Table 3: Population in MBPJ (projected until 2020)

Year	No. of Population
2000	437,121
2005	474,800
2010	531,400
2015	588,000** (estimated)
2020	644,600** (estimated)

Source: MBPJ Local Plan, 2007 in Draft RKK-MBPJ 2010

The study area also covers 6 out of 7 main gateways to the city center of PJ. The study identified that about 92% of the whole study area has been developed and already saturated. Therefore the proper planning to the betterment for the public transport services is indeed crucial in order to overcome the current congestion issues and future scenario in this area.

2.1 Land Use

The rapid expansion of vehicle population within the Petaling Jaya City Council (MBPJ) area may be related to some key aspects such as economic stability, changes in the social structure particularly lack of land use planning, high dependence on the private vehicles and the lack of investment in high-capacity transport facilities. In addition to the increasing number of private vehicle together with the concentration of work opportunities in central areas, the shortages of parking spaces and poor control over irregular parking have boosted the problems caused by traffic congestion in the central commercial area.

Table 4 listed the changes of land use from 2003 to 2010 indicating that the residential area had increased by 6.78%, business and services by 3.45% and transportation shows an increase of 7.78% which in one way or another contributes to the traffic congestion within the area.

Table 4: Land Use Changes Within the Study Area from 2003-2010

Land Use	Hectarage (2003)	(%)	Hectarage (2003)	(%)	% of change 2003-2010
Residential	1466.94	19.67	1972.63	26.45	+6.78
Business and Services	261.90	3.51	519	7	+3.45
Industry	193.73	2.59	236.59	3.17	+0.58
Institution & Public Facilities	1027.14	13.77	1084.56	15	+0.77
Recreation & Vacant land	742.90	9.96	671.03	9	-0.96
Transportation	1261.67	16.92	1841.67	25	+7.78
Infrastructure & Utilities	403.09	5.41	422.59	6	+0.26
Vacant Land	1481.74	19.87	159.38	2.14	-17.73
Forest	465.97	6.25	477.37	6.40	+0.15
Water Institution	152.94	2.05	73.20	0.98	-1.07
Total	**7458.02**	**100%**	**7458.02**	**100%**	

Source: Study on RKK Zon PJU1, PJU2, SS and PJS, Petaling Jaya, 2010.

2.2 Study Methodology

The study survey was conducted among the public transport users (n=259) and non-public transport users (n=112). Respondents were approached at the public transport station such as bus terminal/bus stop as well as at LRT and KTM Komuter station, within the study area. The questionnaires were designed to gather information on socio demographic data, such as age, occupation, monthly income, etc. It was followed by information on the trip purpose,

passengers' perception of public transport services, opinion on the security provided as well as their reasons if they want to choose public transport as their means of transportation especially for respondents who are currently not using public transport for what ever reason. Those questions were designed to determine why most of the people regret or feel uncomfortable to use public transport. The main aim of the study is to determine the desirability of using the public transport and what are the factors or incentives that would encourage them to use public transport rather than private vehicles. All data from the questionnaires were analysed using the SPSS statistical software.

3. EXISTING PUBLIC TRANSPORT SUPPLY

3.1 Stage Bus Services

Stage bus services are those services which allow passengers to board and alight buses at a number of designated stops along a route (Jamilah and Ibtishamiah, 2002). The first and most obvious reasons for affording preferential treatment to the bus services is that it plays a crucial part in balancing between public and private transportation, and as such potentially holds the key to the problem of the peak-period congestion (Ibtishamiah, 2007). The success and failure of public transportation will influence the quality of the urban life and the form of the urban structure in the future.

Table 5: Existing Stage Bus Coverage and Travel Time in the Study Area

No.	Trip No.	From	To	Travel Time
		RapidKL		
1	T505	Sri Sentosa – Jalan Sultan, Pej Pendaftaran – Sri Sentosa		01:00:25
2	T606	Ara Damansara	LRT Kelana Jaya	00:22:01
3	T622	LRT Kelana Jaya - Taman Mayang Emas – LRT Kelana Jaya		00:26:32
4	T624	LRT Kelana Jaya – Stadium MBPJ – LRT Kelana Jaya		00:14:59
5	T625	LRT Taman Bahagia – SS 6 PJ – LRT Taman Bahagia		00:34:52
6	T626	LRT Taman Bahagia – Damansara Utama – LRT Taman Bahagia		00:30:23
7	T627	LRT Taman Paramount – Seksyen 14 – LRT Taman Paramount		00:30:00
8	T628	LRT Asis Jaya – Seksyen 17 – LRT Asia Jaya		00:24:16
9	T629	LRT Asia Jaya – Phileo Damansara – LRT Asia Jaya		00:32:20
10	U8	Terminal Chow Kit	Damansara Damai	01:09:03
11	U43	Bandar Utama	Putrajaya Sentral	00:44:38
12	U66	Pasar Seni	Taman Medan	01:05:22
13	U82	KL Sentral	Bandar Utama	00:49:47
14	U84	Pasar Seni – Kelana Jaya – LRT Asia Jaya		01:46:37
15	U85	LRT Taman Paramount	Pasar Seni	00:32:40
16	U86	Bandar Utama	Metro Prima	00:38:52
17	U89	LRT Kelana Jaya – Kota Damansara Seksyen 4 – LRT Kelana Jaya		01:25:02
18	U623	LRT Kelana Jaya – Subang Parade – LRT Kelana Jaya		00:49:16
No.	**Trip No.**	**Metrobus**		
19	12	SS 2 Sea Park	Pasar Seni	00:51:06
20	98	Pasar Seni	Taman Medan	01:27:48
21	99	Pasar Seni	Kota Damansara	00:48:22
22	100	Terminal Chow Kit	Damansara Damai	00:48:11
No.	**Trip No.**	**Selangor Omnibus**		
23	144C	Chow Kit	Bandar Sri Damansara "A"	00: 36:56
24	145A	Medan Pasar	Kota Damansaraa	01:19:37

Source: Study on RKK Zon PJU1, PJU2, SS and PJS, Petaling Jaya, 2010.

The study identified that there are 3 main stage bus operators within the study area i.e. Rangkaian Pengangkutan Integrasi Deras Sdn Bhd (RapidKL), Metrobus Nationwide Sdn Bhd dan Syarikat Selangor Omnibus Sdn Bhd. (refer table 5). The daily travel time is recorded using the Global Positioning System (GPS) and this figure may vary according to traffic conditions, the hours of operation, the frequency of breakdown, the number of stops on route and the turnaround time. The fare imposed for stage bus services is according to zonal area, i.e. MYR1.00 for adult and MYR0.50 for concession fare within the same zone.

In a market economy, transportation demand presumably arises as a result of utility or profit maximization of decisions by households and firms (Meyer, *et al.* 1991). The demand for transportation is commonly labeled as 'a derived demand' in the sense that transport is not normally demanded for itself but as a derivative of buying or seeking some other service or commodity.

Generally, bus services are likely to be more cost-effective and satisfactory to users when a variety of buses and services are employed to meet different levels of demand (Jamilah and Ibtishamiah, 2002).

3.2 Other Public Transport Supply

The Light Rail Transport (LRT) and KTM Komuter are the two types of rail base transport within the study area. Both services have 3 stations each i.e. for KTM Komuter at Setia Jaya, Seri Setia and Kg. Dato Harun, whereas for LRT, the stations are at Taman Bahagia, Kelana Jaya and Lembah Subang. Besides LRT and KTM Komuter, urban taxicabs are an important means of transport which offer a speedy, comfortable and direct transport service within the urban areas.The city taxis have a vital role in the urban transportation system in complementing the other modes of transport. On the other hand, there are more than 10,000 parking spaces are available within the study area (Ibtishamiah *et al.* 2011).

4. RESULTS AND DISCUSSION

The field survey for this study was divided amongst 2 types of respondents, i.e. the public transport users and non-public transport users. The purpose of this segregation was to identify the reasons for using or not not using public tranport.

4.1 Demographic Characteristics

The questionaire design for demographic characteristics included the age, gender, occupation, monthly income and trip purpose, for using public transport or private vehicle (table 6).

The respondents for public transport users aged between 16-60 years old. Many of public transport users were female (60%). More than 50% of public transport users work in private sector, followed by students (27%) and the government employee (10%). Based on the survey results, many of the public transport users, i.e. 62% earned between MYR1000-3000 (USD330-1000) monthly and 32% of them earned less than MYR1000 (USD330) a month. The use of public transport is increasingly popular for daily working trips (53%), followed by education (20%) and shopping (11%). About 9% of the public transport users take public transport for social/recreation purposes.

The non public transport users respondents are aged between 15-60 years old and many of them are male (64%). Most of them works in private sector (43%), followed by

government sector (23%), students (14%) and business sector (11%). About 57% of them earned between MYR1000-3000 (USD330-1000) monthly, followed by less than MYR1000 (19%) and between MYR3000-5000 (17%) monthly. Their trip purpose was mostly (74%) for working, followed by education and shopping, i.e. 11% and 10%, respectively.

Table 6: Summary of Demographic Characteistics of the Survey Respondents

Characteristics		Percentage (%)	
		PT Users	Non PT Users
Age (years old)	< 16	0	1
	16-20	15	6
	21-25	36	35
	26-30	25	19
	31-35	7	15
	36-40	9	9
	41-45	4	8
	46-50	1	3
	> 50	1	5
Gender	Male	40	64
	Female	60	36
Occupation	Government Sector	10	23
	Private Sector	55	43
	Business	2	11
	Housewife	4	6
	Student	27	14
	Unemployed/pensioner	2	3
Monthly Income	< MYR1000	32	19
	MYR1001-3000	62	57
	MYR3001-5000	5	17
	>MYR5000	1	7
Trip Purpose	Works	53	74
	Shopping	11	10
	Education	20	11
	Personal Business	3	2
	Official Business	2	1
	Social/recreation	9	1
	Others	1	0

Source: Study on RKK Zon PJU1, PJU2, SS and PJS, Petaling Jaya, 2010.

4.2 Public Transport (PT) Users

As one of the more popular type of public transportation, bus services offer a speedy, comfortable and direct transportation service. Buses are also an affordable means of transportation and provide a high degree of flexibility and convenience compared to other fixed-track transport. It is popular amongst the lower income people because it provides the basic services in most places by connecting one place to another as they can carry considerable passenger loads and the service can be significantly expedited if proper attention is paid (Grava, 2002).

The study has identifed that 42.5% of the respondents were the captive user, which means that they use the public transport on daily basis and about 33% of them used it once a week. The trip length are between 1km-40km. Majority of the respondents (95%) choose public transport as an important means of transport, whereas 61% of them regards public transport as their main transportation modes. This was followed by car (39%) and motorcycle (15%). Non motorised transport ranked the lowest two (figure 2).

The result of the study shows that 67% of the respondents are still using public transport

such as stage bus, LRT or KTM Komuter as their means of transportation. However, the balance of 33% of the respondent did not use public transport. Accordingly, the waiting time for stage bus users shows that 65% of them wait less than 30 minutes, 33% have to wait between 30 minutes to 1 hour and 2% wait for more than 1 hour. Whereas for LRT and KTM Komuter, 25% of the respondents wait less than 5 minutes, 63% waits between 5 to 15 minutes and 12% waits more than 15 minutes. Respondents who used stage bus as their means of transportation cited that their travel time is less than 30 minutes (59%), and the balance of 41% cited that their travel time took between 30 minutes to 1 hour. Normally, travel time using LRT or KTM Komuter is shorter than stage bus, and this is true when 40% of the respondents cited that their travel time is less than 15 minutes, 30% is between 15-30 minutes and another 30% of the respondents travel more than 30 minutes. In terms of fare, many of the public transport respondents i.e. 76% paid between MYR1-MYR2 for one way trip, whereas 14% paid more than MYR2 for one way trip and about 11% paid less than MYR1 for their one way trip using stage bus services. Many of the respondents i.e. 46% who use LRT or KTM Komuter paid more than MYR3 for every single trip they made, whereas 27% paid between MYR1-MYR2, 18% paid between MYR2-MYR3 and only 9% of them paid less than MYR1.

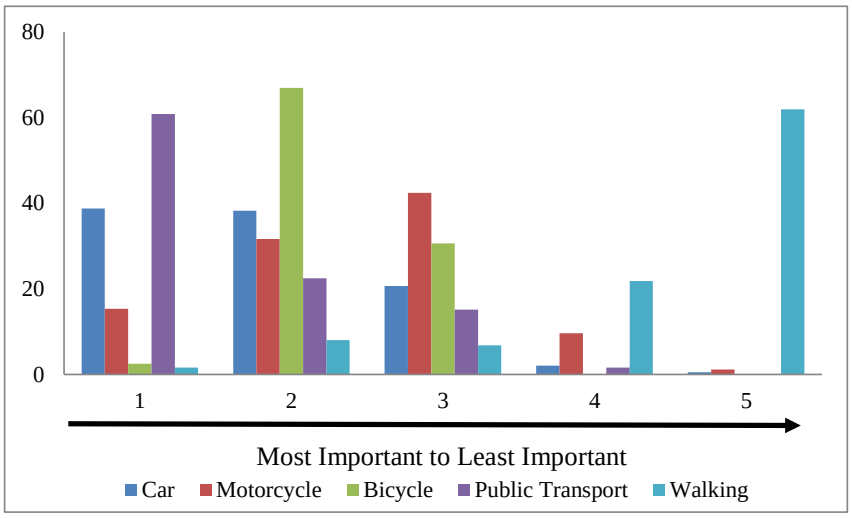


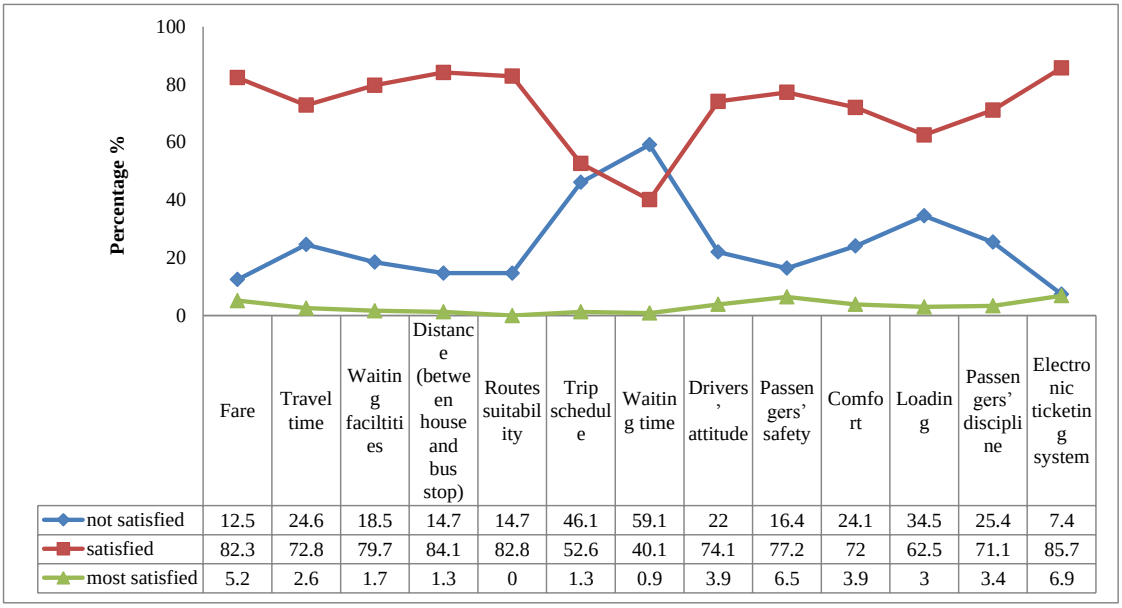
Figure 2: Type of transportation preferred by respondents

4.3 Passengers' Perception on Stage Bus and LRT/KTM Komuter

This section describes the results of perception study undertaken as part of the stage bus operation study in MBPJ. Stage buses are amongst the popular means of travel for MBPJ residents. However, it was found that bus passengers are generally unhappy about the effectiveness and efficiency of the stage bus services in MBPJ.

Many of the respondents i.e. from public transport users and non-users alike complaint on waiting time (59.1%) as many of them use this type of public transport for working trip. Accordingly, 46% of them were not satisfied on trip sechedule, 35% on loading, both 25% are on other passengers' discipline and travel time while another 22% on the drivers' attitude. The comfort elements represented about 24% of complaints from respondents.

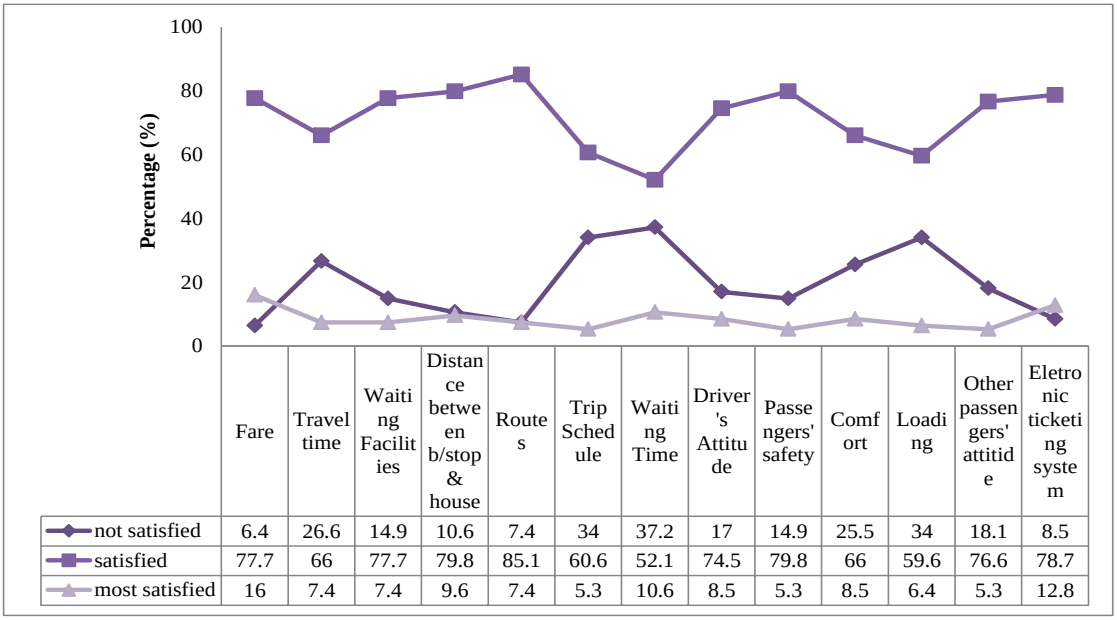
Elements such as fare, location of bus stop (distance from respondents' house), routes and electronic ticketing system gain satisfaction amongst the respondents, as those elements recorded more than 80% of resepondents' satisfaction (figure 3).



	Fare	Travel time	Waiting facilities	Distance (between house and bus stop)	Routes suitability	Trip schedule	Waiting time	Drivers' attitude	Passengers' safety	Comfort	Loading	Passengers' discipline	Electronic ticketing system
not satisfied	12.5	24.6	18.5	14.7	14.7	46.1	59.1	22	16.4	24.1	34.5	25.4	7.4
satisfied	82.3	72.8	79.7	84.1	82.8	52.6	40.1	74.1	77.2	72	62.5	71.1	85.7
most satisfied	5.2	2.6	1.7	1.3	0	1.3	0.9	3.9	6.5	3.9	3	3.4	6.9

Figure 3: Respondents' Perception on Stage Bus Services

Figure 4 below outlined the respondents' perception of LRT and KTM Komuter services. Data obtained from the survey found that on average, many of the respondents are satisfied with the services of LRT and KTM Komuter. However, issues that users find less satisfying include travel time, trip schedule, waiting time and the number of loading.



	Fare	Travel time	Waiting Facilities	Distance between b/stop & house	Routes	Trip Schedule	Waiting Time	Drivers's Attitude	Passengers' safety	Comfort	Loading	Other passengers' attitide	Eletronic ticketing system
not satisfied	6.4	26.6	14.9	10.6	7.4	34	37.2	17	14.9	25.5	34	18.1	8.5
satisfied	77.7	66	77.7	79.8	85.1	60.6	52.1	74.5	79.8	66	59.6	76.6	78.7
most satisfied	16	7.4	7.4	9.6	7.4	5.3	10.6	8.5	5.3	8.5	6.4	5.3	12.8

Figure 4: Resepondents' Perception of LRT/KTM Komuter Services

4.4 Security Issues

There were only 73.4% of the respondents who answer on the security issue. Apart from that, only 2.7% of them agreed that the public transport services within their area is safe. Most of them cited robbery and snatched-thieves as the most important issues. It was followed by overloading of passengers especially during peak hour and this scenario, sometimes resulted

in robbery as well as sexsual harrasment to female passengers. Moreover, overloading or overcrowding will bring discomfort to the passengers especially to those who travel for long distance which will take some time to reach the destinations and during congested period.

There were other issues concerning public transport users while waiting to get public transport services as well as inside the public transport itself. Listed in figure 5 below are some of the problems identified and the degree of concern by the respondents.

The study results showed that there are 2 most concerned issues i.e. (i) public transport especially stage bus services which do not follow the trip schedule and (ii) the limitation of the capacity of waiting area which cannot accomodate large number of users. The scenario is worst especially during a rainy day as well as during peak hours. Many of the public transport users feel uncomfortable and their security may be threatened such as being pick-pocketed or robbed during this period.

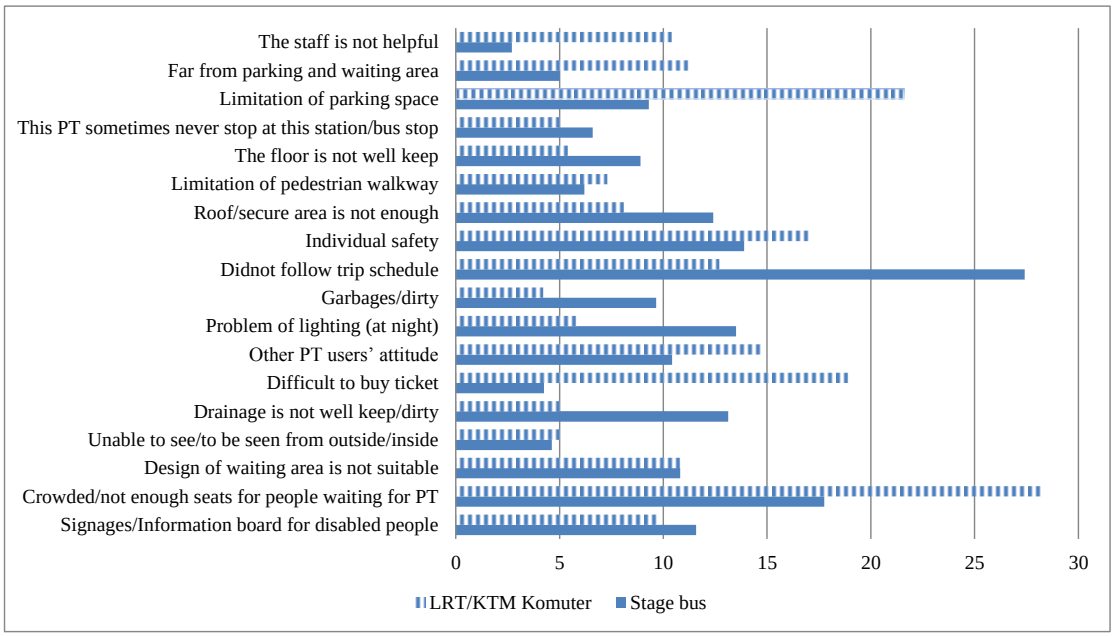


Figure 5: Summary of Security Issues

5. MOTIVATIONAL FACTORS

This study which is based primarily on a survey of the urban travel attitudes and behavior of the MBPJ residents also aim to identify the 'm*otivational factors*' which will lead to the changes from being non-public transport user to public transport user. Table 7 below depicted that cheaper fare is on top of the list (60.3%) followed by frequency of services (58.0%) and adherence to schedule (55.9%) are amongst the motivational factors which can contribute to the increasing number of public transport users within the study area. Other factors identified are shorter waiting time (29.0%) and safety (21.6%).

Table 7: '*Motivational Factors'* for Changing to Public Transport Use

Items	(1 = most important) Important (%) (12 = most not important)											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Trip Frequency	22.8	16.7	18.5	12.3	7.4	4.9	4.9	3.7	2.5	0.6	4.3	1.2
2. Cheaper fare	22.4	27.3	10.6	8.1	5.6	5.0	5.0	3.7	2.5	1.9	2.5	5.6
3.On time /adhere to schedule	20.9	11.7	23.3	11.0	11.7	8.6	3.7	2.5	3.1	1.2	1.2	1.2
4. Location of terminal/comfort/safe	3.1	5.6	6.9	16.3	10.0	10.6	12.5	14.4	6.9	5.0	5.6	3.1
5. Station connectivity (easy & convenience)	3.1	1.9	3.1	9.3	21.0	13.0	9.9	11.7	12.3	5.6	6.2	3.1
6.Station connectivity to housing area (easy & convenience)	3.1	4.9	3.7	5.5	7.4	16.0	15.3	10.4	14.1	12.3	5.5	1.8
7. Pedestrian and bicycle walkways	0.6	0.0	2.5	3.1	5.6	8.0	15.4	7.4	13.6	14.2	12.3	17.3
8. Upgrading on infomation of the services	3.1	2.5	1.2	0.6	3.1	5.6	8.0	19.8	11.1	17.9	13.6	13.6
9. Comfort / Convenience	4.3	6.2	5.6	7.4	8.6	7.4	9.9	9.3	16.0	8.6	9.9	6.8
10. Safety	7.4	6.8	7.4	8.6	6.2	8.0	5.6	8.0	8.0	17.9	9.9	6.2
11. Shorter waiting time	12.3	11.1	5.6	11.7	6.8	7.4	5.6	4.9	6.2	8.0	15.4	4.9
12. Shorter travel time	0.6	6.2	13.0	6.8	6.2	6.2	4.3	5.0	3.7	8.1	10.6	29.2

Source: Study on RKK Zon PJU1, PJU2, SS and PJS, Petaling Jaya, 2010.

As for the respondents who do not wish to use public transport either bus or other mode of public transport stated that they now own private vehicle and it is more convenient to use private vehicle because of comfort and mobility. Additionally, some of them are not confident of using public transport especially during crowded periods.

5.1 Types of Public Transport System Prefered

Both respondents from public transport users and non public transport users were asked to rank on the types of public transport system that they think it is useful and prefered to have within their respective area. The study survey found that both public transport user and non public transport users preferred to have LRT i.e. 56% for public transport users and 47% for non public transport users. This was followed by choosing bus rapid transit (BRT) system i.e. 32% for public transport users and 28% for non public transport users. The land public transport such as stage bus (normal bus), mini bus and taxi, ranked lowest with 5.6%, 3.4% and 8.2% respectively, chosen by public transport users and 9.1%, 4% and 11% respectively, chosen by non public transport users respondents.

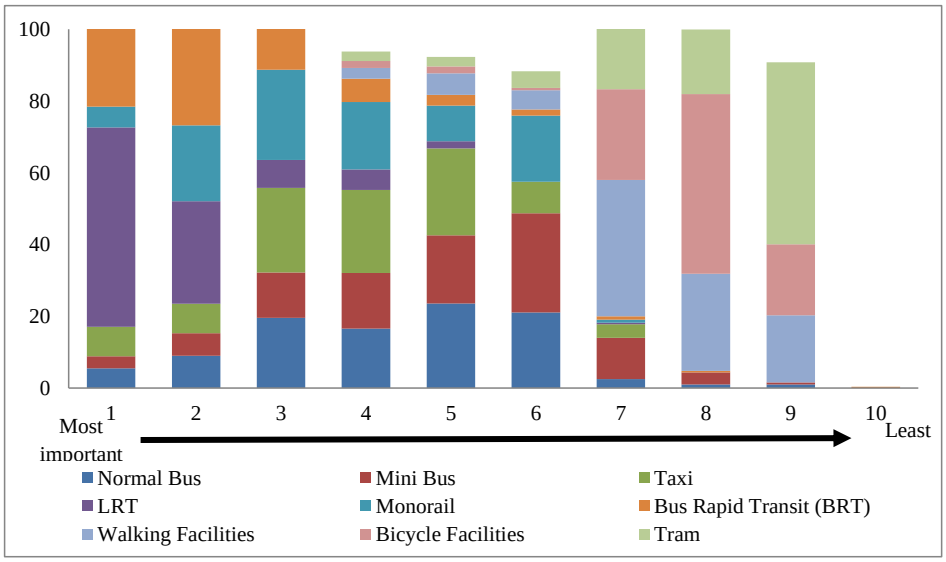


Figure 6: Types of public transport system preferred by PT users

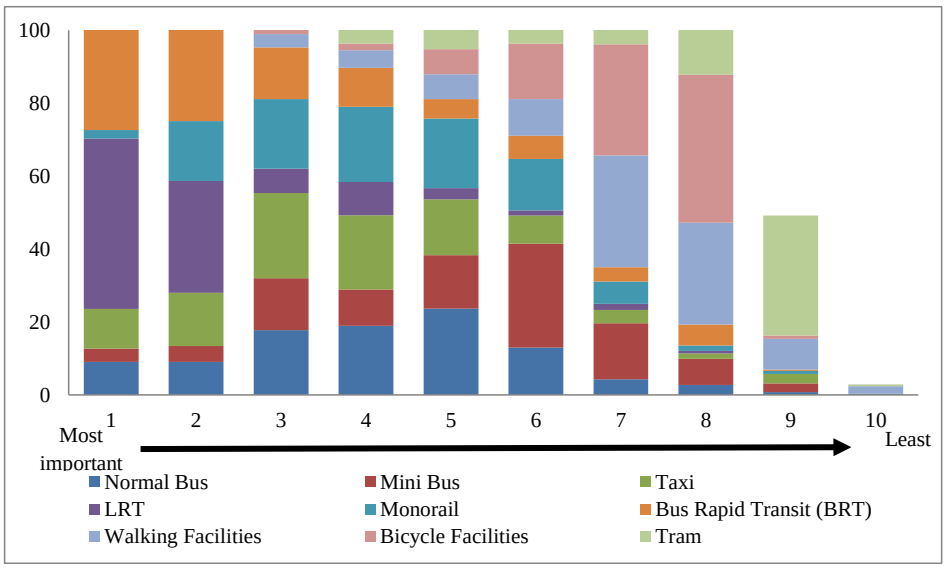


Figure 7: Types of public transport system preferred by non PT users

6. CONCLUSION

Generally, planning for transportation system and networks need to consider various issues and involve a multitude of factors such as travel demand, landuse, demography, political and institutional, economic, environmental and culture, to name a few. Based on the survey results, the study found that there are still room for improvements for the public transport services that would attract non-public transport users to start taking public transport. It is also indicated from the results of the study that people nowadays would prefer to have public transport which has their own dedicated path/lane such as light rail transit (LRT) or bus rapid transit (BRT). A dedicated passage for the transit service (either road-based or rail-based) would ensure better control on the service schedule and overall service characteristics as compared to public transport that have to share road space.

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