In order to build good public transport, assessments and evaluations of the way in which a transport system can be designed, developed and operated are important. Nijkamp (1995) develops the pentagon prism which contains five dimensions of the success factors for transport system, i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware*. Velde (1999) emphasizes the importance of distinguishing the levels of planning and control as well as analyzing organizational forms of public transport. In each level, it is clearly defined the actors who responsible for the decisions and the relationships between actors. All of these concepts are important in developing good public transport.

I.2. Research Problem

Bali is the name of a tourist island in Indonesia which is famous for its natural beauty and cultural charm that are still well preserved. Administratively, the island is governed

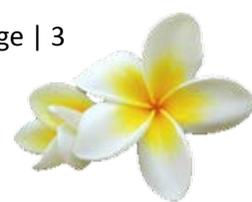


by The Provincial Government of Bali along with other smaller islands such as Nusa Penida, Nusa Ceningan, Nusa Lembongan, Serangan and Menjangan (Figure 1.1). The total area of Bali is 5,636 km² or 0.29% of the area of the Indonesian Archipelago. Tourism has over time become the main pillar of Bali's economic growth which accounts 70% of total GDP. The number of tourists visiting Bali has been increasing every year. In 2011, the number of tourists was over 6 million people ⁽¹⁾ and is expected to continue to increase in the following years. In 2025, the number of air passengers is expected to reach 25-32 million ⁽²⁾, most of whom are tourists. This number does not include tourists who enter the island through ferry ports and cruise ships harbors.



Figure 1.1 – Maps of Bali Island (Sources: <http://www.balitrekkingtour.com>)

In order to anticipate the demand of tourism, the Bali government has made several policies to improve the accessibility. Ngurah Rai International Airport as the major gateway of tourists and non-tourist is undergoing expansion of its terminal building. This airport project will be completed in mid of 2013. The capacity of this terminal building expected will accommodate 20 million tourists ⁽¹⁾. Improvements and increased capacity of ferry ports and cruise ships harbors are also being conducted. Accessibility to/ from Bali Island and between islands can be considered adequate to serve the tourists. However, accessibility within island in Bali is considered to be insufficient, especially public transport.



Lack of public transport as an accessibility in order to support tourist and non-tourist activities is a serious problem in Bali Island. Research conducted by Suweda et al (2011) also takes this issue as one of their conclusion. Currently, Bali government only improves the accessibility in the island only by focusing on the provision of transport infrastructure, such as construction of toll road and underpass in Southern Bali. There is no adequate means of public transport to support the mobility of local people and tourist to fulfill their desires. Bali rather has no public transport to support the tourist and non-tourist activities. Since 2011, Trans Sarbagita Bus has been operating to meet the transport needs. Bali also has other public transport such as carts, bemo, city transportation (*angkot*), rural transportation (*angdes*), shuttle bus, and inter-city buses. But all kinds of these transportation services are insufficient to facilitate tourist and non-tourist activities.

One of the causes of public transport underdevelopment in Bali is that Balinese people rely on private cars and motorcycles to support daily activities (Suweda et al, 2011). Majority the transport activities of the tourist and non-tourist is based on this mode, i.e. taxi, private car rental, travel services, shuttle bus, and motorbike rental. Consequently, traffic congestion happened in many tourist destination areas. If this condition continues to occur, it will bring negative impact for the tourism development. The transport problem occurs regarding with the level of accessibility and the applied transport system. Therefore, the provision of public transport to support the tourist and non-tourist activities is necessary in Bali Island (Suweda et al, 2011).

I.3. Research Aims

The main aim of this research is to propose recommendations for improving the accessibility by public transport for the tourism and non-tourism activities in Bali Island. Therefore, it is very important to examine in which way the accessibility by public transport system is designed, developed and operated in order to identify the weaknesses and strengths so that the suitable improvement strategies can be suggested. In order to have references of the best accessibility by public transport, this thesis will take lessons from other tourist islands that have already proven their success in accessibility by public transport. For that reason, the Crete Island – Greece, and Mallorca Island – Spain are taken as the comparator island that will be explored since both islands have better accessibility by public transport quality.



I.4. Research Questions

The main research question is:

‘What are the differences and similarities in accessibility by public transport between Bali Island – Indonesia, Crete Island – Greece, and Mallorca Island – Spain, and to what extent can the accessibility by public transport in Crete Island – Greece and Mallorca Island – Spain be adopted by Bali Island – Indonesia in order to improve the accessibility by public transport?’

The main question is divided into the following sub-questions:

- In which way are the five dimensions of the public transport, i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware* provided in Bali, Crete, and Mallorca?
- In what way the organizational forms, levels of planning and control, and actors involved are organized in the public transport in Bali, Crete, and Mallorca?
- To what extent can accessibility by public transport in Crete and Mallorca be transferred to Bali?

I.5. Research Framework

The research framework aims at giving the notion about how to improve accessibility by public transport in Bali Island - Indonesia. The framework of this research can be seen as the following figure.

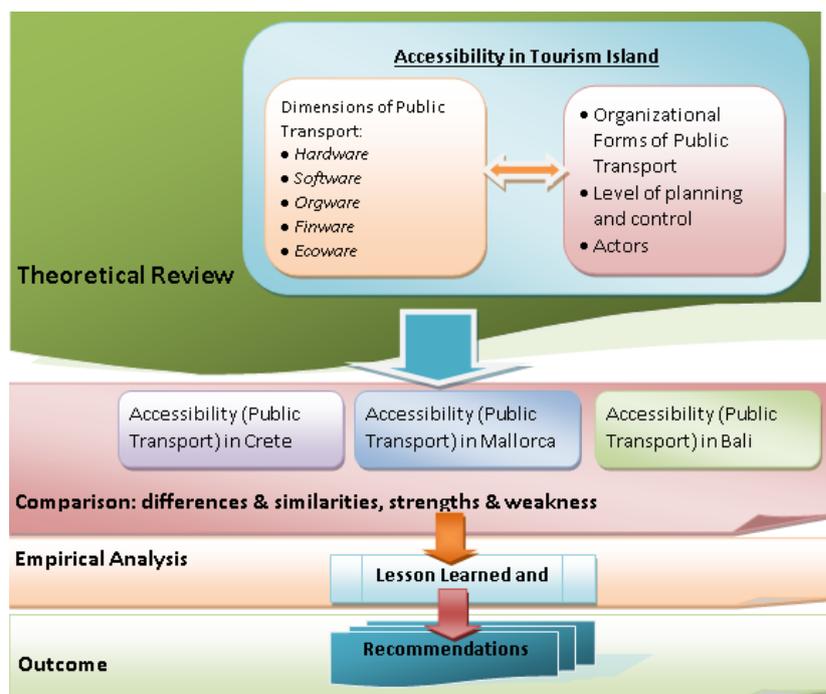


Figure 1.2 – Research Framework (Sources: Author)



This framework is developed by doing a theoretical review about accessibility and public transport. A framework becomes important since it is the base for understanding the key factors for improving accessibility in the tourism island. There are several aspects focused in this research, e.g. dimension of public transport, organizational forms, level of planning and control, and actors involved in public transport. Furthermore, these aspects are used to analyze the empirical case studies of accessibility, especially the public transport in Crete Island - Greece and Mallorca Island - Spain to get lessons as key points that then will be adopted to Bali case. As the outcome of this research, recommendations are formulated about how to improve the public transport for tourism and non-tourism activities in Bali.

I.6. Thesis Structure

This thesis consists of nine chapters. The content of this thesis can be described as follow:

Chapter I: Introduction

This chapter consists of background, research problem, research aims, research questions, theoretical framework and research framework, and research structure.

Chapter II: Accessibility

This chapter discusses the notions of accessibility as well as the accessibility in the tourism island. The first section introduces the concept and definition of accessibility. Meanwhile, the second section discusses the accessibility in the tourism island.

Chapter III: Public transport in the Tourism Island

This chapter's aim is to gather the knowledge about the notion of public transport, especially in the tourism island, as well give a strong foundation for the analysis in this research. The first section discusses the dimensions of public transport, i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware*. The next section, discuss the notions of the organizational forms, the level of planning and control, and the actors involves in public transport. This chapter also provides a conceptual



framework as the analytical guidance of the research in the last section of this chapter.

Chapter IV: Research Methodology

This chapter discusses the research method and the selection criteria of the cases. This chapter consists of methodology of research, and data collection. The first section discusses the research design; the next section discusses the case selection. The last section discusses the data that are needed and the method of analysis in this research.

Chapter V: Accessibility by Public Transport in Bali Island – Indonesia

This chapter discusses the accessibility by public transport in Bali Island – Indonesia. The first section gives the overview of accessibility by public transport in Bali. The second section gives the overview of land use of accessibility by their public transport. The next section identifies each dimension of the public transport in Bali. The last section discusses organizational forms, level of planning and control, as well as actors involved in their public transport.

Chapter VI: Accessibility by public transport in Crete Island – Greece

This chapter discusses the accessibility by public transport in Crete Island – Greece. This chapter is divided into four sections, i.e. overview of accessibility by public transport the first section, overview of land use of accessibility by public transport in next section, discussion of the five dimensions of public transport in the third section, and discussion of the organizational forms, level of planning and control, as well as actors involved in public transport in the last section.

Chapter VII: Accessibility by public transport in Mallorca Island – Spain

This chapter discusses the accessibility by public transport in Mallorca Island – Spain. The first section explains the current accessibility by public transport in Mallorca. The next section gives the overview of land use of accessibility by public transport. The third section discusses



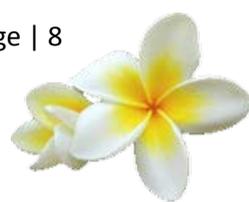
the five dimensions of their public transport. The last section discusses the organizational forms, level of planning and control as well as the actors involved of their public transport.

Chapter VIII: Comparison and Lessons Learned of Accessibility by public transport in Bali Island, Crete Island, and Mallorca Island.

This chapter presents the comparisons of the case study and discusses the lessons learned from this comparison. The first section of this chapter compares the similarities and differences in public transport in Crete, Mallorca, and Bali. Lessons learned from the comparison are presented in the next sections.

Chapter IX: Conclusions, Recommendations, and Reflections

This chapter provides conclusions, recommendations, and reflections of the research.



CHAPTER II

ACCESSIBILITY

This chapter discusses the notions of accessibility as well as the accessibility in the tourism island. These concepts are important in developing the theoretical background of this research. Since accessibility is a broad concept (Vandenbulcke et al., 2009), this chapter tries to formulate the accessibility concept based on several literatures and in line with the focus of this thesis. In order to gain better understanding about the notion of the accessibility and accessibility in the tourism island, this section divided into two sections. The first section gives short introduction about the concept and definition of accessibility. The second section explains the accessibility in the tourism island.

II.1 Concept and Definition of Accessibility

Accessibility is not a new concept; it is a concept that has been known for a long time. Litman (2012) in his research mentions that the first concept of accessibility was formulated by scientist whom named Hansen in 1959. Accessibility also a broad concept; there is no consensus about its definition and formulation (Vandenbulcke et al., 2009). Halden et al. (2005) explains that definition of the accessibility is depending on the context of the discussion. One of the well-known concepts and cited by many researchers is the accessibility concept that developed by Geurs and van Wee in 2004. Geurs and van Wee (2004) defines four components of the accessibility i.e. land use, transportation, temporal, and individuals (Figure 2.1). The land-use component reflects the land-use system; the transportation component describes the transport system; the temporal component reflects the temporal constraints and the time available for individuals to participate in certain activities; the individual component reflects the needs, abilities, and opportunities of individuals (Geurs and van Wee, 2004).

Based on this concept, many scientists try to formulate definition of accessibility which in line with the context of their discussion. Litman (2012) defines accessibility as the people's ability to reach goods, services and activities, which is the ultimate goal of the most of transport activity. He also defines accessibility into two terms, i.e. in term of potential (opportunities that could be reached) or in terms of activity (opportunities that



are reached). Bertolini et al (2005) argue that integration of transport and land-use planning is widely recognized as an essential aspect to achieve the sustainable development. Meanwhile, Hou and Li (2011) argued that key determinants of accessibility are the capacity and the structure of transport infrastructure.

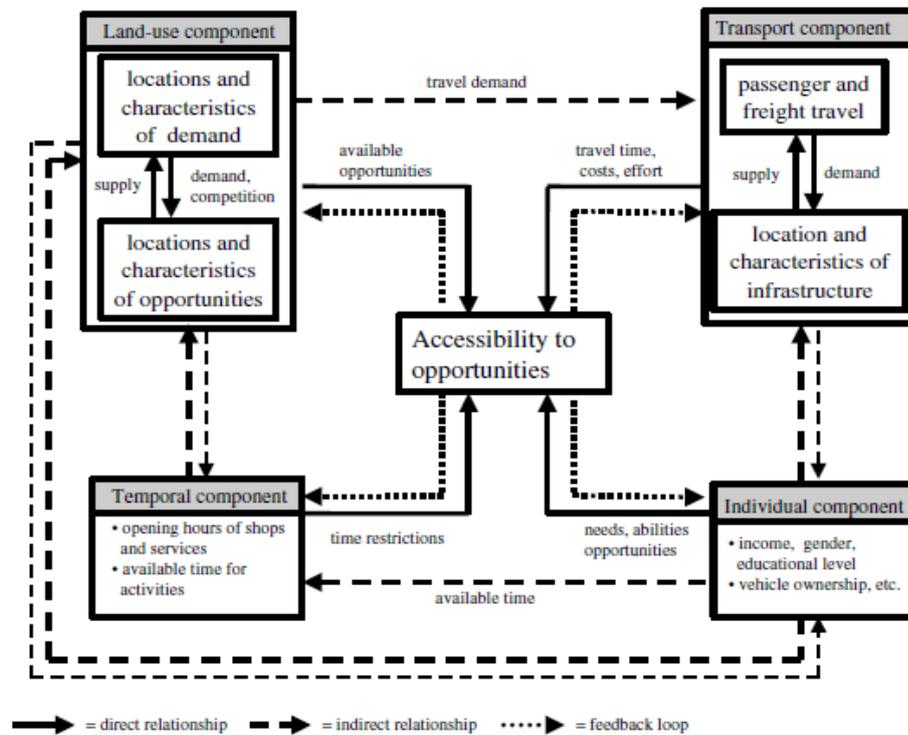
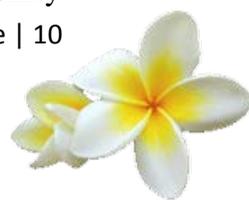


Figure 2.1 – Components of the Accessibility
(Sources: Geurs and van Wee, 2004)

Based on the above explanation and in line with the research aim, the concept of accessibility in this research is focused on the interaction between transport component and land-use component in accessibility. Therefore, the definition of accessibility in this research is formulated as the ability of land-use and transport to facilitate the people activities.

II.2 Accessibility in the Tourism Island

McElroy (2003) argues that one of the important challenges in tourism sector development is accessibility. Since the accessibility as a key element that links tourists to destinations to be accessed (Toth and David, 2010), it is become one of the fundamental preconditions for the existence of the tourist. The tourists cannot reach the destination that they want to visit without the availability of the adequate accessibility.



Lohmann and Nguyen (2011) defines there are three different perspectives and scales of the accessibility in the island, i.e. accessibility to/ from island, inter island accessibility, and accessibility within island. Proper planning of these three types of accessibility is one important aspect in supporting the success of the tourism island (Sato et al, 2009). Meanwhile, accessibility in the tourism island is not specifically only for tourist purposes, any other activities (non-tourist) also depend on the accessibility. Page (2009) explains that making the distinction between tourist and non-tourist in usage of transport is not necessarily feasible in practice. Both of them are typically viewed as passengers.

The quality of accessibility can also affect the number of tourist visits. Toth and David (2010) argue that tourists compare destinations based on their accessibility, thus accessibility has a primary role in selecting potential destinations. High fare in accessibility service is one of the typical problems in the tourism island (Sato et al, 2009). Therefore, they are emphasized the importance of accessibility planning in the tourism island development. Each of the tourism islands has their own characteristic that distinguishing from other island (Toth and David, 2010). Because of the uniqueness in environmental and social features, a special management is required in the planning of accessibility in order not to conflict with this uniqueness.

The integration of the land-use and transport components is important in planning accessibility especially the tourism island (Toth and David, 2010). They defines that the land-use contains the spatial distribution of land-use types (e.g. the locations and features of tourist destinations). Meanwhile, the transport includes demand for transport and services provided by the infrastructure. Changes in land-use will affect transport, and vice versa. Therefore, in order to gain better accessibility, this integration concept should be taken into consideration in the planning. Page (2009) emphasizes that the development of an integrated and coordinated planning of the land use and transport should minimize the distance of travel activities.

VTPI (2011) argues that planning of the accessibility in the tourism island can be done by specific strategies, i.e. improve the transport options, integrate the alternative transport into tourist activities, provide disincentives to drive, etc. VTPI (2011) emphasizes about the policy concept in accessibility should be oriented towards the increased use of the public transport and reducing car use. Public transport includes

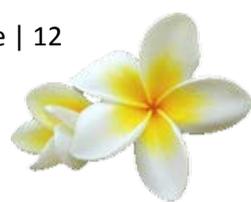


various services using shared vehicles to provide accessibility to the public. Litman (2012) explains that public transport not only provides a much larger portion of certain types of travel, but also brings solution to certain transport problems. Public transport can reduce the private car uses. Page (2009) argues a fully integrated public transport system provides a seamless travel experiences as well as can reach any tourist destinations. He also explains that investment in public transport provides social, economic and environmental benefits for both residents and tourists alike. Investment in transport infrastructure is a long term proposition and is unlikely to yield tangible benefits in market-led economies in relation to tourism.

Based on the definition that has been formulated in the first section of this chapter and the above explanation, the accessibility in the tourism island in this research is defined as the ability of land-use and transport to facilitate the passenger activities, both tourist and non-tourist. Meanwhile, based on the research problem and research aims, the accessibility in this research is focused on the accessibility within island, especially in the public transport. Therefore, in order to gain better understanding about the notion of the public transport in the tourism island, this concept is discussed in further chapter.

Conclusion

This chapter is focused on the concept of accessibility in order to develop the theoretical background of this research. Accessibility is important in tourism. There is a strong integration between land-use and transport in accessibility. In line with this concept, accessibility in this research is defined as the ability of land-use and transport to facilitate the people activities. Land-use refer to spatial distribution of tourist destination, meanwhile transport refer to transport and services provided by the infrastructure which will be discussed in further chapter. The people's activities refer to the tourist and non-tourist activities. The accessibility in this research is focused on the accessibility within island, especially in the public transport. Focus on the public transport is one solution to certain transport problems as well as in line with the integration concept of land-use and transport. A fully integrated public transport system provides a seamless travel experiences as well as can reach any tourist destinations. Investment in public transport provides social, economic and environmental benefits for both residents and tourists alike.



CHAPTER III

PUBLIC TRANSPORT IN THE TOURISM ISLAND

As mentioned in the previous chapter, accessibility, especially the public transport plays an important role in tourism development. In the tourism island, where many tourist and non-tourist are facing a transport problem, public transport may become the key to resolving this problem. Therefore, this chapter describes the public transport in the tourism island. In order to gain knowledge about the notion of public transport, especially in the tourism island, as well give a strong foundation for the analysis in this research, this chapter is divided into three sections. The first section elaborates the dimensions of public transport. The next section explains the organizational forms, levels of planning and control, and actors involved in public transport. The last section introduces the conceptual framework as the analysis guidance of the research. A conclusion summarizes this chapter.

III.1 Dimensions of Public transport

Public transport in tourism is a complex system since it operates in different markets, thus make it difficult to analyze (Page, 2009). A special treatment is necessary in order to planning a better quality in public transport. There are several concepts about how to planning and developing good transport systems, e.g. Transport Demand Management, Transit Oriented Development, etc. Meanwhile, one concept which often used by researchers to study the transport system is the pentagon prism which formulated by Nijkamp in 1995.



Figure 3.1 – The Pentagon Prism of the Success Factors for Transport System

(Sources: Nijkamp, 1995)

The pentagon prism can be used to assess and evaluate the way in which a transport system can be designed, developed and operated. The pentagon prism contains five



dimensions of public transport system, i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware* (Figure 3.1).

In order to gain the understanding about each of these dimensions, this section divided into five subsections. The first subsection discusses the *hardware* in the public transport. The second subsection discusses the *software* in the public transport. The third subsection elaborates the *orgware* in the public transport. The fourth subsection elaborates the *finware* in the public transport. The last subsection discusses the *ecoware* in public transport.

III.1.1 *Hardware*

Hardware is basic element in public transport, no exception for the public transport in the tourism island. Without *hardware* the public transport cannot be operating properly. *Hardware* can be in form of facilities and infrastructure of transport. Nijkamp (1995) defines *hardware* refers to physical aspects of transport infrastructure used to provide integrated transport service(s), e.g. technical equipment, stations, terminals. *Hardware* in public transport is not only in forms of infrastructure and modes. Velde (1999) defines *hardware* side is everything that produces the vehicle-kilometers. Translink (2012) in their manual mentioned that public transport infrastructure plays a vital role in the operation and function of an efficient, convenient, and safe public transport system, therefore, appropriate infrastructure forms an important part of the customer experience and helps to make public transport a competitive, viable alternative to private vehicle travel. Quality and efficiency of the infrastructure network also plays important role in public transport. Page (2009) explains that the infrastructure needs to be harnessed to provide an efficient connection between the tourist and destination if it is to gain a competitive advantage so that tourism can develop.

III.1.2 *Software*

Software is the supporting element of the *hardware* in public transport. Basically, *software* not only facilitates the operation of the facilities and infrastructure, but also helps the passenger (tourist and non-tourist) in the usage of public transport. For example, the information system gives an overview to



the passenger about condition of the island as well the public transport, e.g. tourist destination, distance, time schedule, fares, routes, transit point, and other information. According to Nijkamp (1995), *software* refers both to computer software used to control the sophisticated hardware facilities and related services, e.g. information systems, reservation systems, communication facilities, data services/banks, and route guidance systems which offered to the user of the public transport. Meanwhile, Velde (1999) defines *software* is everything that helps to sell the vehicle-kilometers, e.g. images, additional services, etc.

III.1.3 *Orgware*

Orgware is the dimension that relates with legal aspect of the public transport. Nijkamp (1995) define *orgware* comprises all regulatory, administrative, legal, management, and coordination activities and structures regarding both the demand and the supply side. For example is role of regulation in the public transport. According to Ongkittikul (2006), regulation not only ensure the quality and safety standard of the services, but also able to protect the market and the competition. He explains that regulation for the provision of public transport network is affected by both modally and geographically, therefore, there is no same regulation of public transport in any region.

III.1.4 *Finware*

Funding is an important factor in the development of public transport. Nijkamp (1995) explains that *finware* refers to the socio-economic cost-benefit aspects of new investments, the ways of financing and maintaining new public transport infrastructures, the fare structures, the state contracts for guaranteed finances of the public transport deficits, etc. The *finware* dimension in public transport also includes pricing system, collection and validation ticket system, as well as funding sources.

III.1.5 *Ecoware*

The availability of public transport should not give negative externalities to the environmental conditions. Therefore Nijkamp (1995) adds *ecoware* dimension in his pentagon prism of the success factors for transport systems. He defines



that *ecoware* refers to environmental and ecological concern (including transport externalities such as noise, air pollution, safety, and congestion) in the public transport sectors. The issue of environmental should become a concern in order to develop tourism destinations (Toth and David, 2010).

The resume of these dimensions can be seen in the following table.

Table 3.1 – Resume of Dimensions in Public Transport (Sources: adopted from Nijkamp, 1995)

Hardware	Software	Orgware	Finware	Ecoware
Road networks	Time schedules	Regulations	Funding Sources	Environmental concerns
Rail networks	Fare information	Administrative	Pricing systems	Safety concerns
Vehicles	Route information	Legal aspects	Ticket collecting systems	
Stations	Other information		Ticket validating systems	
Shelters				

These five dimensions of public transport give a systematic way about key success or failure of a public transport system (Nijkamp, 1995). Since there are different factors and processes affecting the organization, operation and management of public transport (Page, 2009), the organizational form, levels of planning and control, and actors involved are important in analyzing public transport (Velde, 1999). These concepts in general give information about public transport services and how it is managed. The overview of services and management of public transport are discussed in next section of this chapter.

III.2 Organizational Forms, Levels of Planning and Control, and Actors Involved in Public transport

Velde (1999) formulates the organizational forms of public transport in order to distinguish the role of each actor in levels of planning and control. There are many actors involved in the public transport, i.e. people, transport authority, transport planner, operator, etc. This leads to complex interactions between actors and their coordination activities. Velde (1999) defines three forms of the public transport organizations i.e. (public) authority initiatives, market initiatives, or combination between authority and market initiatives (Figure 3.2). He argues that the actors involved, their number and the way in which they come to play will depend on the organizational framework. Velde (1999) formulates three main groups of relation between actors, i.e. democratic control, hierarchical control, and management contract.



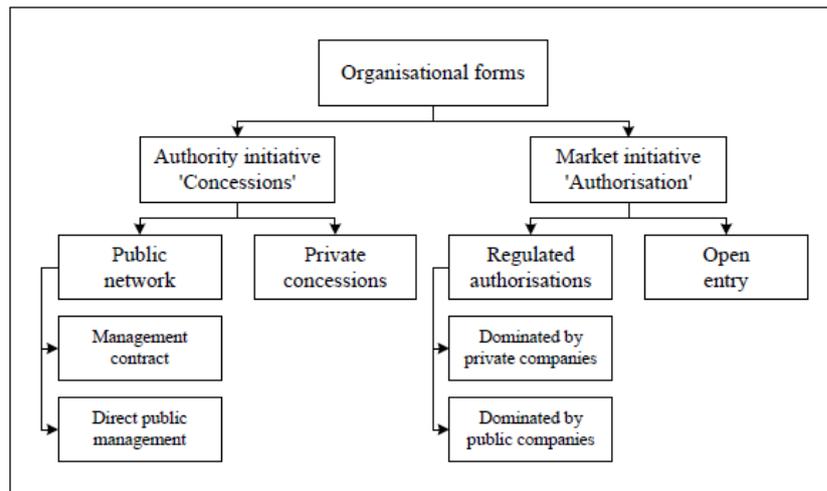


Figure 3.2 – Organizational Forms in Public transport (Sources: Velde, 1999)

Velde (1999) emphasize the importance of distinguishing the levels of planning and control in analyzing organizational forms of public transport. He argues that level of planning and control influences a number of decisions to be made before passenger transport services can actually be produced and sold. Velde (1999) develops hierarchically ordered types of activities which distinguished according to the scope of the planning issues addressed and the planning horizon. There are three levels of planning and control in public transport i.e. strategic level, tactical level, and operational level (Figure 3.3). In each level, it is clearly defined the actors who responsible for the decisions and relationships between actors. There is also a component of public transport dimensions in each level.

Decision level	General description	Decisions	
		“Software”	“Hardware”
Strategic Long term (5 years)	<i>What do we want to achieve?</i>	General Aims Transport policy Market share Profitability General service characteristics Areas Target groups Intermodality	
Tactical Medium term (1-2 years)	<i>Which services can help to achieve these aims?</i>	Detailed service characteristics Fares Image Additional services Vehicles Routes Timetable	
Operational Short term (1-6 months)	<i>How to produce these services?</i>	Sales Selling activities Information to the public ...	Production Infrastructure management Vehicle rostering and maint. Personnel rostering and mnngt

Figure 3.3 – Levels of Planning and Control in Public transport (Sources: Velde, 1999)



At the strategic level, the general aims and the service characteristic are formulated, which include the profit and the market share, the general description of the services, the area of supply, as well the core of ‘entrepreneurship’ and the actor responsible for the crucial decisions. Meanwhile, the tactical level defines the details of service characteristics, whether the traditional parameters of public transport, e.g. the routes, timetable, vehicles, and fares, also ‘softer’ aspects such as the image of the services and the provision of additional services to the passengers. Furthermore, the operational level translates the tactical aspects into day-to-day practice, includes the management of the sales staffs, the drivers, the vehicles and the infrastructures to ensure the realization of the services according to the tactical planning (Velde, 1999).

Based on above explanation, there are several aspects that were assessed and evaluated in this research for each of dimensions and each of decision level in the public transport. The resume of those aspects can be seen in the following table.

Table 3.2 – Resume of Important Aspect in Research (Sources: adopted from Velde, 1999)

Actors	People, transport authority, transport planner, operator				
Relation	Democratic control, hierarchical control, management contract				
Decision Level	Dimension				
	Hardware	Software	Orgware	Finware	Ecoware
Strategic	<ul style="list-style-type: none"> • Transport policy in hardware 	<ul style="list-style-type: none"> • Transport policy in software 	<ul style="list-style-type: none"> • Transport policy in orgware 	<ul style="list-style-type: none"> • Transport policy in finware 	<ul style="list-style-type: none"> • Transport policy in ecoware
Tactical	<ul style="list-style-type: none"> • Road networks • Rail networks • Stations • Shelters • Vehicles 	<ul style="list-style-type: none"> • Time schedules • Fare information • Route information 	<ul style="list-style-type: none"> • Regulations • Administrative • Legal aspects 	<ul style="list-style-type: none"> • Funding Sources • Pricing systems • Ticket collecting • Ticket validating 	<ul style="list-style-type: none"> • Transport environmental concerns • Transport safety concern
Operational	<ul style="list-style-type: none"> • Road networks managements • Rail networks managements • Station managements • Shelter managements • Vehicle managements 	<ul style="list-style-type: none"> • Time schedule managements • Fare managements • Route managements 	<ul style="list-style-type: none"> • Administrative managements 	<ul style="list-style-type: none"> • Funding managements • Pricing managements • Ticket collecting managements • Ticket validating managements 	<ul style="list-style-type: none"> • Transport managements



III.3 Conceptual Framework

Based on the concept and definition that have been discussed in Chapter II, as well the above explanation, a conceptual framework (Figure 3.4) can be generated as the analysis guidance of this research. As mentioned in the second chapter, accessibility is important in tourism development. Public transport is one solution to certain transport problems and in line with the integration concept of land-use and transport. Velde (1999) emphasize the importance of distinguishing the levels of planning and control in analyzing organizational forms of public transport. Based on the concepts of hierarchically ordered types of activities that developed by Velde (1999), there are three levels of planning and control in public transport, i.e. strategic level, tactical level, and operational level. The organizational form also determines the actors involved, their number and the way in which they come to play. Through these levels, the assessment of the dimensions of public transport can be done. Therefore, this research is focused on these three levels of the public transport.

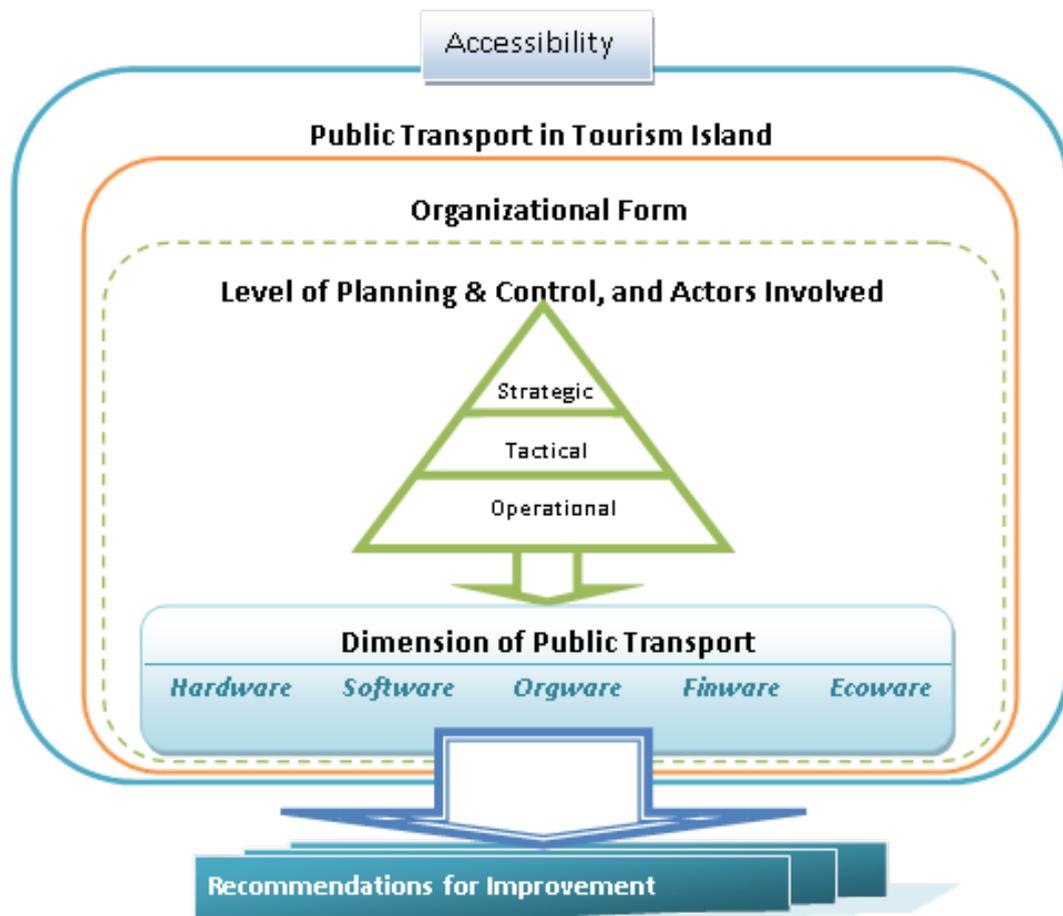
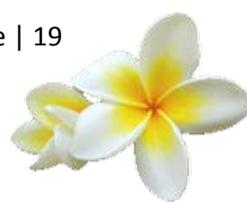


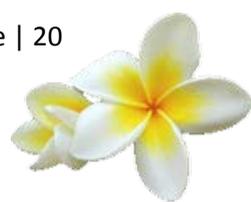
Figure 3.4 – Conceptual Framework (Sources: adopted from Nijkamp, 1995 and Velde, 1999)



Based on the pentagon prism of public transport system that developed by Nijkamp (1995) and in line with the research sub question, there are five dimensions which became the focus of analysis of the public transport in this research, i.e. *hardware, software, orgware, finware, and ecoware*. Through these five components, it can be assessed about how a public transport designed, developed and operated. Therefore, this research is focused on these five dimensions. After analyzing the aspects for each component of public transport in each levels of planning and control as well the actors involved, recommendations formulates about how to improve the public transport for tourism and non-tourism activities.

Conclusion

This chapter is focused on the public transport in tourism. Public transport is important in tourism development. Since public transport is a complex and complicated system, a special treatment is necessary in order to planning a better quality in public transport. Pentagon prism is a concept which well-known and often used by researchers to study the transport systems. Pentagon prism can assess and evaluate the way in which transport systems can be designed, developed and operated. There are five dimensions of public transport in the concept of pentagon prism, i.e. hardware, software, orgware, finware, and ecoware. In line with the research sub question, this thesis is focused on those five components, i.e. hardware, software, orgware, finware, and ecoware. Organizational form is an important thing in public transport. The organizational form determines the actors involved, their number and the way in which they come to play. Therefore, it is important to distinguishing the levels of planning and control in analyzing organizational forms of public transport. There are three levels of planning and control in public transport that be a focuses of this research, i.e. strategic level, tactical level, and operational level.



CHAPTER IV

METHODOLOGY

First of all, before making a comparison of the accessibility by public transport in the tourism island, the last two chapters have been discussing the study literature that used in this research. The notions of the accessibility and accessibility in the tourism island have been elaborated in Chapter II. These notions have been discussed based on the scientific literature review. Thus, the scientific concept of the accessibility in the tourism island can be used as a basis for further steps of this research. Afterwards, in chapter III, the concept of the public transport in the tourism island have been elaborated in order to give strong scientific foundation in order to make the assessment of accessibility by public transport for the comparison purposes in this research.

In this chapter, the research method in order to gain the lessons learned is outlined and, using three selection criteria, the cases for researching the public transport are determined based on existing practices. In order to make a well structured research, this chapter is divides into three sections. The first section discuss the research design, the next section discuss the case selection. The last section discusses the data that needed and the method of analysis in this research.

IV.1 Research Design

Observing surrounding world is one of research method that can be conducted by a researcher (Driscoll, 2011). Since comparison can explore basic information for realizing general values (Teune, 1990), comparative analysis can be used to understand the practices of certain policy in order to design the new policy for solving problems. Mills et al. (2006) argue that comparative analysis can be used for comparing social entities both qualitatively and quantitatively based on many lines in the scope of cross-national or regional. Therefore, in order to assess the accessibility by public transport in the tourism island as well as gain the lessons learned, a comparative case study of three cases is performed. A case study is suitable for this research as it possibility to evaluate the characteristic of public transport as well as to find the strength and weakness. Looking at a general image of the entire tourism island would hardly provide



information on the best solution of accessibility issues because each tourism island has their own characteristics. Due to limited time and resources, the number of cases has been restricted to three. More cases would be preferable for it may cover more variety between the tourism islands than just three. However, this verification is impossible within the time available to conduct this research, as shall be elaborated more on below.

IV.2 Case Selection

In this research, a comparison between three cases of the tourism island is made to find the differences and similarities in each dimension of the public transport in the tourism island. This section is, first, outline selection criteria to choose case of the tourism island and, second, determine the tourism island that fit the criteria.

IV.2.1 Selection Criteria

The island that relies on tourism as a major economic source community is be investigated in this research. Due to the Bali Island as the major cases in this research to improve its accessibility, therefore in order to select the case, it should met the Bali Island characteristic, or at least approaching it. The variety is sought in three criteria:

- a. Size of the island;
- b. Spread of tourist attraction; and
- c. Quality of the accessibility.

The first criterion chosen for the reason that the size of the island that to be choose as the case has a size that is not much different from Bali Island, with the expectation that their policy strategy can be applied in Bali Island. Area of the island of Bali is a 5.636 km². Due to the vary size of the tourism islands, this research set the island size in range 1.000-10.000 km². The same size of the island hopefully also gives same transport option.

The second criterion is the tourism spread, its mean the location of tourist attractions are spread throughout the island and not just concentrated in one spot. This criterion is chosen because of the nature of the spread of tourist attractions in Bali Island are also throughout the island. So the characteristics of the public transport in the island that was chosen as the case also represent the condition of the spread of tourist attractions in Bali Island.



The last criterion is the quality of the accessibility on the island that selected. The success of accessibility is reflected from the quality of existing accessibility, i.e. their public transport. This criterion was chosen regarding with the aims of this research is to gain lessons to improve the public transport in Bali Island. Based on these criteria, some of the tourism island has chosen, as shown in the following table.

Table 4.1 – Tourism Island Chosen Based on the Criteria (Sources: Author)

No.	Island Name - Country	Size (Km ²)	Spread of tourism attraction	Quality of the accessibility
1	Maui - Hawaii	1.883	throughout the island	public transport not well organized
2	Tenerife - Spain	2.034	throughout the island	public transport not well organized
3	Mallorca - Spain	3.640	throughout the island	public transport well organized
4	Rhode - Greece	1.407	throughout the island	public transport well organized
5	Crete - Greece	8.336	throughout the island	public transport well organized
6	Corsica - France	8.680	throughout the island	public transport not well organized
7	Cyprus	9.251	throughout the island	public transport well organized

IV.2.2 Selected Cases and Case Descriptions

Based on table 4.1 the two cases are selected i.e. Crete Island and Mallorca Island. Crete Island and Mallorca Island were chosen because of their size are most approaching to the size Bali Island than other islands. Mallorca Island was chosen to represent the island that lesser in size than Bali Island, meanwhile Crete Island was chosen to represent the island that bigger than Bali Island. Other reasons for choosing both islands are the throughout spread tourist destination in the island and well organized in public transport.

Bali Island – Indonesia

Bali is name of an island in the Indonesian Archipelago. Geographically, Bali Province lies between 115⁰⁰' East longitude and 08²⁰' South latitude. Total area of this island is 5,636 km², which also includes five small islands. The population of Bali in 2010 is 3,890,757 people, with density 690.26/km². Based on data from the Bali Government Tourism Office, number of tourist in 2012 is 8.955.557 visitors. Bali can be accessed through air and sea transport (Figure 4.1). Bali has an international airport in southern part of the island, i.e. Ngurah Rai International Airport. Meanwhile, for the accessibility to/ from island and inter island through sea, Bali has three sea ports i.e. Bena, Gilimanuk, and Padang Bay. Bali has many tourist destinations which are spread to all parts of the island (www.tourism.baliprov.go.id).





Figure 4.1 – Airport and Seaport in Bali Island

(Sources: <http://www.bali-surprise.com/index2.html>)

Crete Island – Greece

Crete is the largest island in Greece, and the fifth largest one in the Mediterranean Sea. Geographically, Crete lies between 25°00' East longitude and 35°15' North latitude. Total area of this island is 8,336 km², which also includes a large number of islands, islets, and rocks hug the coast. The population of Crete in 2010 is 623,065 people, with density 75/km². According to data from the Greek Statistical Authority, number of tourist to Crete in 2010 is 2.464.814 visitors. Crete can be accessed through air and sea transport (Figure 4.2).



Figure 4.2 – Airports and Seaports in Crete Island

(Sources: <http://www.thebestcars.gr/maps-crete.asp>)

The island has three significant airports, i.e. the Heraklion International Airport, Chania Airport, and a smaller one in Sitia. There are also 6 (six) seaports in Crete, i.e. Port of Kissamos (Kastelli), Port of Souda, Port of Rethymnon, Port of Heraklion, Port of Agios Nikolaos, and Port of Sitia. Crete has many tourist interest areas that spread to all parts of the island (<http://www.interkriti.org/crete>). KTEL are bus-bases regular public



transport which serve the tourist and non-tourist activities in this island (<http://www.ktelherlas.gr>).

Mallorca Island – Spain

Mallorca is an island located in the Mediterranean Sea, the largest island in the Balearic Islands Archipelago, in Spain. Geographically, Mallorca lies between 02⁰59' East longitude and 39⁰37' North latitude. Total area of this island is 3,640 km². The population of Mallorca in 2010 is 869,067 people, with density 238.75/km². According to data from the Mallorca Statistical Authority, number of tourist to Crete in 2012 is 9.146.228 visitors. Mallorca can be accessed through air and sea transport (Figure 4.3). The island has one airport, i.e. Palma de Mallorca International Airport. Mallorca has two seaports, i.e. Palma de Mallorca Port and Port d' Andratx. Mallorca has a lot of tourist areas that are spread to all parts of the island. Their public transport is also available and accessible for the tourist and non-tourist activities (<http://palmavirtual.palmademallorca.es>).



Figure 4.3 – Airports and Seaports in Mallorca Island
(Sources: <http://www.info-majorca.co.uk/beaches.php>)

IV.3 Data and Method Analysis

For each case, assessment of the public transport in each tourism islands is done. The organizational forms as well as the five dimensions of public transport i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware* are examined. Based on the resume of important aspect in Table 3.1, the secondary data required for the study and analysis can be determined (Table 4.2).



Table 4.2 – Dimensions, Data Needed and Data Sources

Dimensions	Data Needed	Data Sources
Hardware	Information that related to <i>hardware</i> of public transport, e.g. road networks, rail networks, vehicles, stations, shelter	Trans Sarbagita Report - 2013, Bali Governor Decree No. 11 of 2011 dated 11 April 2011, National Law No. 22 of 2009 on Traffic and Transportation, PERDA No. 16 of 2009 on Spatial Planning (RTRW) of Bali Province, PERDA No. 6 of 2009 on Long Term
Software	<i>Software</i> that applied in public transport , e.g. time schedules, fare information, route information, other information	Development Plan of Regional (RPJPD) Bali Provincial Year 2005-2025, Decision of the Minister of Transport & Communications No.B36934/2805 -
Orgware	<i>Orgware</i> that applied in public transport , e.g. regulation, administrative, legal aspects	Greek Official Gazette 682/b/10-7-2002, Mallorca Law 7 / 1985 of 2 April
Finware	<i>Finware</i> that applied in public transport , e.g. funding sources, pricing system, ticket collecting system, ticket validating system	
Ecoware	Information that related to <i>ecoware</i> of public transport, e.g. regulation of safety, environmental protection	

Analyze of this research is using comparative analysis method. The review and analysis are based on the secondary data that related with the context. The secondary data is used in forms of policy documents, articles, official websites, tourism websites, and other sources. This review and analysis is made to obtain the information that used to analyze the dimension of public transport adopted by the two cases, i.e. Crete and Mallorca. The differences and similarities of the public transport in each case is plotted to compare the strength and weakness. Lessons from this comparison are compared in context of Bali Island. The potential strategy is made as recommendation and solution for improvement the accessibility in Bali Island.

Conclusion

In this chapter, two cases have been selected in order to study the accessibility in the tourism island, especially their public transport, namely Crete Island and Mallorca Island. Both of these islands almost have similar characteristics with Bali Island, i.e. in size and spread of tourism destination. Crete Island and Mallorca Island also have better quality in their accessibility. To study the cases, secondary data review and analysis is aimed to get the specific characteristic of the public transport in each case. The strength and weakness of each public transport is formulated and compared in order to get best lessons for improvement of accessibility in Bali Island. The organizational forms and the five dimensions of public transport, i.e. hardware, software, orgware, finware, and ecoware are analyzed in each of case study.



CHAPTER V

ACCESSIBILITY BY PUBLIC TRANSPORT IN BALI ISLAND – INDONESIA

This chapter discusses the accessibility by public transport in Bali Island – Indonesia. The discussion covers the overview of accessibility by public transport, overview of land use accessibility by public transport, dimensions of public transport, levels of planning and control, organizational forms, and actors involved in public transport.

V.1 Overview of Accessibility by Public Transport

Accessibility by public transport in Bali Island is served by road based transport, e.g. taxis, local buses, shuttle buses, bemos (minibus), dokars (horse cart), and ojek (motorcycle taxi). The main form of public transport in Bali is local busses and bemos (<http://www.lonelyplanet.com>). The busses are serving the trips between the biggest villages; meanwhile bemos drive within and inter villages. Both of this transport operate a specific route and stop whenever somebody needs to get off or get on. There are no timetables or written information on the buses and bemos routes (<http://www.tripadvisor.com>). Because not all part of the island is served by this public transport, therefore, the local peoples prefer to use motorbike or private car to support their activities (Suweda et al, 2011).



Figure 5.1 – Local Busses and Bemos in Bali (Sources: <http://www.lonelyplanet.com>)

Bali also has tourist shuttle buses (Figure 5.2) which are quicker, more comfortable, and more convenient than regular public transport (<http://www.lonelyplanet.com>). Shuttle



buses can only be found in certain tourist areas and only serve a particular route based on the order, not in regular services. There are no timetables or written information on the buses routes. Shuttle buses are mostly found in the south part of the island, such as Kuta and Nusa Dua. Generally, shuttle bus services are provided by the hotel or other particular tourist attraction (<http://www.baliagain.com>).



Figure 5.2 – Shuttle Buses in Bali (Sources: <http://www.lonelyplanet.com>)

Bali does not have an adequate regular public transportation to support the tourist and non-tourist activities (Suweda et al, 2011). Meanwhile, a sufficient and proper public transport is important element in support the tourism development (Toth and David, 2010). In response this situation, in 2011, Bali Government launch a regular public transport named Trans Sarbagita Bus (Figure 5.3). Trans Sarbagita only serves the tourist and non-tourist activities in southern part of the island (<http://www.baliagain.com>). The overview of land use in accessibility of this public transport is discussed in next section of this chapter.



Figure 5.3 – Trans Sarbagita Bus (Sources: <http://kminnen.blogspot.nl>)



V.2 Overview of Land Use of Accessibility by Public Transport

This section discusses the land use of accessibility by Trans Sarbagita. As mentioned in previous section, Trans Sarbagita is a buses-based public transport in southern part of Bali. There are eighteen corridors planned, but only three corridors that have been operating, i.e. Batubulan – Nusa Dua, Denpasar City – Airport, and Denpasar City – Uluwatu Temple (Figure 5.4). The routes of Trans Sarbagita not only links the city center (Denpasar City) with the public service areas e.g. Batu Bulan Buses Terminal, Tegal Buses Terminal, Ngurah Rai International Airport, Benoa Harbor, Udayana University, but also with the tourist destination areas e.g. Uluwatu Temple, Nusa Dua Beach, Kuta Beach, Jimbaran Beach, etc. (Trans Sarbagita Report, 2013). The routes are also through the public services areas and tourist destinations areas. The dimensions of Trans Sarbagita are discussed in next section of this chapter.

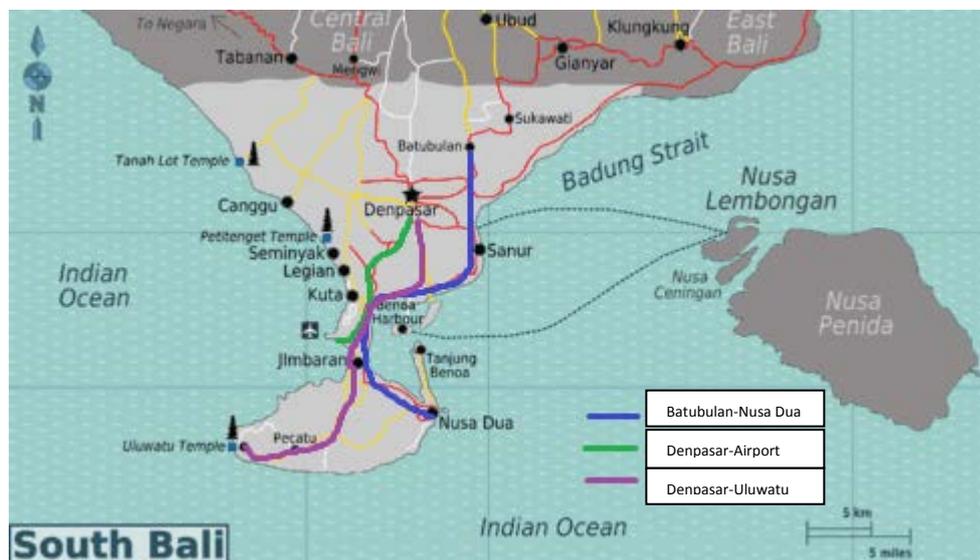


Figure 5.4 –Route Networks of the Trans Sarbagita

(Sources: Trans Sarbagita Report, 2013)

V.3 Dimensions of Public transport

This section discusses the five dimensions of public transport in Bali i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware*. Trans Sarbagita is a regular public transport in Bali which serves the tourist and non-tourist activities.

V.3.1 Hardware

The infrastructure of Trans Sarbagita is using the existing road networks with the "Mixed Traffic Priority" systems. There are no dedicated roads for each route. The network of Trans Sarbagita consists of 18 trunk lines (corridors) and



36 feeder lines as an integrated system of integrated services networks. The trunk lines are the linear networks which links vertices of the crowd, e.g. bus terminal, airport, and several tourism destinations. Meanwhile, the feeder lines are radial networks which take passengers to bus stops from other nearby places. For passenger comfort, Trans Sarbagita is equipped with open shelters located in several points along the routes (Figure 5.5). Trans Sarbagita deploys medium and large bus to operate on the trunk lines and minibus or microbus on feeder lines (Trans Sarbagita Report, 2013).



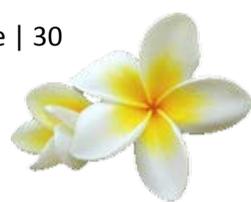
Figure 5.5 – Shelter of the Trans Sarbagita Bus
(Sources: Trans Sarbagita Report, 2013)

V.3.2 *Software*

The vehicle capacities are distinguished according to the route structures, i.e.:

- The trunk lines are served by medium bus with capacity of 30 people (20 people seated and 10 standing) and large bus with a capacity of 50 people (30 seated and 20 standing).
- The feeder lines are served by minibus or microbus with a capacity of 12 people.

Trans Sarbagita operates daily and scheduled to start at 5:00 a.m. and end at 9:00 p.m. with average headway 15 minutes. The information about routes and timetables are available in every bus shelters. The services of Trans Sarbagita currently is not applying advanced system, e.g. in sales, information, and reservation systems. Trans Sarbagita does not apply computerized and internet-based systems in various aspects of their operations. There are no specific marketing systems for their services (Trans Sarbagita Report, 2013).



V.3.3 *Orgware*

SARBAGITA is the acronym of the four regencies in the southern part of the island that supports the provincial capital, i.e. Denpasar, Badung, Gianyar, and Tabanan (Figure 5.6). Because the service area of Trans Sarbagita covers several areas with different jurisdiction, it is required a Memorandum of Understanding (MoU) between the Ministry of Transportation with the Provincial Government of Bali, Denpasar Municipality, Regencies Government of Badung, Gianyar and Tabanan (Trans Sarbagita Report, 2013).

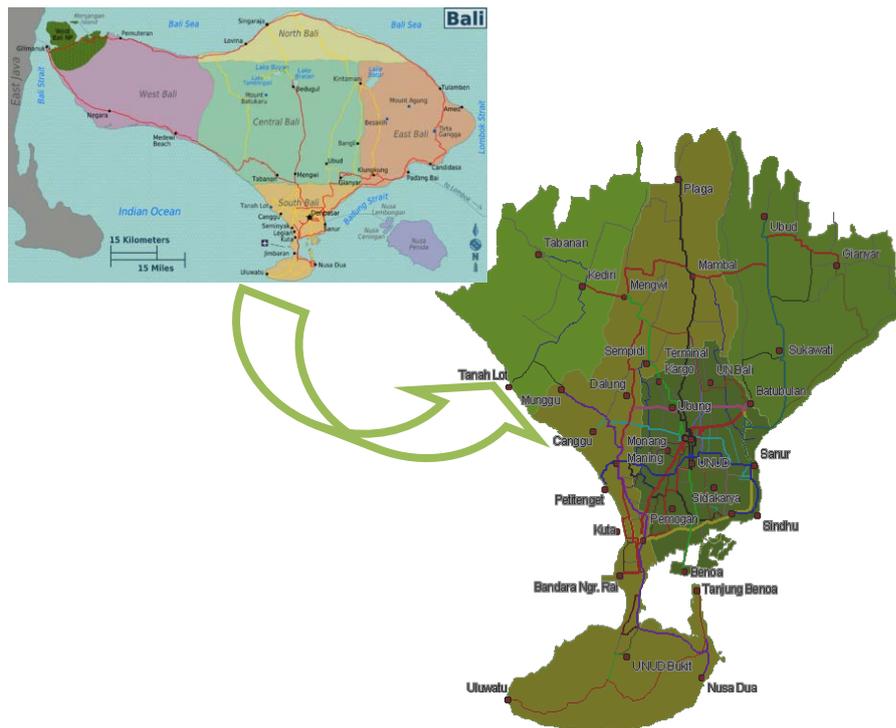
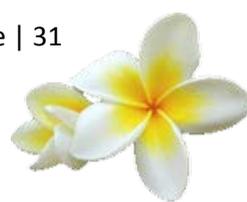


Figure 5.6 – SARBAGITA Area
(Sources: Trans Sarbagita Report, 2013)

There are some state regulations and provincial policies which become the legal basis of Trans Sarbagita development, i.e.:

National Law No. 22 of 2009 on Traffic and Transportation:

- Article 138 section (2) Government is responsible for the implementation of public transport.
- Article 139 section (1) The Government shall ensure the availability of public transport to transport people and / or interprovincial and intercity goods across national borders.



Provincial Regulation (PERDA):

- PERDA No. 16 of 2009 on Spatial Planning (RTRW) of Bali Province is a development policy of space structures which cover improvement of the quality and range of services include regional infrastructure transportation system as major infrastructure network system.
- PERDA No. 6 of 2009 on Long Term Development Plan of Regional (RPJPD) Bali Provincial Year 2005-2025. This regulation emphasize that a single management public transportation is necessary in order to development of urban transport in the region Sarbagita. Therefore, it is mandatory for the development of an integrated transport infrastructure between regions and inters modes as an integrated network transport services. This regulation also emphasizes the increasing of the capacity, quality and accessibility of the urban public transport services (Sarbagita) through improvement of the route network, fare structure and management.

Based on above explanation, Trans Sarbagita is a public transport which controlled by local government. Trans Sarbagita has national and local regulations as legal basis for the operationalization.

V.3.4 *Finware*

Based on Bali Governor Decree No. 11 of 2011 dated 11 April 2011, the fare system of Trans Sarbagita is flat fares. Fares for the main routes is IDR 3,500 (0.3 euro) and there is special fares for students i.e. IDR 2,500 (0.2 euro). For the feeder lines, the fares are IDR 3,000 for adult and IDR 2,000 for student. There is no combination fare for main and feeder routes. Currently, the collection and validation ticket is paper-based tickets; later on the system will use smart card on daily, weekly and monthly basis (Trans Sarbagita Report, 2013).

Trans Sarbagita is fully managed by the local government, therefore the funding sources for the operational and maintenance of the Trans Sarbagita is from provincial and local government budgets (Anggaran Pendapatan dan



Belanja Daerah/ APBD). Meanwhile, the state subsidy is in form of technical assistance of bus fleet provision (Trans Sarbagita Report, 2013).

V.3.5 *Ecoware*

Related to safety and environmental concern, Bali Province has Provincial Regulation (PERDA) which governing of pollution and environmental degradation, i.e. PERDA No. 4 of 2005 which concern about vehicle exhausts emissions. PERDA No. 16 of 2009 on Spatial Planning (RTRW) Bali Province emphasize road as the main transportation system should able to create efficient use of road space and reach all areas as well as maintain the quality of the local environment and surrounding areas. All of the Trans Sarbagita vehicles should comply with the safety and environmental standard (Trans Sarbagita Report, 2013).

V.4 Organizational Forms, Levels of Planning and Control, and Actors Involved

This section provides insight information of the organizational forms of public transport, level of planning and control as well as actors involved in Bali's public transport.

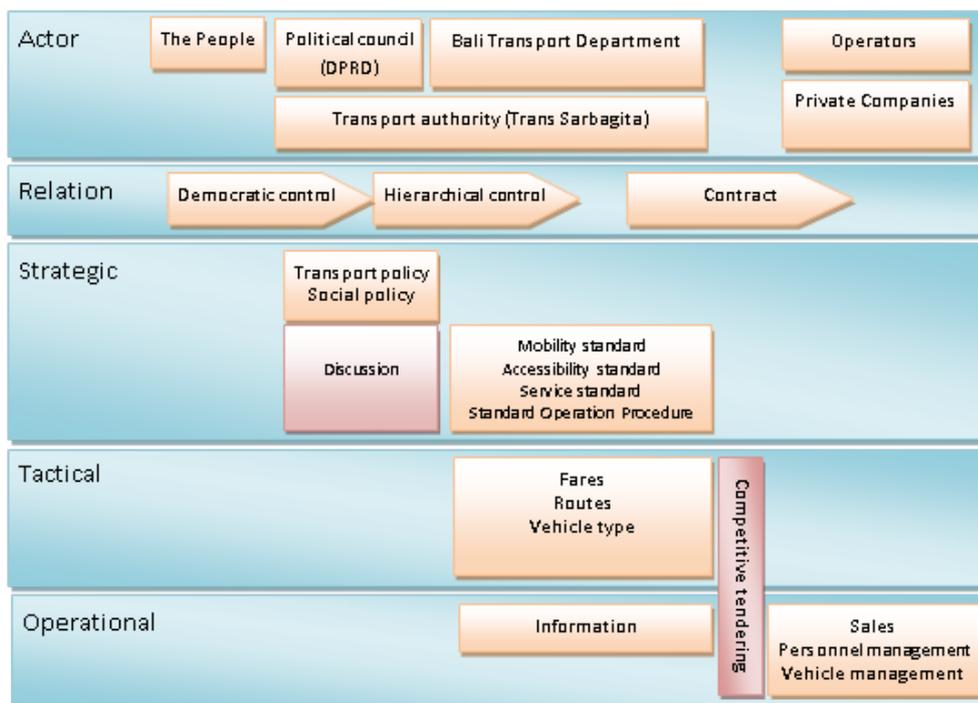
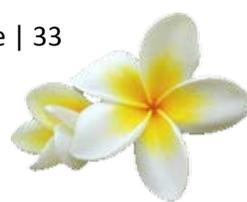


Figure 5.7 – The Organizational Form of the Public transport in Bali

(Sources: adopted from Velde, 1999)



The organizational form of the public transport in Bali can be defined as a central planning and tendering of the realization (Figure 5.7). There are several actors who involves in public transport development in Bali, i.e. the peoples, political council, Bali Provincial Transport Department, transportation authority, and bus operators. There are three relations in between these actors, i.e.: democratic control between the peoples and their representatives in the council, hierarchical control between political council and Bali Provincial Transport Department, and contract between Trans Sarbagita and bus operators (Trans Sarbagita Report, 2013).

Figure 5.7 can be explained as follow. Public transport was initiated by Balinese peoples who express their views through their representatives in the council (DPRD). In the strategic level, the council formulates the social goals of public transport into the social and transport policy forms. Then, the council gives authorization for Bali Transport Department to develop the public transport. Furthermore, Bali Provincial Transport Department forms a Public Service Board (BLU) Trans Sarbagita to develop a bus-based public transport in Bali. The BLU Trans Sarbagita has roles in strategic, tactical, and operational levels (Trans Sarbagita Report, 2013).

In the strategic level, the BLU Trans Sarbagita determines the general aims and the general services characteristics. The general aims of the BLU Trans Sarbagita is to reorganize / restructure the existing public transport route networks into an unified route networks system that connected, integrated and unified, in order to provide travel options for communities (Trans Sarbagita, 2013). Together with political council, the BLU Trans Sarbagita discussing and determining the general service characteristics, e.g. the mobility standard, the accessibility standard, the service standard, and the standard operation procedure (Trans Sarbagita Report, 2013).

In the tactical level, the BLU Trans Sarbagita determines the detail services characteristics of the bus operations, e.g. fare systems, route networks, and vehicle types. Further in the operational level, the BLU Trans Sarbagita provides information about their services. Meanwhile, BLU Trans Sarbagita implements contract systems with the bus operators for the operation of the fleet as well as ticket selling. In the operational level, bus operators are managing the personnel and vehicles (Trans Sarbagita Report, 2013).



Conclusion

In this chapter, accessibility by public transport in Bali has been discussed. Bali does not have adequate public transportation to support the tourist and non-tourist activities. Trans Sarbagita is the regular public transport that serves the tourist and non-tourist activities in southern part of the island. Based on the exploration of their dimensions, Trans Sarbagita is using the existing road network with the "Priority Traffic Mix" system; there is no dedicated line for each route. Trans Sarbagita is using a type of medium bus and big bus, as well minibus/ microbus in their operational. There are eighteen corridors planned, but only three corridors that have been operating. Most of the routes connect the vertices of the crowd, e.g. city center, public service areas, and tourist destinations areas. Trans Sarbagita is regulated by state and provincial regulation. The fare system of Trans Sarbagita is flat fares. The organizational form of public transport in Bali is a central planning and tendering of the realization. In order to achieve the social goal, the Trans Sarbagita as the transport authority has roles in strategic, tactical, and operational levels. In general, the Trans Sarbagita focuses in strategic and tactical levels. On the strategic level, they focus on the policies in all dimensions of the public transport. On the tactical level, they focus on the infrastructures, facilities, and finances of the public transport. Meanwhile for the operational of the buses, there is a contract into the third party or bus operators for bus operation and maintenance.



CHAPTER VI

ACCESSIBILITY BY PUBLIC TRANSPORT IN CRETE ISLAND - GREECE

In order to explore and take lessons from accessibility by public transport in Crete Island – Greece, this chapter discusses the five dimensions of public transport, i.e. *hardware, software, orgware, finware, and ecoware*. The overview of accessibility by public transport is presented in the first section, continued by overview of land use accessibility by public transport. The third section discusses the five dimensions of Crete's public transport. The last section discusses levels of planning and control, organizational forms, and actors involved in public transport. This information is provides data for comparing public transport in Crete with the public transport in Mallorca and Bali.

VI.1 Overview of Accessibility by Public Transport

Accessibility by public transport in Crete Island is served by road based transport, e.g. taxis or buses. Buses are the main public transport services for tourist and non-tourist activities in Crete (<http://www.britsincrete.net>). The public bus company KTEL covers the entire island (Figure 6.1).



Figure 6.1 – KTEL Bus (Sources: <http://wikimapia.org/1596267/KTEL-Bus-station-A>)

KTEL is an acronym of Koino Tamio Eispraxeon Leoforion – Joint Fund of Bus Revenues. Starting in 2003, the KTEL were gradually converted to Private Limited Companies (KTEL SA) that provide transport, tourism and commercial services (European Commission, 2009). KTEL in Crete Island is run by two companies in Crete. KTEL Chanion-Rethymnou S.A. is operated by Minoan Lines on Heraklion and



Lassithi routes. KTEL Hania-Rethymnon S.A. is operated by ANEK Lines on Chania-Rethymno-Heraklion routes (<http://www.britsincrete.net>). KTEL have its bus stations located at the harbor and near the market. Most buses are run several times a day between major cities and at least twice a day from major towns to smaller locations (<http://www.tripadvisor.com>). The overview of land use in accessibility of this public transport is discussed in next section of this chapter.

VI.2 Overview of Land Use of Accessibility by Public Transport

This section discusses the land use of accessibility by KTEL. As mentioned in previous section, KTEL is a buses-based public transport in Crete. The three most populous cities in Crete i.e. Chania - Rethymnon – Heraklion, all of them are situated on the north side of the island. These cities also as the main hubs of KTEL bus services. The routes of KTEL buses not only links the city center with the public service areas e.g. airports, harbors, hospitals, or terminals, but also with the tourist destination areas e.g. beaches, mountains, lakes, historical buildings, traditional villages, etc. The routes are also through the public services areas and tourist destinations areas. (www.bus-service-crete-kTEL.com).



Figure 6.2 – KTEL Route Networks (Sources: <http://www.bus-service-crete-kTEL.com>)



For example, KTEL routes in the western parts of the island (Figure 6.2) i.e. from Chania City to Chania Airport, Palaeochora Harbor, Kastelli Harbor, Kournas Lake, Samaria George National Park, etc. The dimensions of KTEL are discussed in next section of this chapter.

VI.3 Dimensions of Public transport

This section discusses the dimensions of public transport in Crete. Based on the explanation on the first section of this chapter, Crete has KTEL as the main regular public transport which serve the tourist and non-tourist activities.

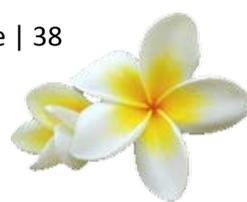
VI.3.1 Hardware

This section discusses the facilities and infrastructures of KTEL. KTEL uses existing road networks; there is no dedicated road for the services. KTEL have comprehensive networks with hub-and-spokes systems (European Commission, 2009). Supra-regional line (Figura 6.3) is the main highway that links three biggest cities in the north side of the island (<http://www.bus-service-crete-kTEL.com>). The busiest long distance bus service is along the North coast highway network. The longest direct journey time by bus can be more than 4 hours when travelling between Heraklion - Rethimnon - Hania and vice versa (<http://www.britsincrete.net>).



Figure 6.3 – KTEL Supra-regional Lines (Sources: Protonotarios, 2012)

There is a secondary road network to connect the regions on the south (Protonotarios, 2012). KTEL distinguish their service areas into three regions, i.e. southwestern, southern, and southeastern. Each of these regions is connected to the three main hubs as the point for departure. There are also



several cities act as the secondary hub, e.g Kastelli, Agios Nikolaos, Sitia, etc. which is connected to the rest areas in the southern part of the island. Most of the KTEL services area connected through radial network systems which spread to all part of the island. Therefore, sometimes a change of vehicles is required for farther journey (<http://www.britsincrete.net>). Officially, KTEL Hania – Rethymnon S. A. is serves the Western Crete, meanwhile KTEL Heraklion – Lashiti S. A. which serves the Eastern Crete. There is collaboration between both companies in several route itineraries, i.e. Heraklion and Thessaloniki (<http://www.ktelherlas.gr>).

KTEL operates 170 modern buses in all sizes; it conducts hundreds of routes daily, thus linking the major cities of the island with all the settlements. KTEL fleet has been renewed with new technology buses. There also a double-decker with air-conditioning buses for sightseeing (<http://www.bus-service-crete-kTEL.com> and <http://www.kTELherlas.gr>). Buses are distinguished based on the color schemes. The long distance routes are served by buses with green and silver color schemes, meanwhile the blue schemes for short distance routes (<http://www.britsincrete.net>). There are also specific bus stations and open space shelters for the passenger.

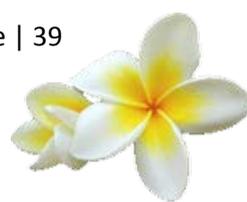
VI.3.2 *Software*

To support their services, KTEL provides clear timetables for all routes. The timetables (Figure 6.4) can be seen in the stations, airports, shelters, and official websites. The operation time of KTEL's buses depend on the routes.

Route	Departure Times
Daily / Καθημερινά	06:40 - 07:30 - 09:00 - 09:30 10:30 - 11:30 - 12:30 - 13:30 15:40 - 16:30 - 17:30 - 19:25 20:20 - 21:20 - 21:45
Departure times from Chania to Airport. Προς αναχώρησης από Χανιά προς Αεροδρόμιο	Daily / Καθημερινά 05:45 - 07:00 - 08:15 - 09:00 10:00 - 11:00 - 12:00 - 13:00 14:40 - 16:00 - 17:00 - 18:30 19:30 - 20:30 - 21:00
Tickets sold in Airport Shops Εισιτήρια εντός του Αεροδρόμιου	

Figure 6.4 – KTEL Timetable

(Sources: <http://livingincrete-carolina.blogspot.nl>)



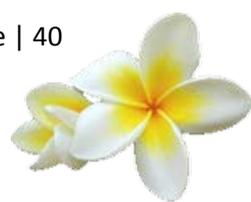
KTEL are equipped by computerized and internet-based systems for their main services, i.e. sales system, information system, and reservation systems. The information about KTEL services, e.g. road maps, routes, timetables, prices, reservation, office contact numbers, etc. available on the KTEL official websites i.e. www.ktelherlas.gr and www.bus-service-crete-ktel.com. These official websites are accessible and available in Greek, Russian, and English versions. In addition to containing the information directly related to the journey, their official websites also offers general information e.g. company profile, lost and found, update news, information about Crete, hotel information, etc. There is also a 24-hour hotline information service (<http://www.bus-service-crete-ktel.com> and <http://www.ktelherlas.gr>).

VI.3.3 *Orgware*

KTEL are private companies that managed by elected boards and are supervised by the Passenger Transport Directorate of the Ministry of Transport and Communications and their Regional Authority. According to Greek law, KTEL have been given exclusive rights to operate all regular domestic bus services and to use the bus terminals across the country (European Commission, 2009). The main legal basis of KTEL Hania – Rethymnon S. A. and KTEL Heraklion – Lashiti S. A. is based on Decision of the Minister of Transport & Communications No.B36934/2805 - Greek Official Gazette 682/b/10-7-2002. This charter is regulates the obligations of all organizations offering transportation services towards all passengers. This charter not only determines the obligations of the transport service organizations, but also the staff obligations, passenger's rights and compensations, and violations – punishments /penalties (<http://www.ktelherlas.gr>). The main shareholders of KTEL are the individual owners of the public bus licenses who make their vehicles available for the use of KTEL through individual contracts (European Commission, 2009).

VI.3.4 *Finware*

KTEL are private companies that are not directly subsidized by the state. The main shareholders of KTEL who make their vehicles available for the use of KTEL are paid a fee per vehicle-kilometer. KTEL are private institutions under



the direct supervision of the state, which determines the fares and ensures that bus travel remains a social service. KTEL are also responsible for the provision and maintenance of vehicles and most terminals. The Greek government only gives subsidy for the KTEL who get loss. The subsidy includes vehicle replacements, refurbishing KTEL terminals and installing fleet management systems. The annual government subsidy of KTEL companies of around €485 million (European Commission, 2009).

The fares are not defined by the company itself but they are determined according to the decision of the Ministry of Transport and Communications (<http://www.ktelherlas.gr>). Ticket prices are controlled by the Greek government and are determined by the trip distance and journey length. Prices are relatively low (European Commission, 2009). For example, the route between Chania and Heraklion, which is approximately 138km cost €13,80 for a one-way ticket in 2 hours and 45 minutes. Some indicative prices, journey lengths and durations on several main routes include the following (<http://www.bus-service-crete-ktel.com>):

- Chania – Rethymnon: €6.20 for 60km in 1 hour
- Chania – Palaiochora: €7.60 for 73km in 1.5 hours
- Chania – Evalonnisi: €10 for 75km in 2 hours

Tickets can be purchased directly on the bus, stations, and airports. Tickets can also be booked through the call center and online services with the following conditions: KTEL gives the passenger a refund of 70% of the ticket price if the cancellation at least 8 hours before the departure time, and 50% if within 8 hours before departure time. There is also a subscription ticket for daily, weekly and monthly trips (<http://www.bus-service-crete-ktel.com> and <http://www.ktelherlas.gr>).

VI.3.5 *Ecoware*

The safety and environmental concern is obligatory for all organizations offering transportation services towards all passengers in Crete. The Decision of the Minister of Transport & Communications No.B36934/2805 - Greek Official Gazette 682/b/10-7-2002 determines the technical and operational



aspects of all organizations offering transportation services. They should ensure the safe transportation of passengers, their luggage and unaccompanied small parcels. The vehicle standards which operated by the operators also should fulfill the safety and environmental requirements. The operators are obligatory to ensure the cleanliness, decent appearance, safe circulations of the buses as well as their maintenance in order to reduce the environmental impact of their use. They also should maintain in good condition all the bus stations, all bus stops, place signs and take any useful and necessary measures for the better services and environmental protections (<http://www.bus-service-crete-ktel.com> and <http://www.ktelherlas.gr>).

VI.4 Organizational Forms, Levels of Planning and Control, and Actors Involved

This section discuss organizational forms, level of planning and control, as well the actors involved in the public transport in Crete.

The organizational form of the public transport in Crete can be defined as a tendering of the design and realization, as the following figure.

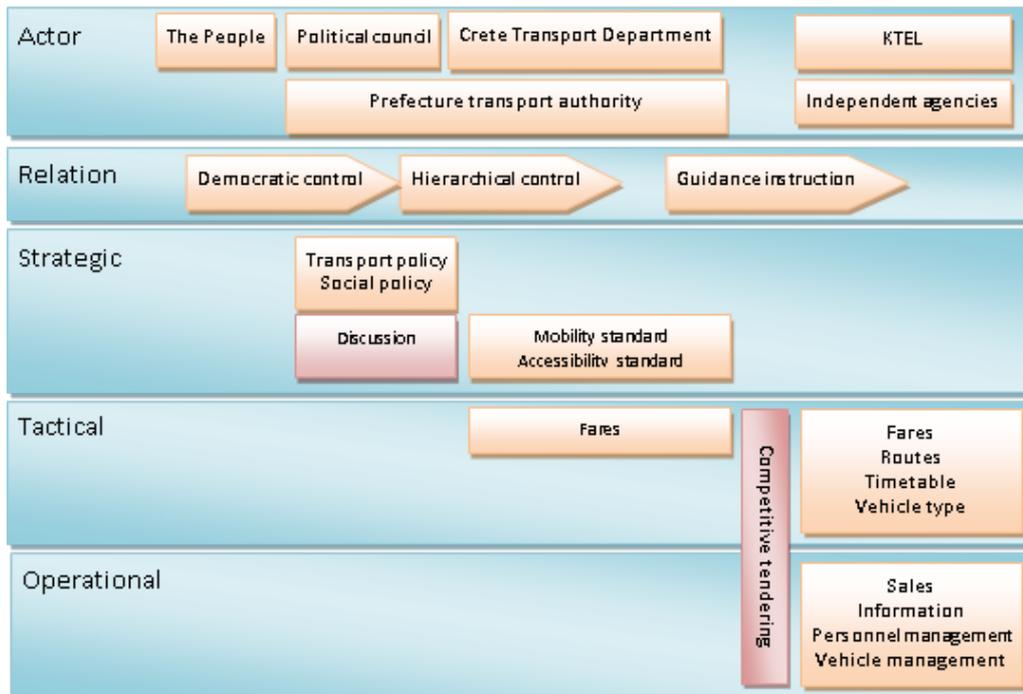
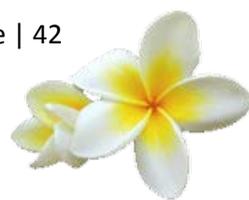


Figure 6.5 – The Organizational Form of the Public transport in Crete
(Sources: adopted from Velde, 1999)



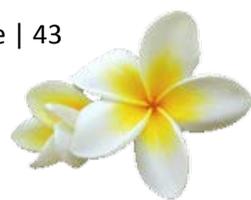
Based on the above figure, there are several actors who involves in public transport development in Crete, i.e. the peoples, political council, Crete Transport Department, Prefecture transportation authority, and independent agency (KTEL). There are three relations in between these actors, i.e.: democratic controls between the peoples and their representatives in the political council, hierarchical controls between political council and Crete Transport Department, and guidance instructions between prefecture transportation authority and KTEL as an public transport independent agency (<http://www.ktelherlas.gr>).

Figure 6.5 can be explained as follow. Public transport was initiated by the Crete's peoples who express their views through their representatives in the political council. In the strategic level, the council formulates the social goals of public transport into the social and transport policy forms. Then, the council gives authorization for Crete's Transport Department to develop the public transport. Also in this level, based on the social and transport policy and discussing with the political council, Crete's Transport Department determines general service characteristics of Crete's public transport, i.e. the mobility and accessibility standards. Furthermore, the Crete's Transport Department appoints KTEL as independent agency to develop public transport in Crete (<http://www.ktelherlas.gr>).

KTEL are private companies that managed by elected boards and are supervised by the Crete's Transport Department. KTEL have been given exclusive rights to operate all regular domestic bus services and to use the bus terminals across the country (European Commission, 2009). KTEL have role in tactical and operational levels. In the tactical level, KTEL determines the detail services characteristics, e.g. fares, routes, and vehicle types. Further in the operational level, KTEL provides information services, ticket selling, as well as manage the personnel and vehicles (<http://www.ktelherlas.gr>).

Conclusion

This chapter has discussed the accessibility by public transport in Crete. Crete has adequate public transportation to support the tourist and non-tourist activities. KTEL Hania – Rethymnon S. A. is the regular public transport that serves the tourist and non-tourist activities in western part of the island, meanwhile KTEL Heraklion – Lashiti S. A. in eastern. Based on the exploration of their dimensions, KTEL are using the existing road network



without any dedicated lines for each route. KTEL distinguish their service areas into three regions, i.e. southwestern, southern, and southeastern. KTEL operate modern technology buses to serve any routes. KTEL provide clear timetables for all of the routes. KTEL are equipped by computerized and internet-based systems for their main services. KTEL are private companies that managed by elected boards and are supervised by the Passenger Transport Directorate of the Ministry of Transport and Communications and their Regional Authority. KTEL also not directly subsidized by the state. The main shareholders of KTEL who make their vehicles available for the use of KTEL are paid a fee per vehicle-kilometer. Ticket prices are controlled by government and determined by the trip distance and journey length. The organizational form of the public transport in Crete is a tendering of the design and realization. The government has roles in strategic level by making regulations and policies about the public transport. Meanwhile, independent agencies (KTEL) have roles in tactical and operational levels by designing and operating the public transport.



CHAPTER VII

ACCESSIBILITY BY PUBLIC TRANSPORT IN MALLORCA ISLAND - SPAIN

This chapter discusses the accessibility by public transport in Mallorca Island – Spain. In the first section, the overview of accessibility by public transport in Mallorca is given. The next section discusses the overview of land use accessibility by public transport in Mallorca. The third section discusses five dimensions of their public transport, i.e. *hardware, software, orgware, finware, and ecoware*. The last section discusses levels of planning and control in the organizational forms as well as the actors involved.

VII.1 Overview of Accessibility by Public Transport

Mallorca has integrated public transport systems. The taxis, buses, trains, tubes, bicycles, scooters and motorbikes are available for the tourist and non-tourist activities (<http://www.mydestination.com>). For the main regular public transport, Mallorca has three different public transport companies, i.e. Ferrocarril de Sóller S.A., EMT (Empresa Municipal de Transports), and the TIB (Transport de les illes Balears).

Ferrocarril de Sóller S.A. is a privately-owned company, most of its capital originating from Soller, devoted to regular rail passenger transport (Figure 7.1a). The company was founded in 1905. The Ferrocarril de Sóller S.A. trains routes through the mountain areas in Mallorca (<http://www.trendesoller.com>). EMT (Figure 7.1b) is an urban bus services that provided by Transport Department of Palma's Municipality. EMT provides the bus services for the tourist and non-tourist activities in the Palma City (<http://www.emtpalma.es>). TIB (Transport de les illes Balears) is an inter-city transport network which provides buses, trains, and tubes services (<http://www.tib.org>). Since 2006, Mallorca Transports Consortium (CTM) was founded to coordinating inter-city public transport network as well as regulating Mallorca Intercity public transport fare issues. CTM (Figure 7.1c) is an inter-administrative Consortium which fully depending on the Mobility Department of the Balearic Islands Government. CTM is in charge of implementing and developing the new integrated fare system, which in the future will include also Palma's City public transport networks (<http://www.biosire.eu>). The



overview of land use in accessibility of this public transport is discussed in next section of this chapter.



Figure 7.1a – Ferrocarril de Sóller S.A Trem

(Sources: <http://www.trendesoller.com>)



Figure 7.1b – EMT Buses

(Sources: <http://www.emtpalma.es>)



Figure 7.1c – CTM (Sources: <http://www.tib.org>)

VII.2 Overview of Land Use of Accessibility by Public Transport

This section discusses the land use in accessibility by public transport in Mallorca. As mentioned in previous section, CTM is an inter-city transport network which provides buses, trains, and tubes services in Mallorca. The routes of CTM not only links the city center with the public service areas e.g. airports, harbors, hospitals, or terminals, but also with the tourist destination areas e.g. beaches, mountains, lakes, historical buildings, traditional villages, etc. (<http://www.tib.org>).



Figure 7.2 – CTM Route Networks (Sources: <http://www.tib.org>)



For example, CTM routes from Palma de Mallorca City to Palma Airport, Port d'Andratx, Platja de Palma, Kournas Lake, etc. The routes are also through several public services areas and tourist destination areas. The dimensions of public transport in Mallorca are discussed in next section of this chapter.

VII.3 Dimensions of Public transport

This section discusses the dimensions of public transport in Mallorca. Mallorca has three organizations which provide a regular public transport for the tourist and non-tourist activities. Therefore, the discussion of the dimensions of public transport is focused on those regular transports.

VII.3.1 Hardware

This section discusses the facilities and infrastructures of Ferrocarril de Sóller S.A., EMT, and CTM. As mentioned in the first section, Ferrocarril de Sóller S.A. is a franchise company of the rail-based public transport. Based on the age of establishment, facilities and supporting infrastructure such as rail, route, locomotive, electric trams, stations, electric power stations, and bridges have been built long time ago. Ferrocarril de Sóller operates four locomotives and three electric trams. All of the facilities and infrastructures are still well maintained for the tourist convenience (<http://www.trendesoller.com>).

There are two routes served by Ferrocarril de Sóller, i.e. Palma – Sóller via train and Sóller – Port de Sóller via tram (Figure 7.3). All of these routes through mountain areas for the tourism purposes (<http://www.trendesoller.com>).

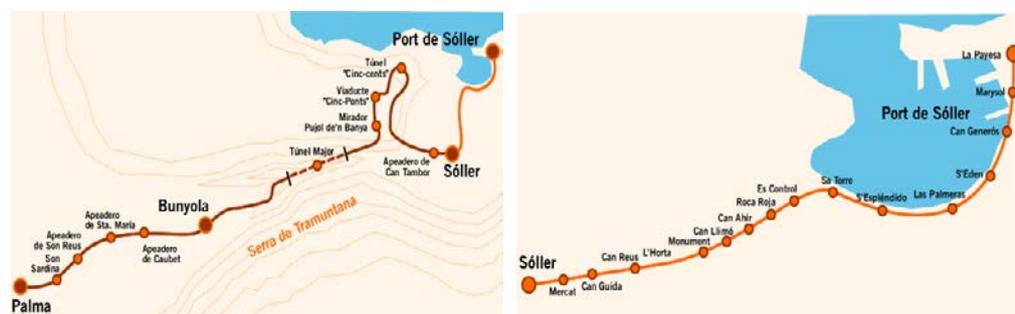
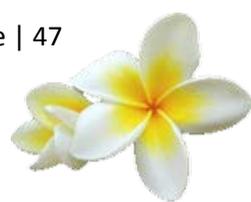


Figure 7.3 – Ferrocarril de Sóller Train and Tram Route
(Sources: <http://www.trendesoller.com>)



EMT is urban bus services which provided by Transport Department of Palma's Municipality. EMT bus routes using the existing road network, there is no dedicated lines. EMT buses are available for tourist and non-tourist activities in the Palma City. There are 31 bus lines which served by buses in various sizes. There are no definitely route systems of their services (Figure 7.4a). The journey is started and ended at the same point departure by passing several places of interest. The double decker buses are available for the sightseeing routes (Figure 7.4b). The EMT provides several bus-stops along their routes.



Figure 7.4a – EMT Bus Lines

Figure 7.4b – Sightseeing Bus

(Sources: <http://www.emtpalma.es>)

TIB is a suburban public transport which provides interurban buses, trains, and metro services for tourist and non-tourist purposes (Figure 7.5). TIB bus services are using large-sized buses (<http://www.tib.org>).



Figure 7.5 – TIB Buses, Trains and Tubes (Sources: <http://www.tib.org>)

TIB also integrated in their facilities and infrastructures. The TIB networks connect all parts of the island to the Palma's city (Figure 7.6). There are three



main stations in Mallorca, i.e. Palma Intermodal Station (Central), Inca Station, and Manacor Station. Most of TIB routes through these stations. Each of the station is completed with full facility, e.g. information office, intermodal card, bike services, left luggage, free Wi-Fi, park and ride services, and commercial services (Sources: <http://www.tib.org>).

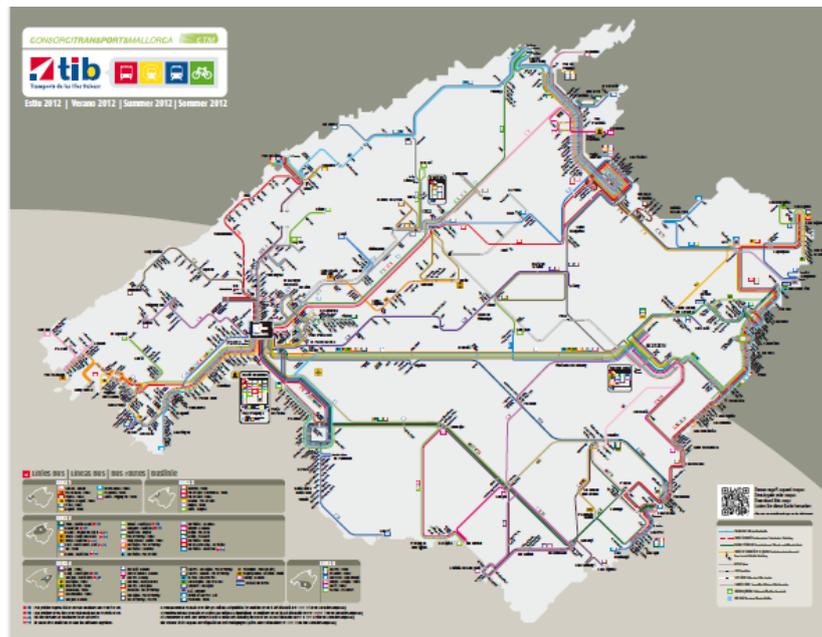


Figure 7.6 – TIB Networks (Sources: <http://www.tib.org>)

TIB serve six zones, i.e. 100, 200, 300, 400, 500, and 800 (Figure 7.7).

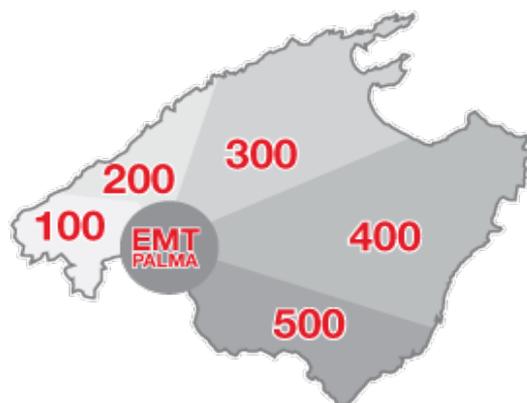
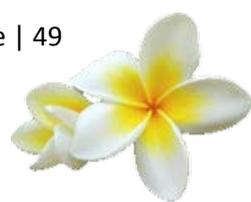


Figure 7.7 – TIB Buses Zone (Sources: <http://www.tib.org>)

In each zone there are several routes. The bus trip is started and ended at the same point departure by passing several places of interest. Almost all parts of the island are served by TIB bus. TIB train and tubes do not serve all parts of



the island. TIB train service only connecting the Palma de Mallorca Station to Sa Pobla Station and Manacor Station (Figure 7.8a). Meanwhile the tubes are connecting Palma de Mallorca Station to Marratxi and UIB Estació (Figure 7.8b).



Figure 7.8a – TIB Trains Routes



Figure 7.8b – TIB Tubes Routes

(Sources: <http://www.tib.org>)

VII.3.2 Software

Ferrocarril de Sóller provides clear timetables for all of the routes. Timetables are available in the station and accessible in their official website, i.e. www.trendesoller.com. The train and tram have fixed schedules. The operation times started at 08.00 a.m. to 19.00 p.m. (<http://www.trendesoller.com>). EMT and TIB also provides timetables which available in the stations and accessible in their official website, i.e. www.emtpalma.es. The operation time started at 05.00 a.m. to 02.00 a.m. the next morning, depend on the routes (<http://www.emtpalma.es> and <http://www.tib.org>).

Both of the EMT and TIB are equipped by computerized and internet-based systems for their main services, i.e. sales system, information system, and reservation systems. The information about their services, e.g. road maps, routes, timetables, prices, reservation, office contact numbers, etc. available on their official websites i.e. www.emtpalma.es and www.tib.org. These official websites are accessible and available in Spanish, Catalan, English, and German. In addition to containing the information directly related to the journey, their official websites also offers general information e.g. company profile, lost and found, update news, information about Mallorca, hotel information, etc. (<http://www.emtpalma.es> and <http://www.tib.org>).



There is no special system for sales and reservation for the train and tram of Ferrocarril de Sóller S.A., the tickets sales on board. There is an official website, i.e. www.trendesoller.com that gives information about the services. This official website is provided and managed by Ferrocarril de Sóller S.A. This official website is accessible and available in Spanish, English, and German (<http://www.trendesoller.com>).

VII.3.3 Orgware

The Spanish urban transport is determined by the administrative structure and the regulation in the different levels. Public transport Authorities (PTA) is a legal body which regulates the public transport in Spain. There are six types of PTA functions, i.e. spatial planning, financial planning, tariff regulation, infrastructure construction, service provision and evaluation of public transport. There are several ATP in Spain based on their administrative regions. The Majorca Transport Consortium (CTM) is one of 18 PTA in Spain which administratively controls the public transport in the Balearic Island (Urbano et al, 2010). CTM is a public body attached to the Ministry of Mobility and Town and Country Planning. The purpose of CTM is designing, establishing and maintaining a common system of regular public passenger transport on the island of Majorca. The means of transport grouped within the CTM are principally the train, the tube and bus. EMT and TIB are parts of this consortium (<http://www.tib.org>). As a local authority, CTM should refer to the national, regional, and local regulations as the legal basis. Most of these regulations are emphasize the importance the quality of services offered by urban transport as an essential part in attracting users. This quality can be observed across different indicators, e.g. commercial speeds, frequencies, age of vehicles, service timetables, etc. (Urbano et al, 2010). Ferrocarril de Sóller S.A. is a foundation who has franchise to operate the train and tram in Mallorca also under supervision of CTM (<http://www.trendesoller.com>).

VII.2.4 Finware

The financing of urban transport in Spain is determined by the jurisdiction, by the tariff system and the law on the financing of public transport. The CTM as a consortium of twelve companies is under supervision of the Ministry of



Mobility and Town and Country Planning. There is a funding share between CTM as authority and these companies. In 2007, the government provides subsidies for bus operation is equal to 1,827€/Vehicle-Km for the urban buses and 0,368€/Vehicle-Km for the suburban buses. There is no subsidy for rail based transport (Urbano et al, 2010). Meanwhile, Ferrocarril de Sóller S.A. is a franchise private company, therefore most of its capital originating from Sóller; no subsidy from the government (<http://www.trendesoller.com>).

CTM establish the fare system for the public transport in Mallorca. There are special fares for segments of population with some type of disadvantage, such as students and seniors' citizens. CTM imposes the Integrated Fare System (IFS) based on zones. For collecting and validating tickets, CTM distinguish the ticket into two categories i.e. multi-trip tickets and single tickets. There is also Intermodal Card which easy to carry as it is light and takes up very little space. Moreover, IFS incorporates an electronic chip for the data storage (Sources: <http://www.tib.org>).

The IFS is based on a partition of Majorca into 30 zones, grouped into 5 concentric circles around Palma. The following figure shows the zone boundaries adopted by the IFS (<http://www.tib.org>).

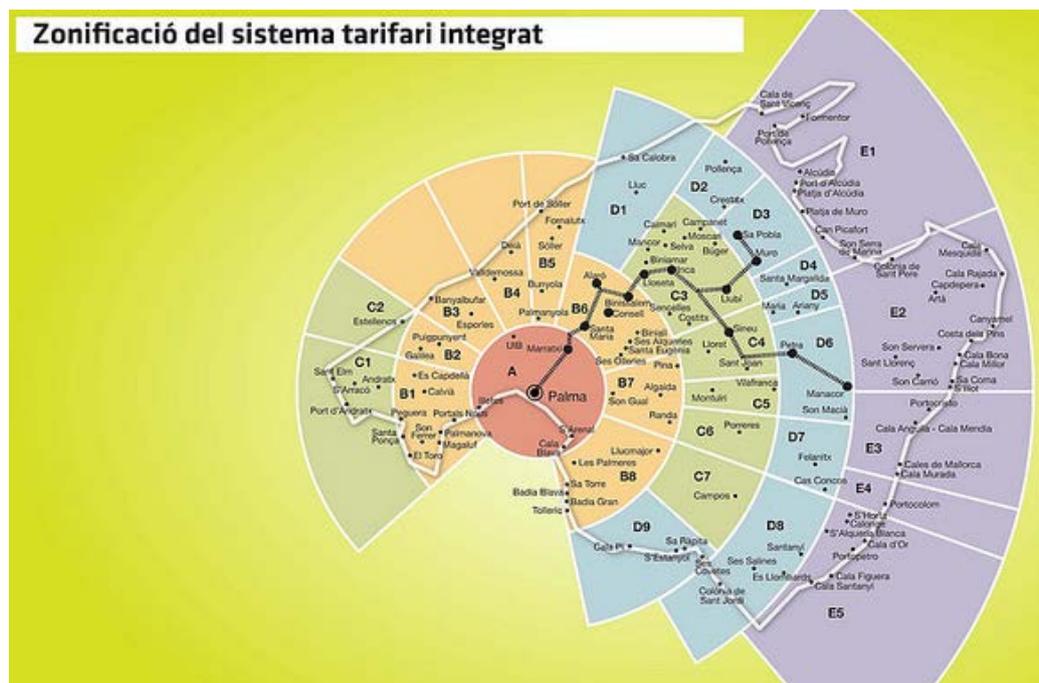


Figure 7.8 – CTM IFS Zones (Sources: <http://www.tib.org>)



For example (<http://www.tib.org>):

- **Bus and Train:** trip from Andratx (zone C1) to Estacio d'Inca (zone C3).
The first stage is trip on bus route L102 from Andratx (zone C1) to Estació Intermodal de Palma (zone A). And the second stage is trip by train from Estació Intermodal de Palma (zone A) and Estació d'Inca (zone C3). The total journey from Andratx to Inca will only use up 1 trip from the card, because transfer from bus to the train is free.
- **Bus, Train and Metro:** trip from Sant Joan (zone C4) to the UIB (zone A).
The first stage is Trip by bus from Sant Joan L406 (zone C4) to Sineu (zone C4). Then trip by train from Sineu (zone C4) to Palma (zone A). Finally, trips by metro from Palma (zone A) to the UIB (zone A). The total journey from Sant Joan to the UIB will only use up 1 trip from the card, because transfers from the bus to the train and from the train to the metro are free.

The pricing system for Ferrocarril de Sóller S.A. trains and trams are based on the routes. For several routes, return ticket is cheaper than one-way tickets. The train ticket can be purchased on board or online. Meanwhile, tickets are sold on board the tram (<http://www.trendesoller.com>).

VII.2.5 *Ecoware*

The Law 7 / 1985 of 2 April emphasize that the municipalities themselves or partners must provide urban public passenger transport as well environmental protection. Therefore, CTM establish the regulation of vehicle's safety and quality standards. The quality of public transport is determined by different variables, in terms of frequency, comfort, timetable, vehicle's average ages, environmental impact, etc. The age of vehicles is determinant of quality because a higher age implies further deterioration of its components. This generates less safety and convenience, which strongly influences the technology in that fleet renewal also means a substitution of improved technologies. Regarding the railroads, the concessionaires must comply, in both construction and development, with the quality and safety criteria determined by the government. In term of reduces emissions and improves air quality and thus increase the health of people, CTM obligates the replacement



the polluting vehicles and the introduction of other more technologically advanced and environmentally friendly vehicles (Urbano et al, 2010).

VII.4 Organizational Forms, Levels of Planning and Control, and Actors Involved

This section provides insight information of the organizational forms of public transport, the level of planning and control as well as the actors involved in Mallorca’s public transport.

The organizational form of the public transport in Mallorca can be defined as a planning and tendering of the realization (Figure 7.9).

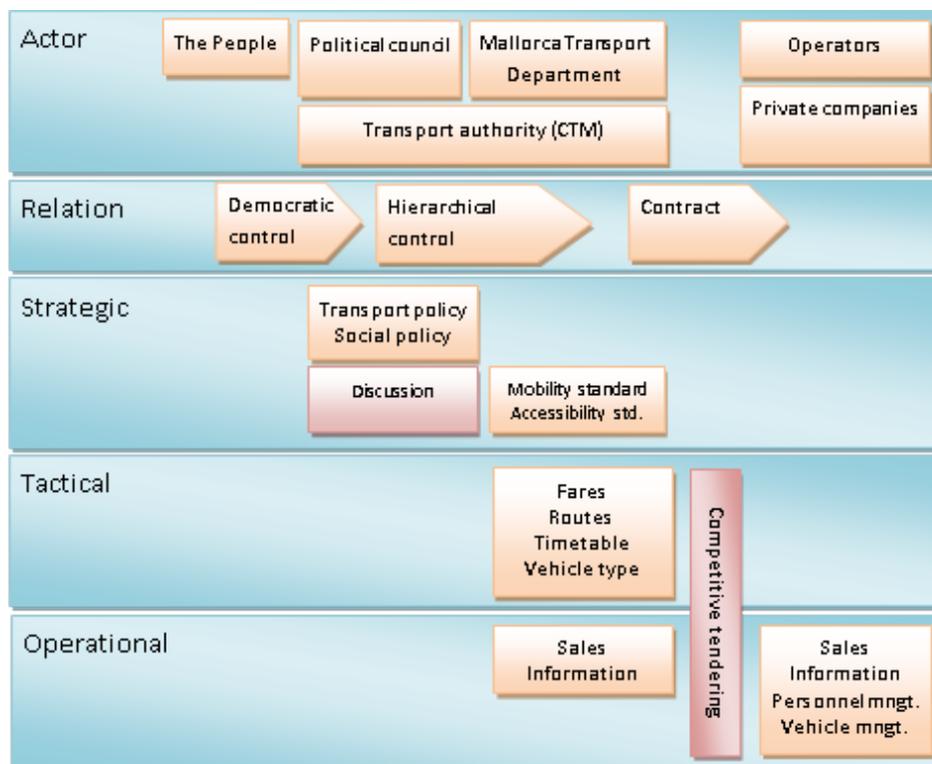


Figure 7.9 – The Organizational Form of the Public transport in Mallorca
(Sources: adopted from Velde, 1999)

Based on the above organizational forms, there are several actors who involves in public transport development in Mallorca, i.e. the peoples, political council, Mallorca Transport Department, transportation authority (CTM), and private companies/operators. There are three relations in between these actors, i.e.: democratic control between the peoples and their representatives in the political council, hierarchical control between political council and Mallorca Transport Department, and contract



between CTM as transport authority and private companies/ operators (<http://www.tib.org>).

Figure 7.9 can be explained as follow. Public transport was initiated by the Mallorca's peoples who express their views through their representatives in the political council. In the strategic level, the council formulates the social goals of public transport into the social and transport policy forms. Then, the council gives authorization for Mallorca Transport Department to develop the public transport. Furthermore, Mallorca Transport Department through CTM as transport authority have role in designing, establishing and maintaining a common system of regular public passenger transport on the island of Majorca. The CTM has roles in strategic, tactical, and operational levels (Urbano et al, 2010).

In the strategic level, the CTM determines the general aims and the general services characteristics. Together with political council, CTM are discussing and determining the general service characteristics, i.e. the mobility and accessibility standards (<http://www.tib.org>).

In the tactical level, the CTM determines the detail services characteristics, e.g. fares, routes, timetables and vehicle types. Further in the operational level, the CTM provides information about their services. Meanwhile, CTM implement contract systems with the private companies/ operators for the operation of the fleet as well as ticket selling. In the operational level, the private companies/ operators also manage the personnel and vehicles. In this term, the EMT, TIB and Ferrocarril de Sóller S.A. have role as the operator in the CTM (<http://www.tib.org>).

Conclusion

The accessibility in Mallorca has been discussed in this chapter. There are three companies which provide regular public transport services for the tourist and non-tourist activities, i.e. Ferrocarril de Sóller S.A., the Empresa Municipal de Transports (EMT), and the TIB (Transport de les illes Balears). Based on the exploration of their dimensions, Ferrocarril de Sóller S.A. is a privately-owned company, most of its capital originating from Sóller, devoted to regular rail passenger transport through a contract agreement (franchise). EMT and TIB, both operate a modern technology transport modes to serve the tourist and non-tourist routes



in the island. They are using a computerized system and network based system in order to give good services for the customer.

The Mallorca Transport Consortium (CTM) is a public transport authority which administratively controls the public transport in the Balearic Island. The purpose of CTM is designing, establishing and maintaining a common system of regular public passenger transport on the island of Majorca. The means of transport grouped within the CTM are principally the train, the tube and bus. EMT and TIB are parts of this consortium. The CTM as a consortium of twelve companies is under supervision of the Ministry of Mobility and Town and Country Planning. There is a funding share between CTM as authority and these companies. There is no subsidy for rail based transport. CTM imposes the Integrated Fare System (IFS) based on zones. CTM distinguish the ticket into two categories i.e. multi-trip tickets and single tickets. CTM establish the regulation of vehicle's safety and quality standards.

The organizational form of the public transport in Mallorca can be defined as a planning and tendering of the realization. The CTM has roles in strategic, tactical, and operational levels. CTM implement contract systems with the private companies/ operators for the operation of the fleet as well as ticket selling. In this term, the EMT, TIB and Ferrocarril de Sóller S.A. have role as the operator in the CTM.



CHAPTER VIII

COMPARISON AND LESSONS LEARNED OF ACCESSIBILITY BY PUBLIC TRANSPORT IN BALI ISLAND, CRETE ISLAND, AND MALLORCA ISLAND

This chapter discusses the comparisons and the lessons learned from this comparison. The first section of this chapter presents the comparison of public transport which had discussed in chapter V, VI, and VII. This section also discusses the differences and similarities of the accessibility by public transport in three case studies. The lessons learned from this comparison are presented in the last section of this chapter.

VIII.1 Comparison

This section contains the summaries of the organizational forms, actors involved, and focus in each levels of planning and control in each dimensions of the public transport in Bali, Crete, and Mallorca. The summaries are presented in a table. This table contains the accessibility by public transportation in each islands based on the five dimensions and their focuses in each levels of planning and control of public transport. The table also presents the organizational forms for each case study as well the actors involved in each levels of planning and control of public transport. Based on this table, the similarities and differences of the public transport in each island can be found and discussed in the subsection of this section.

Table 8.1 Summaries of the Organizational Forms, Actors Involved, and Focus in Each Levels of Planning and Control in Every Dimensions of the Public transport

	Bali	Crete	Mallorca
Organizational Forms	Central planning and tendering of the realization	Tendering of the design and realization	Central planning and tendering of the realization
Levels ↓	Actors involved		
Strategic	The people, political council (DPRD), Bali Transport Department, Transport authority (Trans Sarbagita)	The people, political council, prefecture transport authority, Crete Transport Department	The people, political council, Mallorca Transport Department, Balearic transport authority (CTM)



Focus			
Hardware	Regulation about services areas, route networks, minimum service standards, standard operation procedure, and vehicle specifications	Regulation about the obligations of organizations offering transportation services towards all passengers, services areas, route networks, minimum service standards, and vehicle specifications	Regulations about provision of urban public passenger transport, services areas, route networks, minimum service standards, and vehicle specifications
Software	Regulations about minimum service standards and vehicle specifications	Regulation about the obligations of organizations offering transportation services towards all passengers	Regulations about minimum service standards and vehicle specifications
Orgware	National and local government regulation (PERDA) about public transport, infrastructure networks, development of Public Service Board (BLU) Trans Sarbagita	Regulation about the obligations of all organizations offering transportation services towards all passengers, staff obligations, passengers rights and compensations, and violations – punishments /penalties	Regulation about CTM as a public body (transport authority) and a consortium of companies under supervision of the Ministry of Mobility and Town and Country Planning.
Finware	Local government regulation about fare systems and Trans Sarbagita funding system	National regulation about fares system, KTEL payment as a fee per vehicle-kilometer, and subsidy only for the KTEL who get loss	Regulation about CTM as a consortium of companies under supervision of the Ministry of Mobility and Town and Country Planning, and CTM regulation about the fare system for the public transport in Mallorca
Ecoware	Local government regulation about vehicle exhaust emissions and maintain the quality of the local environment and surrounding areas	National regulation about the technical and operational aspects of all organizations offering transportation services	National regulation about provision of urban public passenger transport as well environmental protection, and CTM regulation of vehicle's safety and quality standards
Tactical	Actors involved		
	Bali Transport Department, Transport authority (Trans Sarbagita)	Prefecture transport authority, Crete Transport Department, KTEL	Mallorca Transport Department, Balearic Transport authority (CTM)
Focus			
Hardware	Bus as the main public transport, using the existing road networks by mixed traffic priority systems, only southern parts of the island, provides open space shelters, trunk and feeder lines networks, and linear and radial network systems; rely on big and medium buses, minibus and microbus.	Bus as the main public transport, using the existing road networks, comprehensive network with a hub-and-spokes systems, supra-regional line as the main highway, service all parts of the island by distinguish service areas into three regions, provides open space shelters, rely on modern buses in all sizes and double-decker with air-conditioning buses for sightseeing, distinguish buses based on the color	Both road and rail based transport networks, integrated facilities and infrastructures, the buses use the existing road networks, there is no dedicated lines, buses service all parts of the island by zonal based bus networks, provides 3 main stations, large and double-decker bus services, trains, trams and tubes do not serve all parts of the island
Software	Timetables only available in the buses, operational times 5:00 a.m. to 9:00 p.m.	Clear timetables which available in the stations, airports, shelters, and official websites, the operations time depends on the routes, KTEL are equipped by computerized and internet-based systems	Timetables available in the stations, airports, shelters, and official websites, the operations time depends on the routes CTM are equipped by computerized and internet-based



		for their main services, the official websites i.e. www.ktelherlas.gr and www.bus-service-crete-ktel.com	systems for their main services, the official websites i.e. http://www.tib.org
Orgware	Development of Public Service Board (BLU) Trans Sarbagita	KTEL as private companies that managed by elected boards, the main shareholders of KTEL are the individual owners of the public bus licenses who make their vehicles available for the use of KTEL through individual contracts	The purpose of CTM is designing, establishing and maintaining a common system of regular public passenger transport, CTM emphasize quality into several indicators, e.g. commercial speeds, frequencies, age of vehicles, service timetables
Finware	Flat fares and fully government subsidy	The fares based on trip distance and journey length, and the prices are relatively low. Subsidy only for the KTEL who get loss.	There is funding share between CTM as authority and the private companies, the government provides subsidies for bus operation, no subsidy for rail based transport, CTM imposes the Integrated Fare System (IFS) based on zones, there is intermodal Card and electronic chip, and special fares for segments of population with some type of disadvantage
Ecoware	Provision of Trans Sarbagita buses which safely and environmentally friendly	Provision of KTEL buses which safely and environmentally friendly	Provision of vehicles (buses, trains, trams, and tubes) which safely and environmentally friendly
Operational	Actors involved		
	Transport Authority (Trans Sarbagita) and Bus Operators	Independent agency (KTEL)	Transport Authority (CTM) and Operators
	Focus		
Hardware	Bus operators who do the bus operations and maintenances, as well personnel managements	Bus operators who do the bus operations and maintenances, as well personnel managements	Vehicles (buses, trains, trams, and tubes) who do the vehicles operations and maintenances, as well personnel managements
Software	Headway 15 minutes	Headway depend on routes, the official websites are accessible and available in Greek, Russian, and English versions, there is 24-hour hotline information service	Headway depend on routes, the official websites are accessible and available in Spanish, Catalan, English, and German, there also operators official websites and 24-hour hotline information service
Orgware	Trans Sarbagita daily management	KTEL daily management	CTM daily management and operators daily management
Finware	Paper based ticket and ticket sales on board bus	Paper based ticket, ticket sales on the buses, stations, and airports, reservation also by call center and online services, there is subscription ticket for daily, weekly and monthly trips	Paper based and electronic ticket, ticket sales on the vehicles, stations, and airports, reservation also by call center and online services, there is subscription ticket for daily, weekly and monthly trips
Ecoware	Trans Sarbagita bus management	KTEL bus management (operation and maintenance)	Operator vehicles management (operation and maintenance)



VIII.1.1 Similarities

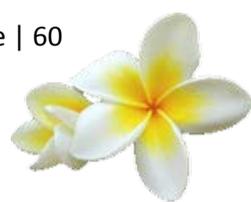
Based on Table 8.1, there are several similarities were found in the public transport in Bali, Crete, and Mallorca, as listed below.

Organizational Forms, Levels of Planning and Control, and Actors Involved

- a. Bali and Mallorca have similar organizational forms in public transport i.e. central planning and tendering of the realization. The local government in both of these islands establishes a transport authority to develop public transport. Purpose of the transport authority is designing, establishing and maintaining public transport. They have role in strategic, tactical, and operational levels.
- b. In the strategic levels, there are four actors involved in public transport i.e. the people, the political council, the transport department, and the transport authority in Bali, Crete and Mallorca. The council formulates the social goals of public transport into the social and transport policy forms. Together with political council, transport authority discussing and determining the general aims and the general services characteristics, i.e. the mobility and accessibility standards.
- c. In the tactical levels, Bali and Mallorca have a transport authority, i.e. BLU Trans Sarbagita in Bali and CTM in Mallorca who determines the detail services characteristics of public transport, e.g. fares, routes, vehicle types, etc.
- d. In the operational levels, Bali and Mallorca have a transport authority that provides information about public transport services. Both of these public authorities implement contract systems with the private operators for the operation of the fleet as well as ticket selling.

Hardware

- a. In the strategic levels, Bali, Crete, and Mallorca have regulations that emphasize the provision of public transport. The regulation determines



the services areas, route networks, minimum service standards, and vehicle specifications.

- b. In the tactical levels, Bali, Crete, and Mallorca have bus as public transport. The buses using the existing road networks, there is no dedicated lines for the bus services. They also provide open space shelters for the passenger transfers. In Crete and Mallorca, the buses serve the entire parts of the island.
- c. In the operational levels, operators do the operation and maintenance of vehicles, as well personnel managements.

Software

- a. In the strategic levels, Bali, Crete, and Mallorca have regulations about service standards.
- b. In the tactical levels, public transport in Crete and Mallorca are equipped by computerized and internet-based systems for their main services, i.e. for sales, information, and reservation. All of these services are available in their official websites.
- c. In the operational levels, the official websites of public transport in Crete and Mallorca are available in several languages. There is also available 24-hour hotline information service. Both of these islands also provide a clear timetables which available in the stations, airports, shelters, and official websites. The operations time depends on the routes.

Orgware

- a. In the strategic levels, Bali, Crete, and Mallorca have regulations about the organization that develop the public transport.
- b. In the tactical levels, the government in Bali and Mallorca determines transport authorities to develop the public transport.



- c. In the operational levels, the public transport organizations in Bali, Crete, and Mallorca focus on their daily management.

Finware

- a. In the strategic levels, the government in Bali, Crete, and Mallorca has regulations about fare and funding systems.
- b. In the tactical levels, the government in Bali, Crete, and Mallorca provides subsidy for the bus services.
- c. In the operational levels, there is paper based tickets and the onboard buses ticket selling.

Ecoware

- a. In the strategic levels, Bali, Crete, and Mallorca have regulations about vehicle safety and environmental protections.
- b. In the tactical levels, there is provision of vehicles that comply with safely and environmentally friendly.
- c. In the operational levels, each operator manages their vehicles in order to comply with safety and environmental standards.

Based on the above explanation, overall of case studies, i.e. Bali, Crete, and Mallorca operate buses as the regular public transport for tourist and non-tourist activities. Only the buses in Crete and Mallorca link the entire parts of the island. Buses in Crete and Mallorca are supported by proper infrastructure and facilities. They also equipped by computerized and internet-based system for the main services which available of their official website. Meanwhile, Bali and Mallorca have close similarities in the organizational forms, levels of planning and control, as well as actors involved in public transport.



VIII.1.2 Differences

Based on Table 8.1, were found in the public transport in Bali, Crete, and Mallorca, as listed below.

Organizational Forms, Levels of Planning and Control, and Actors Involved

- a. The organizational form of public transport in Crete was differing with Bali and Mallorca. Crete's organizational forms is tendering of the design and realization. Crete's government appoints KTEL as independent agency to develop public transport. KTEL are private companies who have been given exclusive rights to operate all regular domestic bus services and to use the bus terminals across the country. KTEL only have role in tactical and operational levels.

Hardware

- a. Bus as public transport modes in Crete and Mallorca are well managed. Buses are able to service the tourist and non-tourist activities to the entire island. There are also rail based transport networks in Mallorca, but do not serve all parts of the island. The buses in Bali are not yet to serve all parts of the island, only in the southern parts of the island can enjoy the bus services. There are eighteen corridors planned, but only three corridors that have been operating.
- b. Crete and Mallorca have a comprehensive bus networks. Bus networks in Crete are hub-and-spokes systems with supra-regional lines and three bus service regions. Bus networks in Mallorca is zone based systems with 30 zones, grouped into 5 concentric circles around Palma. Meanwhile, there is trunk and feeder lines networks in Bali. The linear network systems for the main routes and radial network systems for feeder lines.
- c. There is a double decker buses in Crete and Mallorca for sightseeing purposes. There are no double decker buses in Bali.



Software

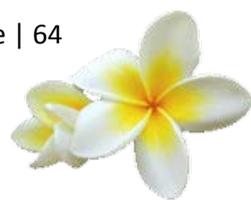
- a. Bus services in Crete and Mallorca are equipped by clear timetables which available in stations, airports, shelters, and official websites. There are no timetables for bus services in Bali.
- b. The public transport operations time in Crete and Mallorca are depends on the routes. Meanwhile in Bali, Trans Sarbagita buses are operates from 5:00 a.m. to 9:00 p.m.
- c. Public transport in Crete and Mallorca are equipped by computerized and internet-based systems for their main services which available in their official websites. Their official websites are available several languages. There is also 24-hour hotline information service. Meanwhile Bali's public transport is not equipped by computerized and internet-based systems for their main services.

Orgware

- a. The government in Bali and Mallorca are appointing transport authority in order to develop the public transport, i.e. BLU Trans Sarbagita in Bali and CTM in Mallorca. Meanwhile in Crete, there is an independent agency appointed to develop public transport. In Crete, KTEL as an independent agency and private companies are managed by elected boards. The main shareholders of KTEL are the individual owners of the public bus licenses who make their vehicles available for the use of KTEL through individual contracts.

Finware

- a. There is different regulation in pricing systems and governmental funding for the public transport in Bali, Crete, and Mallorca. Bali's transport authority applies a flat fares and fully government subsidy for the public transport. In Crete, fares are based on trip distances and journey length. Meanwhile, subsidy only for the KTEL who get loss. In Mallorca, there is funding share between CTM as transport authority and the private companies; the government provides subsidies for bus operation. The



government only provides subsidies for bus operation; there is no subsidy for rail based transport. CTM imposes the Integrated Fare System (IFS) based on zones; there is intermodal Card and electronic chip, and special fares for segments of population with some type of disadvantage.

- b. There is electronic ticket in Mallorca, meanwhile Bali and Crete only paper based tickets. Ticket selling in Crete and Mallorca are on the vehicles, stations, and airports. The reservation also can through call center and online services. There is subscription ticket for daily, weekly and monthly trips. Meanwhile in Bali, there are no subscription ticket systems and reservation services.

Based on the above explanation, buses as public transport in Bali are differing with Crete and Mallorca in the organizational forms, levels of planning and control, and actors involved, hardware, software, orgware, and finware. The Bali transport authority can learn from these differs in order to improve their public transport.

VIII.2 Lessons Learned

Through exploring the similarities and differences of public transport in Bali, Crete, and Mallorca, the strengths and the weaknesses of public transport in those three tourism islands can be revealed. The strengths and weaknesses in Crete and Mallorca can be used to improve the public transport in Bali. This process is called lessons learned processes. The lesson learned in this thesis was discussed as follow.

Organizational Forms, Levels of Planning and Control, and Actors Involved

- a. The Bali transport authority can adopt the Crete system by appoints an independent agency to develop public transport which able to manage private companies that have exclusive rights to operate regular bus services.

Hardware

- a. In order to develop the public transport networks, the Bali transport authority can adopt the KTEL network systems i.e. hub-and-spokes which able to service the tourist and non-tourist activities to the entire island.



- b. Public transport in Crete and Mallorca are equipped by clear timetables which available in stations, airports, shelters, and official websites. In order to give better services for passengers, the Bali transport authority can improve the public transport in Bali by those facilities.

Software

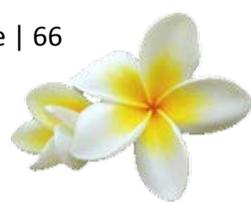
- a. Public transport in Crete and Mallorca are equipped by computerized and internet-based systems for their main services which available in their official websites. Their official websites are available several languages. There is also 24-hour hotline information service. As an international tourist destination, public transport in Bali also should be equipped by computerized and internet-based systems for their main services, in order to give better services for tourist and non-tourist activities.

Orgware

- a. The Bali transport authority can use the KTEL systems in provides and manages the fleet. The individual buses owners can be as a provider in provide bus services for rest part of the island through individual contract. Thus, the burden on the government for the provision and management of fleet can be reduced.

Finware

- a. The Bali transport authority can manage their pricing systems by based on trip distances or zones depend on the route networks. Therefore, the burden on the government for the subsidy can be reduced.
- b. The reservation ticket systems in Bali can also be improved by electronic ticket systems and provided on the vehicles, stations, airports or through call centers and online services. Bali's public transport also can provide subscription ticket systems.



CHAPTER IX

CONCLUSIONS, RECOMMENDATIONS, AND REFLECTIONS

IX.1 Conclusion

This thesis discusses the accessibility by public transport in Bali, Crete, and Mallorca, and analyzes to what extent the practice of the accessibility by public transport of Crete and Mallorca can be transferred to Bali. Accessibility by public transport in Bali, Crete, and Mallorca for the tourist and non-tourist activities have been assessed and evaluated through pentagon prism which contains five dimensions of the success factors for transport system, i.e. *hardware*, *software*, *orgware*, *finware*, and *ecoware*, as well as assess the organizational forms, levels of planning and control, and actors involved.

The five dimensions of public transport in Bali, Crete, and Mallorca are provided in different way. Crete and Mallorca have better public transport than Bali. Bus as one of the public transport in Crete and Mallorca are able to service the passenger to the entire island. Meanwhile, public transport in Bali only serves southern parts of the island. Crete and Mallorca governments are focusing in development of any aspects in the five dimensions, e.g. through a comprehensive route networks, a clear timetables, an informative official websites, a computerized and internet-based systems, better in the pricing and financing system, etc. Meanwhile, Bali lacks in management of the public transport.

The organizational forms, levels of planning and control, and actors involved in Bali, Crete, and Mallorca are organized in different way. Bali and Mallorca have similarities in organizational forms of public transport, i.e. central planning and tendering of the realization. Meanwhile, organizational forms in Crete is tendering of the design and realization. There are several actors who involves in each levels of planning and control, e.g. the peoples, political council, transport department, transportation authority, and private companies/ operators. There are also several relations in between these actors, i.e.: democratic control, hierarchical control, guidance instructions, and contract. Each of these actors have different role in each levels of planning and control, depend on the organizational forms of public transport.



Accessibility by public transport in Crete and Mallorca can be transferred to Bali through a lessons learned processes. This process are exploring the similarities and differences of public transport in Bali, Crete, and Mallorca, the strengths and the weaknesses of public transport in those three tourism islands can be revealed. The strengths and weaknesses in Crete and Mallorca can be used to improve the public transport in Bali.

IX.2 Recommendations

Recommendations are made in order to improve the accessibility by public transport for tourism and non-tourism activities in Bali. There are several recommendations formulated as follow:

1. Bali Provincial Government can adopt the Mallorca's organizational forms about the way to designing, establishing and maintaining a common system of regular public passenger transport. Otherwise, can adopt from Crete about how to manage private companies which have exclusive rights to operate regular bus services.

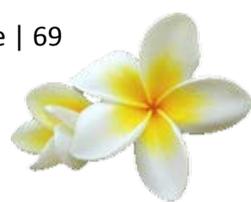
2. Bali Provincial Government can adopt the policy in manages public transport from Crete and Mallorca thus able to service the tourist and non-tourist activities to the entire island. There are several policies and practices that can be adopted by Bali Provincial Government from Crete and Mallorca in order to improve accessibility by public transport in Bali, e.g.:
 - a. Developing a comprehensive bus networks with a hub-and-spokes systems or zone based systems. Both of these network systems are able to service the entire parts of the island. Hopefully by using one of these network systems can improve the service areas of public transport.
 - b. Providing clear timetables which available in stations, airports, shelters, and official websites. An accurate timetable allowing the passengers to manage their travel times in a proper way.
 - c. Providing computerized and internet-based systems for the main services which also available in the official websites in order to give better services for passengers.



3. Bali Provincial Government can adopt the shareholding policies in public transport from KTEL. The main shareholders of KTEL are the individual owners of the public bus licenses who make their vehicles available for the use of KTEL through individual contracts. This system can be used by Bali Provincial Government in provides and manages the fleet. Through these systems, the individual buses owners can be as a provider in provide bus services for rest part of the island. It can reduce the burden of the government for the provision and management of fleet.
4. Bali Provincial Government can adopt pricing and funding policies in public transport from Crete and Mallorca. Public transport in Bali can adopt pricing system based on trip distances which developed by KTEL, or zoning systems which developed by CTM. Better in pricing systems can improve the service quality of public transport. Meanwhile for the improvement of funding systems, Bali Provincial Government can adopt the Crete's systems that prioritize subsidies for that get loss, or the Mallorca's systems who apply a funding share between transport authority and the private companies. Better funding systems also can reduce the burden on the government budget for public transport subsidies.
5. Bali Provincial Government can adopt from CTM about the electronic ticket systems and the subscription ticket systems. Both of these systems hopefully can improve the service quality of Bali's public transport.

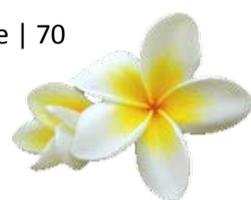
IX.3 Reflections

The choice of research methods used in this thesis is appropriate since it can explain the differences and similarities of accessibility, especially public transport in Bali, Crete, and Mallorca by applying comparative analysis and case study research. However, in conducting this research, there are some weaknesses that can be used as input for improvement in future studies. The assessment of the case studies faces some challenges especially in several documents and content of the websites which only available in local languages. Therefore, the English-speaking islands should be chosen as a case study to inhibit this condition.



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