MAIN CHARACTERISTIC OF USER REQUIREMENTS FOR THE TRANSFORMATION OF EXISTING BUS TERMINAL IN NORTHERN REGION OF MALAYSIA

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by

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LIST OF ABBREVIATIONS

ATM	**A**utomated **T**eller **M**achine
BHA	**B**us **H**olding **Area**
BTS	**B**andar **T**asik **S**elatan
CI	**C**riticality **I**ndex
CTS	**C**entralized **T**icketing **S**ystem
ERL	**E**xpress **R**ail **L**ink
HVAC	**H**eating, **V**entilation and **A**ir **C**onditioning
ITS	**I**ntelligent **T**ransportation **S**ystem
ITT	**I**ntegrated **T**ransportation **S**ystem
LRT	**L**ight **R**ail **T**ransit
OKU	**O**rang **K**urang **U**paya
PIDS	**P**ublic **I**nformation **D**isplay **S**ystem
PIS	**P**assenger **I**nformation **S**ysem
PWD	**P**ublic **W**orks **D**epartment
SPAD	**L**and **P**ublic **T**ransport **C**ommission
SPSS	**S**tatistical **P**ackage for **S**ocial **S**ciences
UTC	**U**rban **T**rasformation **C**entre

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CIRI-CIRI UTAMA KEPERLUAN PENGGUNA UNTUK TRANSFORMASI TERMINAL BAS SEDIA ADA DI UTARA MALAYSIA KEPADA TERMINAL BAS BERSEPADU

ABSTRAK

Kini, negeri-negeri di utara Malaysia sedang berkembang dengan pesat sejajar dengan peningkatan terhadap permintaan kemudahan pengangkutan awam. Walau bagaimanapun, kemudahan awam yang disediakan di setiap bas terminal di negeri-negeri tersebut masih di dalam keadaan yang kurang baik dan masih tiada ciri-ciri mesra pengguna. Oleh itu, kajian ini dijalankan untuk menilai kemudahan paling sesuai yang perlu disediakan di terminal-terminal bas di negeri tersebut dengan menjalankan kajian komparatif berdasarkan perspektif dan keperluan pengguna yang mempengaruhi keputusan pengguna semasa di terminal bas di Perak, Kedah, dan Pulau Pinang. Dalam usaha mencapai objektif kajian, borang soal kaji selidik diedarkan kepada 380 orang pengguna awam yang berada di dalam kawasan terminal. Seterusnya, pengiraan kekerapan (frekuensi) dan indeks kritikal dikira untuk menentukan kedudukan faktor kemudahan berdasarkan keutamaan pengguna. Dapatan kajian menunjukkan Hentian Raya Parit Buntar adalah stesen bas yang berada pada kedudukan utama dengan ciri-ciri kemudahan sedia adanya berada dalam keadaan baik. Sementara itu, Hentian Shahab Perdana berada pada kedudukan terakhir dengan kemudahan sedia adanya berada dalam keadaan kurang baik. Seterusnya, dapatan kajian menunjukkan kedudukan tertinggi kemudahan yang menjadi keperluan sangat penting untuk memenuhi keperluan pengguna adalah sektor perkhidmatan yang diperlukan di terminal seperti Klinik 1 Malaysia, Pejabat

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Pos Malaysia, Balai Polis dan Pejabat SPAD. Kedudukan kedua tertinggi adalah keperluan menambah baik kawasan letak kereta iaitu dengan membina tempat letak kereta bertingkat untuk memenuhi permintaan parkir dan menyediakan ruang parkir yang dekat dengan pintu masuk kepada warga OKU. Kedudukan ketiga tertinggi adalah kemudahan mesra untuk orang kurang upaya (OKU). Laluan khas berserta panduan perlu disediakan buat golongan ini. Kemudahan yang bercirikan mesra pengguna OKU perlu dipastikan ada pada lif dan tandas. Selain itu, tekstur lantai untuk warga tua serta cerun laluan bagi pengguna berkerusi roda perlu juga dipastikan agar sentiasa berada dalam keadaan selamat. Kesimpulannya, kajian ini mencadangkan pelaksanaan transformasi dan penambahbaikan pada kemudahan awam sedia ada di stesen bas di Utara Malaysia oleh pihak pengurusan terminal dan pihak berkuasa tempatan negeri Perak, Kedah dan Pulau Pinang.

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MAIN CHARACTERISTICS REQUIREMENTS FOR THE TRANSFORMATION OF EXISTING BUS TERMINALS INTO INTEGRATED BUS TERMINALS IN NORTHERN REGION OF MALAYSIA

ABSTRACT

The states of North Malaysia are now growing rapidly in line with the increasing demand for public transport. However, public facilities available at the bus terminals in the states of North Malaysia are still in poor condition and still have no friendly user features. Therefore, this study is conducted to evaluate the most sensible facilities to be provided at each bus terminal by conducting a comparative study based on user perspectives and needs affecting current user results at bus terminals in Perak, Kedah and Penang. In order to achieve the objectives of the study, a questionnaire survey was distributed to 380 public users at the terminal area. Further, computational frequency and critical calculations were calculated to determine the position for the convenient factor based on user preferences. The findings showed that Hentian Raya Parit Buntar is in the top list with its existing features in a great condition. Meanwhile, the Hentian Shahab Perdana is in the last list with their existing facilities in a bad condition. Further research found that the top priority of facilities to cater the needs by consumers are the sectoral services required at terminals such as 1 Malaysia Clinic, Pos Malaysia Post Office, Police Station and SPAD Office. The second highest list is the need to improve the parking area, where a multi-storey car park should be built to meet parking demands and providing near entrance car parking for disables people. The third highest list is a friendly facility for the disabled people. Special lane with guidance should be

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prepared for this group. The facilities that have disable user-friendly features must be ensured to be available in lifts and toilets. Besides that, texture of the floor for the elderly and the slope paths for those who using the wheelchairs must also be ensured to always be in a safe condition. In conclusion, this study suggests the implementation of transformation and improvements on the existing public facilities at terminal buses in terms of terminal managements and local authorities of Perak, Kedah and Penang.

CHAPTER ONE
INTRODUCTION

1.1 Background

Malaysia is moving towards becoming a world-class economic region by the year 2025. The Northern Corridor Economic Region (NCER) aspires to transform Peninsular Malaysia's four northern states which are Perlis, Kedah, Pulau Pinang and northern Perak by improving the public transport in the medium term that will help to accelerate the economic growths and elevate the income levels in northern Peninsular Malaysia.

Nowadays, buses are considered to play an important role in the transport system. It is also known as a primary mode of public transport in several states in the Northern Peninsular Malaysia. Public transport provides passenger with a more environmentally-sustainable necessity of the private vehicle. Benevolent people to shift from using the car to using public transport will contribute to reduction of environmental impacts and decrease reliance on non-renewable resources (Transit, 2012).

Specifically, private transportation is known as privately owned vehicles handled by owners for their personal use, such as bicycle and private car (Vuchic, 2002). Therefore, public transport is a transportation service system where passenger proceeded from their location to a desired destination safely without using their own vehicles.

Users' option and requirement should be considered. For example, customers' satisfaction in the context of bus service is contributed by various factors, such as the availability of shelter and benches at the bus terminal, cleanliness,

overcrowding, information system, safety, personnel security, and physical condition of bus stops (Nandan, 2010). Meanwhile, for a design perspective, station facilities such as the availability of public restrooms, food/drink sales, places to sit, shelter from sun/rain, and cleanliness are the most important factor in explaining respondents' overall satisfaction (Iseki and Taylor, 2010).

The built surroundings also influence people's behavior and perceptions significantly, as well as areas with potential criminal opportunities and social disorder. All stations should maximize lighting, controlled access and movement, minimized obstructions, and designed in a way that discourages loitering in order to minimize crime, enhance surveillance, reduce insecurities by commuters and provide a better comfort (Diec et al., 2010).

As a result, by knowing what should be the best condition for a development in a bus station, policy makers would be able to make the right policies which will enhance the suitability of building and consider the existing public facilities structure that should be available at the bus station. It can also help the government to provide a safe and appropriate facility structure to enhance passenger satisfaction level.

Population in Northern Malaysia in 2015 was approximately 6.5 Million (Department of Statistics Malaysia, 2015). This figure indicates that the level of needs and consumption for these facilities is in line with the high capacity of population.

Hence, this study was carried out to ensure that the existing facilities are always in good condition and can be continuously used. Besides that, this study aims to evaluate the main characteristic and requirement for the transformation of existing bus terminal in the Northern Region of Malaysia.

1.2 Problem Statement

Northern Malaysia is growing rapidly. This leads to an increasing demand for public transport facilities. Al-Mudhaffar et al. (2016) reported that such demands for the growing area has encouraged challenges to build the needed terminals in order to provide a suitable public facility at the bus terminals.

Nowadays, layout planning at the bus terminal is not suitable for users safety and comfortability. Plus, some of the existing public facilities provided at the bus station and terminal were not maintained properly. Bakry et al. (2008) mentioned that it is very important to determine the layout mode in terms of the physical layout of the terminal, and an easy access platform should be given priority for users and transport facilities.

As proven by Full and Tabassi (2014) at Sungai Nibong Bus Terminal, the users were most disappointed to be in the pick-up area that was mainly an exposed area without any heating, ventilation, and air-conditioning system. The users also feel unsatisfied about air quality assessment. The pick-up area is exposed to pollutants and bad air quality from outside environment—most likely dust and dirt.

Soltani et al. (2012) further added that most public transport terminals are still lacking in providing a good design and facilities for the disabled people. The existing facilities normally unable to meet their needs, poor accessibility and difficult for the disabled people to move.

Therefore, evaluation on the main requirement of facilities is crucial in transforming the existing the bus terminal into an integrated bus terminal in the Northern Region of Malaysia. This will enhance users' perspective regarding the environment and facility in the bus terminal. Consequently, it can accelerate the economic growths and elevate the income levels in northern Peninsular Malaysia.

1.3 Objectives

The research objectives are as follows:

1. To investigate the most suitable facilities for bus terminal in Northern Malaysia.
2. To conduct a comparative study on the needs of facilities in the bus terminals based on the bus users' perspective at several bus terminals in Perak, Kedah, and Pulau Pinang.
3. To provide feedbacks about the main concerns of users on the most suitable facilities to meet the needs of users in Northern region of Malaysia.

1.4 Scope and Limitation

This study gives attention to marketing strategy in order to attract users to use public facility which exists in bus station in the Northern Malaysian states: Kedah (Shahab Perdana Bus Station, Ukir Square Bus Station, and Kulim Bus Station), Pulau Pinang (Sungai Nibong Bus Terminal), and northern Perak (Kamunting Raya Bus Terminal and Hentian Raya Parit Buntar). Focus of this study is on the existing facilities and their interior design layout at the waiting area of the bus stations. Next, this study also aims to evaluate the main requirement of a facility in order to meet the users' wish to transform the existing bus terminal/station. The scope of works focuses on collecting data from 380 total respondents who were in the public bus station area.

1.5 Research Methodology

This study was conducted by gathering questionnaire responses among public bus users, who entered and exited the bus station only. Convergence is the type of questions utilised in the questionnaire in terms of user satisfaction and safety related to the suitability of facilities in the bus station.

In additions, a number of questions were posed orally to users on the problems that are often arise; in particular, as a consumer approaching to understand more of the detailed aspects related to the comfort and safety of users.

1.6 Significance of The Research

This study can assist the local authorities in increasing the comfort level and users' safety around the public bus stations in Northern Malaysian. This research particularly intends to create a user-friendly bus terminal, organized layout, and safe to overcome the existing problems that need to be addressed immediately.

Hence, results of this study can influence society in chosing to use public transport compared to private transport in their journey. It eases the society to go to their destination or workplace. Instantly, it can reduce emissions from vehicles that will cause pollution when the use of cars on the road are reduced.

Apart from that, it can handle proclamation factor faced by society on the existing facility; thus boosting the local economy while attracting tourist to visit the beauty of the country. Research output in enhancing public facility at the bus station in the Northern Malaysia will prove that land public transport usage is the best option. In fact, users can enjoy the facilities and service that the facilities provided.

1.7 Framework

The theoretical framework is a network of the relationship between independent variables. A conceptual framework as shown in Figure 1.1 is used to conduct this research. All independent variables were selected as the main factors to determine the priority of the suitability of the facilities at the public bus station in Northern Malaysia in order to meet the needs of users.

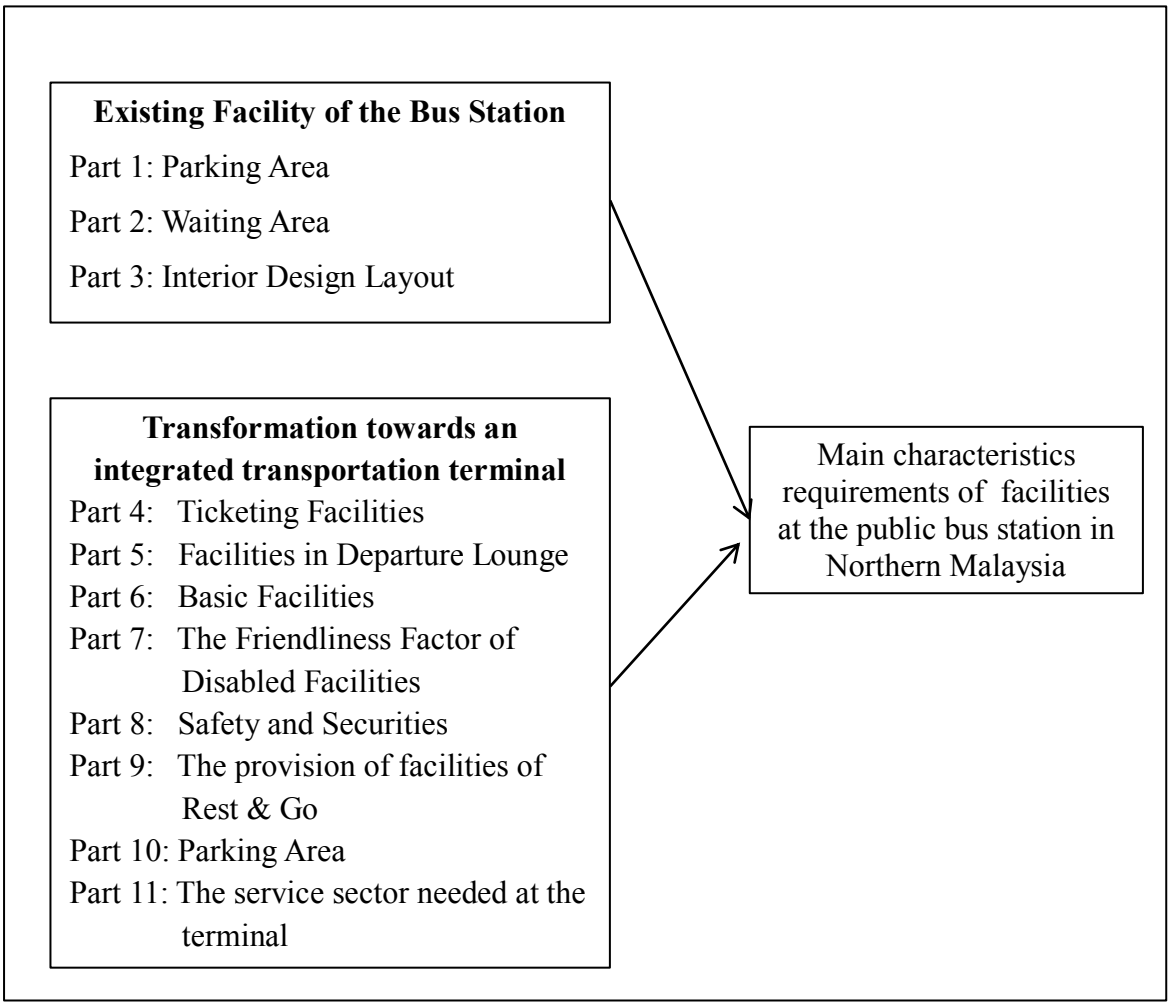

Figure 1.1: Theoretical framework

1.8 Thesis Structure

This research is analytical in nature and uses a case study method to fulfil research objectives. There are 5 chapters in the thesis as follows:

Chapter 1 Introduction

This chapter contains overall information about the study that has been carried out. This chapter explains the background, objectives, significance of the research, scopes of the study, and the problem statement.

Chapter 2 Literature Review

This chapter evaluates and summarizes related and relevant literature on the characteristics of existing public facility at bus stations in the Northern Malaysia.

The literature review discusses on different issues at other bus stations that would be important for different facility provided for customer satisfaction. It can be further seen in studies on the existing facilities of a bus station. On the other hand, the level of customer satisfaction towards the service and facility that was provided at the bus station is also demonstrated.

Chapter 3 Methodology

This chapter explains the methodology applied for the study in order to identify the problem and issues that may affect the customers' perception on the bus stations in the Northern Malaysia. Data collection was done using two methods, namely primary and secondary. The primary method obtains data through questionnaire form while the secondary data through journals, articles, and reports.

Chapter 4 Results and Discussion

Thus chapter discusses on the findings from the survey conducted to identify the determinants of customer satisfaction and perception with the public facilities in the context of Northern Malaysia. The findings of this study can specify the types of facility needed from users' perspectives in terms of comfortability and safety.

Chapter 5 Conclusion and Recommendation

This chapter concludes the findings and offers answer for the objectives throughout the research. It also provides recommendations for further work in the next future research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

Literature have emphasized that in designing a building, the most important thing is to cater the users needs, especially women, the elderly and disabled people that belongs in vulnerable groups. Hence in this chapter, the researcher will venture to measure the extent of users' perceptions on the level of public facilities provided by the public transport providers to assess the comfort and safety of the users from the findings of other researchersthat are related to this research study.

It starts with definitions of terms and further elaborations on the scenario at park and ride facilities. Then, it moves to view the scenario of building structure, general issues on each facilities, including the safety and security scenario, and it ends with summary of research gap.

2.2 Definition Users' Perception

Schiefelbusch and Dienel (2009) stated that users are conclusive judge and the success of a quality services depends largely on the users. Hence, users' satisfaction should be customer-oriented and meet the users' needs and desires. Users also are known as 'soft index', which is subjective in nature because they are the direct users. Where applicable, users can be used as indicator to measure the effectiveness of a service towards customers' perceptions (Noor et al., 2014). Evaluation towards an emotion-based response to a service is the "customer's fulfillment response" to define satisfaction of a service quality (Rust and Oliver, 1994). Service quality is

commonly evaluated in terms of technical quality and functional quality (Nandan, 2010).

Service quality is evaluated by the perceptions and expectations of users; for example, to ask users about some aspects on the quality of service. The importance and satisfaction levels of users can be identified to make improvements (Eboli and Mazzulla, 2008).

Nowadays, bus stations as an attractive neighborhood anchor are announced as a new chapter in urban mobility and the life (Kroll, 2007). However, public facilities vary between stations in the different cities and rely on factors such as the needs of users, financial sources, the local preference policy, etc. These make the problems faced by users on the availability of facilities also vary. It is said that the problems encountered in each bus terminal facilities are depends on the circumstances of the bus terminal and the needs of users. These include availability, cleanliness, convenience, safety, and physical condition whether it meets the users' needs or not while at the bus station.

2.3 Park and ride facilities scenario

Park and ride facilities is a system used with intention to reduce congestion and the needs for more parking. This system works to allow drivers to park or leave their vehicles in parking lots on the outskirts of a bus terminal and travel to the city center on public transportation. Picket (2005) stated that the dropped off and picked up of users by car often occur at the station. Terminal in Cairo can be used as an example for this park and ride matter. As a poor state, Cairo faced problems in terms of insufficient parking lots at the park and ride station. This attracts researcher to

study and point out strategies to be applied to maintain and improve the park and ride lots to ease the user (Bakry et al., 2008).

Meanwhile, the U.S cities are jam-packed with an unbelievable amount of people. The dominant mode of transportation in the U.S cities was automobiles. In order to ease users to access the Bus Rapid Transit stations, park-and-ride facilities should be provided in U.S cities. Park and ride will encourage the public transport usage. Therefore, current planners need to design park-and-ride facilities with the inclusion of commercial activities (Galicia et al., 2009). Lam et al. (2001) also supported the idea that the jam-packed issues can be addressed by implementing the park and ride schemes. The schemes can be noticed as a part of the solution to reduce congestion.

Equally important, the provision of sufficient number of parking spaces and the parking space designs play as a key role in determining the success of the parking lots availability (Hamsa et al., 2014). Physical conditions of the parking facilities such as location, number of parking spaces, and its designed need to be analysed (Roess et al., 2004) to determine the parking demand at park and ride stations. Fjellstrom (2010) supported the idea through suggestion to develop a parking space to avoid parking on walkways.

Hamsa et al. (2014) suggested that a multi-storey parking facility should be designed to increase the number of parking spaces due to the inavailability of land to expand it horizontally, especially at Terminal Putra and Kelana Jaya stations to accommodate more parking for users (see Figure 2.1).

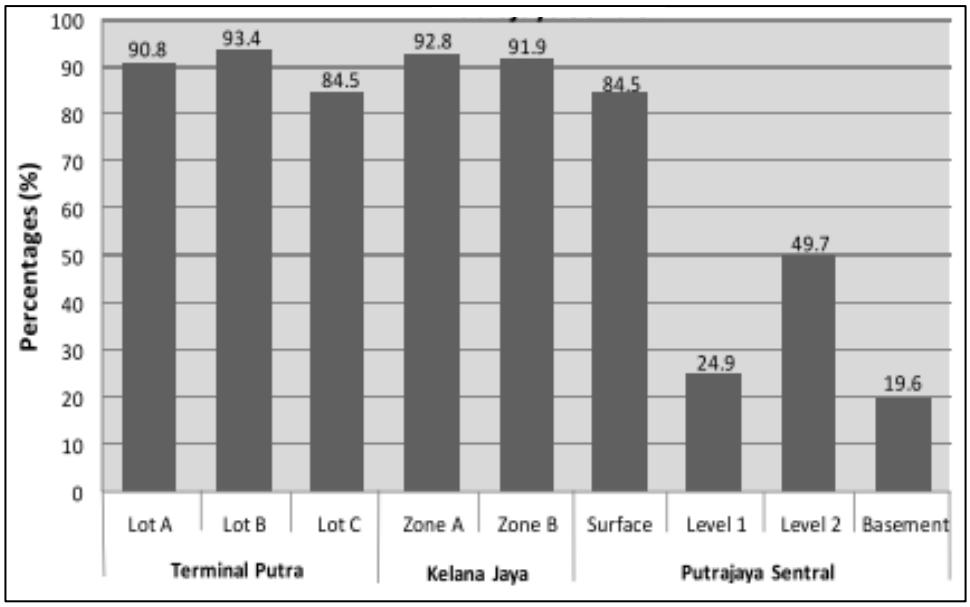

Figure 2.1: Parking occupancy at Terminal Putra, Kelana Jaya, and Putrajaya Sentral park and ride facility (Source: Hamsa et al., 2014)

In comparison, Figure 2.1 shows the demand of the multi-storey parking at Putrajaya Sentral park and ride facility is lower than the surface parking. They also highlighted that the distance, conveniences, direct access to the terminal building from the parking areas were the important determinant factors for high utilization rate of the parking facility. Besides, users preferred to park at the surface parking because it was easier and convenience. According to Figure 2.2, the parking spaces at Level 2 is higher than Level 1 and Basement. Level 2 parking lot is located near to the transit station. It was also found at all levels that users most likely to parked their vehicle near to the staircase and lift that linked to the entrance of the terminal building (Hamsa et al., 2014).

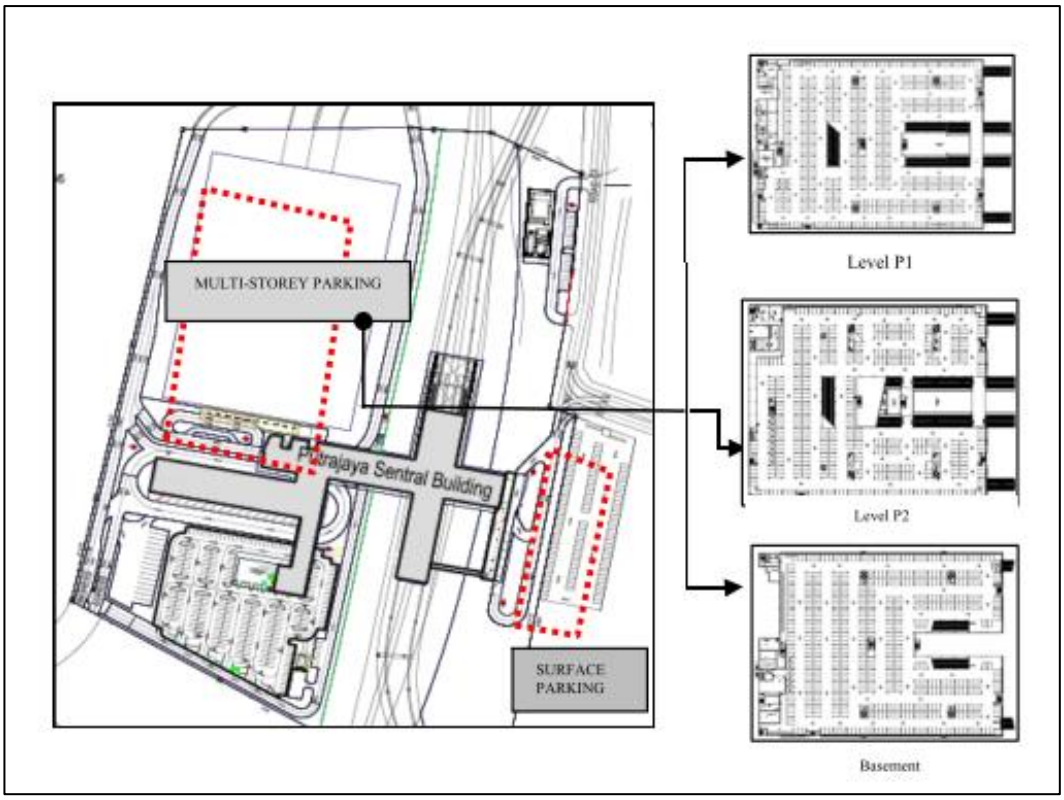

Figure 2.2: Parking provision at Putrajaya Sentral (Source: Hamsa et al., 2014)

Syed Adnan and Kadar Hamsa (2015) emphasized on the factor of users' parking behavior in terms of parking availability at Putrajaya Sentral. Their findings (Figure 2.3) show that the multi-storey parking indicated a higher mean rank compared to the surface parking. There were distinct perceptions between the surface and the multi-storey parking users. According to Figure 2.3, three statements scored the highest mean values for multi-storey parking regarding the ability to get parking space at all time, adequacy of parking space, and the ease and convenience to park the vehicle. Thus, they suggested these motivating factors so the governments will realized and include these factors for considerations in the future investment of park and ride facilities so it can be more effective.

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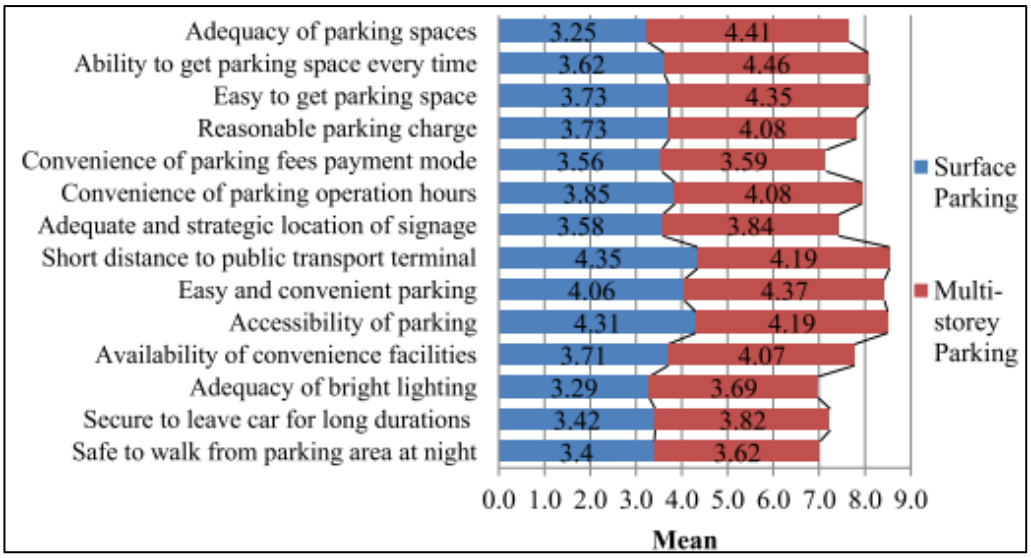

Figure 2.3: Mean rank of parking related characteristics according to types of parking (Source: Syed Adnan and Kadar Hamsa, 2015)

The major problems for users in major urban centers such as in Petaling Jaya was illegal parking. Illegal parking affects the ease of reaching destinations and overall accessibility (See Plate 2.1). These scenarios are stemming from the shortage of the parking spaces that cannot accommodate the number of cars. Illegal parking on the street only makes the congestion become worst and difficult to manage. Thus, the researcher suggest on the needs of redevelopment to encourage fully used of the public transport system (Ibrahim et al., 2011).

Plate 2.1: Illegal parking in major urban centers in Petaling Jaya, especially at Damansara Utama (Source: Ibrahim et al., 2011)

Furthermore, past studies also showed that if the user were guaranteed with car security at the station and the usage of the park and ride facilities, it can influence users to use the park and ride facilities. Therefore, the management of public transport operators in the Klang Valley needs to improve both the accessibility and efficiency of their public transport services (Dahalan et al., 2015).

2.4 Building structure/layout scenario

Ergonomic approach intends to optimize human interactions with systems, in order to make human activities more comfortable, efficient, safe, and satisfying. Some aspects of the design to be taken into consideration are wayfinding, safety

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during emergencies, design for all and design for people with special needs. Therefore, the researcher suggested to refurbish the design of the terminal. Prior to that, there is a need to observe on the real users and their behaviors in using the areas to be refurbished. It could allegedly increase the overall quality of delivering design solutions in terms of users' satisfaction (Attaianese, 2000; Attaianese and Duca, 2012).

Japan now is facing with social changes, where the public walking space should be adjusted in the future because users enjoy to shopping and window shopping while waiting at the station. Therefore, users' behavior created issues such as crossing flow and the decrease in the walking speed. Frequently the distance between the visits facilities and the neighbouring facilities such as Café to waiting room or waiting room to café. Thus, Yamashita et al. (2007) reported that refurbishment or adjusting the public walking area might help to address the problem.

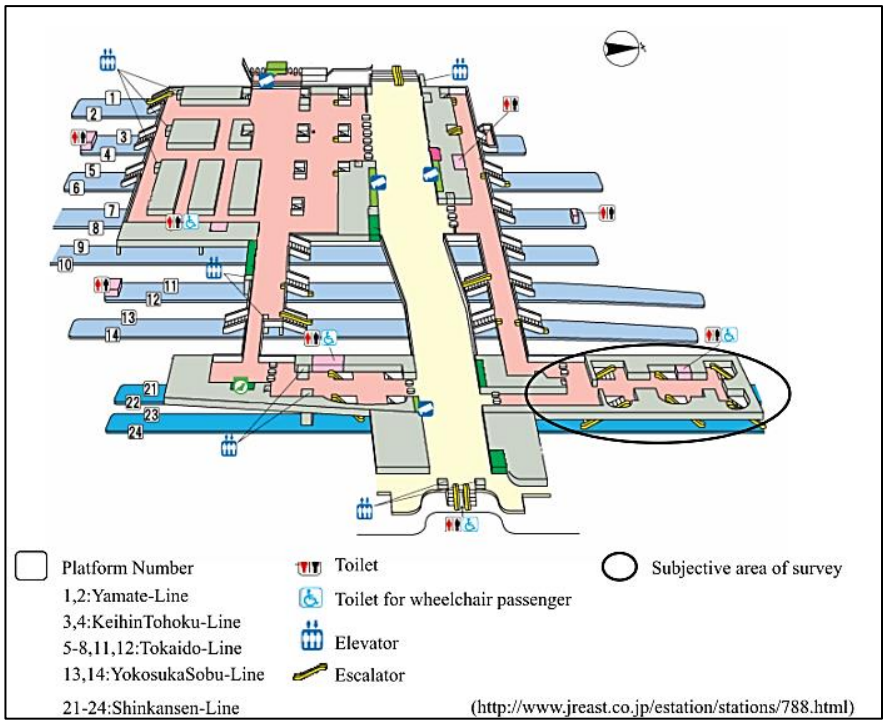

Figure 2.4: Inside map of Shinagawa station (Source: Yamashita et al., 2007)

In short, a good layout in a station can decrease the length of walking distance for users to and from various facilities. On the contrary, the suitability of original layout of a Taoyuan station in Taiwan is no longer suitable after a period of time. This is due to the increasing number of users, the types of users, and the surrounding conditions. For that reason, Lee (2011) suggested that it is good if some facilities in Taoyan station can be relocated to another suitable locations within the station.

2.5 General issues of facilities in the bus terminal

Facilities provided at every bus station or bus terminal are the same for the user. However, the need for every user on the availability of each facility is different. Hence in general, the scenario of facilities that will be discussed in this sub topic are waiting areas, ticketing facilities, departure lounge, and basic public facilities.

2.5.1. Basic public facilities

Basic public facilities are needed by users while at the bus terminal such as number of seats. For example, Qatar is facing a rapid growing economy, activities, population, and hence a growing demand for transport (Shaaban and Khalil, 2012). Therefore, based on a survey results by Shaban and Khalil, the station should be provided with enough quantity of seats to accommodate at least 10 users in busy areas. In addition, the terminal should be provided with a female waiting area, toilets and praying areas as the need for both genders (Shaaban and Khalil, 2013).

India railway station also pointed out three elements of basic facilities that should be provided at the terminal (See Figure 2.5). These are the most important

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basic facilities as the determinant of user satisfaction that should be provided at the station (Nandan, 2010):

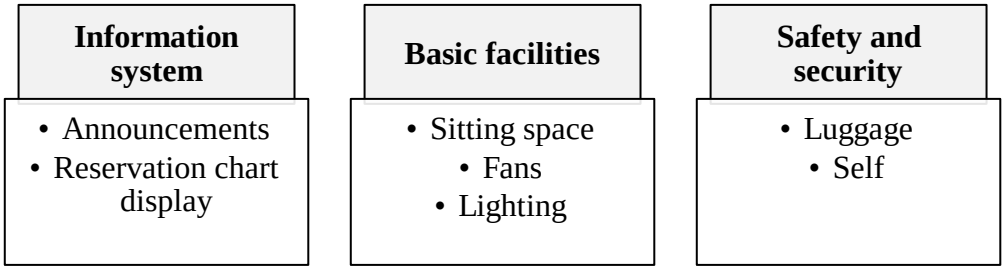

Figure 2.5: Important elements of users satisfaction (Source: Nandan, 2010)

Noor and Dola (2013) mentioned that facilities provided in the bus terminal would effect users' perception of quality service. Such facilities measured at the Klang Valley case, were old and not under the care of transport service providers. In terms of cleanliness (Refer to Table 2.1), users claimed that the terminals was heavily contaminated by the emissions from idle buses and it was a poorly lit terminal.

Table 2.1: Users satisfaction on the provided facilities at bus hub and train station (Source: Noor and Dola, 2013)

Facilities	Seating	Cleanliness	Ticket System
Bus Terminal	2.59	2.52	nil

Next, Table 2.2 shows that users in Klang Valley are satisfied with the facilities of toilets and escalators but most of the users complained on the unclear signage. Unclear signage causes difficulty to guide users to the designated platforms and the schedule of trips. Therefore, a good suggestions surfaced from this research study are to provide a good signage in terminal and improved ticketing systems to assist a smooth movement of users in the terminal (Noor and Dola, 2013).

Table 2.2: Users satisfaction on some facilities provided
(Source: Noor and Dola, 2013)

Item	Escalator	Toilet	Lift	Signage	Automatic Gate	PA System	Safety and Security
Mean	3.63	3.63	3.57	3.45	3.59	3.50	3.50

At Pudu Central Kuala Lumpur, users who are visiting UTC have to wait for a long time to use an elevator. This is because the elevator is not working properly and not well maintained (Malek et al., 2015).

Hamim et al. (2015) on their study at the Sungai Nibong bus terminal stated that among the problems faced by the tourists is the unavailability of money changer and auto-teller machine (ATM). Without the money changer point, it will make it difficult for the tourist to convert their money and the same goes to the ATM, users in need cannot withdraw money conveniently and have to walk far to do that.

Full and Tabassi (2014) reported that in terms of services and cleanliness, the condition of toilet inside the Sungai Nibong bus terminal was pretty bad. The facilities were not being properly managed; for example, a water tap in the toilet is damaged but no action was taken to fix it (see Plate 2.2). On the contrary, the dining area of the terminal is in good operating condition and equipped with air-conditioning systems (see Plate 2.3), where the indoor temperature can be adjusted to the optimum level.

Plate 2.2: The handle of the water tap is damaged (Source: Full and Tabassi, 2014)

Plate 2.3: Dining area with air-conditioning system (Source: Full and Tabassi, 2014)

2.5.2. Waiting area scenario

Waiting area refers to the areas for users to sit and stand in the terminal building based on the Washington State Department of Transportation Terminal Design Manual. Location of the waiting areas must be as close as possible to the boarding platform. The waiting areas need to accommodate walk-on users as well as drive-on users who have entered the terminal building after temporarily parking their vehicles. While the size of waiting areas for users is based on three parameters: the pedestrian level of service, design event methodology, and route type (WSF, 2016).

Full and Tabassi (2014) mentioned that the waiting area in Nibong Tebal Bus Terminal was in good operating condition with a good lighting which is fixed with a fluorescent lighting system (See Plate 2.4) but the surroundings for the staircase and corridor were dims. This is because the lighting system only operates at night hours. This might cause unwanted incidents to happen.

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Plate 2.4: Waiting area in bright conditions (Source: Full and Tabassi, 2014)

Table 2.4 shows a summary of the mean values for the thermal comfort and lighting condition satisfaction of the bus terminals. The users in Penang Sentral were dissatisfied with the overall thermal comfort. Meanwhile users in the Sungai Nibong bus terminal is neither satisfied nor dissatisfied with thermal comfort while being there. Next, the lighting condition has a better level of occupant satisfaction in both bus terminals (Full and Tabassi, 2014).

Table 2.4: Summary of mean values in the waiting area satisfaction on the indoor environmental parameters in the bus terminals (Source: Full and Tabassi, 2014)

	Penang Sentral bus terminal	Sungai Nibong bus terminal
(A) Thermal comfort	2.70	3.00
Amount of light	3.12	3.12
Visual comfort	3.18	3.18
(B) Lighting condition	3.15	3.22

2.5.3. Ticketing facilities scenario

Ticket facilities are places where the users can buy a bus ticket at the terminal. Ticket purchases can be made at the ticketing counter or at the ticket booths. Therefore, it provides an opportunity for users to purchasing their bus tickets without being invaded by agents. Observations of Hamim et al. (2015) at the Sungai Nibong Express Bus Terminal showed that invasion of tickets agents on the users has

become the primary problem faced by users when they came to buy the bus tickets (See Plate 2.5). Some users were unwillingly being forced by agents to buy tickets from them and repeatedly asking for their destination.

Plate 2.5: Views at Sungai Nibong Terminal (Source: Hamim et al., 2015)

Another essential point is foreign tourists are also unsatisfied towards ticketing services provided by agents. This is because the agents are not fluent in English and there is no itinerary being provided. Thus, the researcher proposed to solve the problem by establishing a bus ticket machines in the terminals. By implementing this proposal, the users can make their own choice to buy tickets easily. Another solution is to design an interactive kiosk machine (Hamim et al., 2015). Other issues and problems observed at Sungai Nibong Bus Terminal are listed in Figure 2.6.

Issues	Observation
No information board	Users do not know the schedule and the ticket prices.
	There are users who do not know which bus to go to their destination.
	Boarding platform and the bus plate number.
User experience	User feel uncomfortable when raided and were repeatedly and pressured by some ticket agents that waiting at the parking space and asking their destination.
	There is a sense of doubt and fear when raided so.
	To avoid being duped by "ticket maggots".
Ticket counter	Too many users are confused and do not know the ticket counter which offers bus to their destination.
	Mixed ticket counter, users get another bus ticket at different ticket counter.
e-ticketing	There are buses that offer online ticket purchasing system where users can continue to buy bus tickets online but users are not familiar or don't know how to use the system.
	Users do not have credit card or online banking.
ATM machine	No ATM machine service at the bus terminal and it's difficult when the user does not have enough money. Conveniences.
	Each ticket counter takes cash payments only.
Money changer	No foreign exchange in the services and it is difficult for foreigners to purchase a ticket without Malaysian ringgit (RM) currency.

Figure 2.6: Issues and problems at Sungai Nibong bus terminal (Source: Hamim et al., 2015)

2.5.4. Departure lounge scenario

Full and Tabassi (2014) stated that users in Sungai Nibong bus terminal are still slightly satisfied being in the departure area of the terminal. However, the researchers insisted that air quality is the main problem in the departure area. As shown in Plate 2.6, most of the users are dissatisfied with indoor thermal while in the pick-up area. Mainly, the area is in exposed conditions without any control systems of HVAC (Heating, Ventilation and Air Conditioning). Next, the users are also dissatisfied with its air quality assessment while in the picking area. As shown in Plate 2.7, the buses accessing the platform in the pick area are causing higher air pollution. It shows that the pick up area is exposed to the external environment. The platform also is open to dust and dirt from the road outside the terminal. In the same situation, the pollution and the worsen quality area are caused by the buses which

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also produce dirty air and smoke while get into the platform (Full and Tabassi, 2014).

Plate 2.6: Pick-up area of Nibong Tebal Bus Terminal in exposed condition
(Source: Full and Tabassi, 2014)

Plate 2.7: Buses accessing the platforms worsen the air quality
(Source: Full and Tabassi, 2014)

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