REVIEW ON MOTORIZATION AND USE OF PUBLIC TRANSPORT IN PERAK MALAYSIA: REALITIES AND CHALLENGES

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ABSTRACT: This paper presents about the reality of motorization phenomena and the use of public transport in Perak, Malaysia. The quantitative analysis to be performed to show the existing motorization trend against some other factors related. Data set collected, such as population, socio-economic, vehicle registration, accident data, and other factors were used for analyzing the characteristics and indicators of motorization. Statistical test was carried out for validation of model parameters.

The impacts of motorization and some transportation problems were extensively discussed. Congestion, road accidents, noise, pollution, fuel consumption are among the important issues related with motorization problems. Promoting of public transport currently becomes interesting choice in anticipating the serious trend of motorization. Otherwise, the near future challenges of motorization are transport management to minimize congestion, accidents, noise, pollution and fuel consumption and promoting the use of public transport. The results indicate the remarks on impacts of motorization and some potential anticipation. The public awareness in advantages of public transport use will encourage the success of promoting public transport and will empower the people to use public transport as an alternative to reduce private cars use.

Keywords: Motorization, Quantitative Analysis, Indicators of Motorization, Public Transport

INTRODUCTION

The rise of population and increase of income in Perak, Malaysia, have been accompanied by the increasing of cars ownership. As commonly known, the increase of income could push people to be better life and it is followed with high increasing in welfare. In economic aspect, the higher welfare of people is the more opportunity of having their own (private) vehicle, thus the more people to produce trips of any purpose and mobility of people will rise.

A large number of trips produced can affect the increase of traffic meanwhile the growth of road length and its facility is inadequate. The traffics are going to be crowded, more delays, more wasting time and fuel consumption, more noise and pollutant produced, and even more accidents are happen. In relation to this context, the alternative of using public transport can be expected to reduce the use of private vehicle (cars). Public transport by using the higher occupancy vehicles can relatively carry a larger number of passengers than the use of private vehicles.

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This paper presents about the reality of motorization phenomena and the use of public transport in Perak, Malaysia. The quantitative analysis to be performed to show the existing motorization trend against some other factors related. Data set collected, such as population, socio-economic, vehicle registration, accident data, and other factors were used for analyzing the characteristics and indicators of motorization. Statistical test was carried out for validation of model parameters. The impacts of motorization and some transportation problems were extensively discussed. Congestion, road accidents, noise, pollution, fuel consumption are among the important issues related with motorization problems. Promoting of public transport currently becomes interesting choice in anticipating the serious trend of motorization. Otherwise, the near future challenges of motorization are transport management to minimize congestion, accidents, noise, pollution and fuel consumption and promoting the use of public transport. The results indicate the remarks on impacts of motorization and some potential anticipation.

DATA SOURCES AND APPROACH

The results summarized in this paper are drawn from analysis of secondary data from the following agencies: Jabatan Perangkaan Malaysia Negeri Perak, Road Transport Department Malaysia, Perak Roadways Sdn. Bhd., Ibu Pejabat Polis Perak, Perak State Economic Planning Unit, Majlis Bandaraya Ipoh, Jabatan Pengangkutan Jalan Perak, Jabatan Kerja Raya Malaysia and Jabatan Keselamatan Jalan Raya. In this study, to predict the trend of motorization a non-linear equation (power function) was proposed. The function is given as follows:

$$C_{st} = a_s . GDP_t^b \quad \text{……..…….... (1)}$$

Where C_{st} represents number of cars per 1000 population in state *s* and year *t*. GDP is per capita Gross Domestic Product. By transforming the equation to its natural logarithm, thus, the parameter can be estimated by linear regression. Therefore, the significance was tested by using R-squared value, as follows:

$$R^2 = 1 - \frac{SSE}{SST}, \text{ where: } SSE = \sum \left(Y_i - \hat{Y}_i\right)^2 ;$$

$$SST = \sum \left(Y_i - \overline{Y}\right)^2 = \left(\sum Y_i^2\right) - \frac{\left(\sum Y_i\right)^2}{n} \text{ …. (2)}$$

SSE = sum of square error, SST = total sum of square.

POPULATION AND ECONOMIC GROWTH

Geography of Perak

Perak is second widest state in Peninsular Malaysia with many distinguished characteristics of geography and demography statistics. Perak state covers area of 21,005 km2 with the East boundary of Kelantan and Pahang state, the West boundary of Straits of Malacca Sea, the North boundary of Kedah state and Thailand and the South boundary of Selangor state.

Perak Stated with areas of 21,005 km^2 is bounded by Penang at the North, by Pahang at the East, by Selangor at the South and by Malaka Sea at the West. Ipoh is the centre of Perak as capital State, located at the middle way from Kuala Lumpur to Penang. Perak Darul Ridzuan with areas of 21,005 km^2 is one of the 13 states of Malaysia. It is the third largest state in Peninsular Malaysia bordering Kedah and Thailand to the North, Penang to the Northwest, Kelantan and Pahang to the East, Selangor Southward and to the West by the Strait of Malacca. Perak's population was approximately 2.28 million in 2006 and now it is 2.35 million (2008) [i].

Total population, growth and distribution

During period 2000-2006, the total population of Malaysia increased by 14.5% from 23.28 million to 26.64 million. Previously, during 1991-2000 it increased by 26.6% from 19.47 million to 23.28 million. There was a fact that the increasing 14.5% (2000-2006) was lower than those of 26.6% during 1991-2000. Meanwhile, the population of Perak increased by 11.3% from 2.05 million (2000) to 2.28 million (2006). In previous period, 1991-2000, the population increased by 3.9% from 1.98 million to 2.05 million. It was different with Malaysia, in Perak, the increasing of 11.3% during 2000-2006 was higher than those of 3.9% during 1991-2000.

Among the states, during 2000-2006 the highest increasing population was in Perak (3.9% to 11.3%), which was followed by Kelantan (0.9% to 2.4%), Perlis (7.5% to 11.5%), Terengganu (11.2% to 15.9%) and Kuala Lumpur (12.4% to 14.6%). The annual population growth rate of whole Malaysia was 2.2% (2006), lower compared with those of 2.6% (2000). Meanwhile, the annual growth rate of population in Perak of 1.7% (2006) was higher compared with those of 0.4% (2000).

In 2006 the Perak population density of 108.7 people per km^2 was above of those of Malaysia (80.8 people per km^2). Perak's area with 6.4% of total Malaysia was populated by 8.6% of population in Malaysia. Among the states which have population density lower than Perak were Kelantan (101.9 people per km^2), Terengganu (80.4 people per km^2), Sabah (40.7 people per km^2), Pahang (40.5 people per km^2) and Serawak (19.1 people per km^2). The top five of share of total

area of Malaysia were Serawak (37.7%), Sabah (22.3%), Pahang (10.9%), Perak (6.4%) and Johor (5.8%).

Economic Growth

Car ownership rising in Perak State was affected externally by the rapid economic growth and development in whole of Malaysia and was internally determined by Perak economic growth. Foreign Direct Investment (FDI) has contribution to the country's GDP, as quite substantial to push the economic growth in Malaysia. Per capita GDP among the states in Malaysia were adapted from the Seventh, Eighth and Ninth Malaysia Plan. Some projections were carried out by using the annual growth rate of per capita GDP (1987 constant prices) [ii].

MOTORIZATION

Motorization indicators

Some common indicator used to describe the motorization include such as (a) private motor cars per 1000 population, (b) motor cycles per 1000 population, (c) total vehicle per 1000 population, (d) private motor cars per road kilometer, (e) motor cycles per road kilometer and (f) total vehicle per road kilometer. Table 1 shows the indicators

Table 1. Motor vehicles per thousand populations (2005) and per kilometer of road (2004)

State	Population in 2005 (million)	(a)	(b)	(c)	Length of Road in 2004 (thousand)	(d)	(e)	(f)
Johor	3.10	270	342	663	7.18	117	148	286
Kedah	1.85	103	275	407	5.50	35	92	137
Kelantan	1.51	106	177	305	2.84	56	94	161
Melaka	0.71	264	403	708	2.01	94	143	251
N. Sembilan	0.95	221	370	640	4.17	50	84	145
Pahang	1.43	153	225	412	7.79	28	41	76
Perak - 2004	2.23	189	365	595	7.06	60	115	188
2005	2.26	200	379	621	7.06	64	121	199
2006	2.28	212	394	648	*na*	*na*	*na*	*na*
2007	2.32	217	397	658	*na*	*na*	*na*	*na*
Perlis	0.22	52	190	257	0.72	16	60	81
Pulau Pinang	1.47	431	598	1,079	2.10	302	396	755
Sabah	3.02	108	35	192	16.20	20	7	36
Sarawak	2.31	177	170	393	6.47	63	61	141
Selangor	4.74	167	168	371	9.82	80	81	179
Terengganu	1.02	105	185	315	4.52	24	42	71
WP Kuala Lumpur	1.56	1,250	613	2,083	1.32	1,367	670	2,277
Malaysia - 2004	25.58	231	257	538	77.70	76	85	177
2005	26.13	248	268	567	78.46	83	89	189
2006	26.64	261	280	593	78.46	88	95	201
2007	27.17	273	292	619	*na*	*na*	*na*	*na*

Note: (a) private motor cars per 1000 population, (b) motor cycles per 1000 population, (c) total vehicle per 1000 population, (d) private motor cars per road kilometer, (e) motor cycles per road kilometer and (f) total vehicle per road kilometer.

In 2007, at whole of Malaysia, there were total vehicle of 619 compared to 1000 population, 273 cars per 1000 population and 292 motorcycles per 1000 population.

Service rate (vehicle per 1000 population); In 2005, at Kuala Lumpur the motor car is double folded from the motor cycles. But, in Perak the motor cycle is double folded from the motor cars. In Johor, Pinang, Sarawak, Selangor, and total of Malaysia the number of motor cars is equal to motor cycles. Meanwhile, in Kelantan, Melaka, N Sembilan, Pahang and Terengganu the number motor cycle was 1.5 times from motor cars. For Kedah and Perlis number of motor cycles was 3 times from motor cars. And specially, in Sabah the number of motor car was about 3 times from motor cycles.

Access rate (vehicle per kilometer); In 2004 a number of states had number of vehicles per kilometer above average of Malaysia (177 vehicles per kilometer) were Johor, Melaka, Perak, Pinang, Selangor, Kuala Lumpur. In whole Malaysia the number of vehicles per 1000 population increased by 14% during 3 years from 177 vehicles (2004) to 201 vehicles (2006).

Regression Analysis of private motor cars

In this section, there was fully showed the close relationship between cars per 1000 population and the per capita in the state in whole of Malaysia. Table 2 presents both the average annual change and gross change in passenger cars per 1000 population and per capita GDP between 1998 and 2007.

Kuala Lumpur, as a capital country, is the federal/state that has achieved the highest increase in the eight year period. However, the GDP grew with low rate. In Johor, Melaka, Pinang, Sabah, Sarawak, Terengganu and Kuala Lumpur, passenger cars, on the average, grew more than per capita GDP.

Perak experienced the average annual growth in passenger cars (5.6%) lower than growth of GDP, which have highest growth rate of per capita GDP (7.2%). It was reciprocal fact compared to Kuala Lumpur which had achieved highest passenger cars growth rate (8.4%), but lower growth of GDP (5.4%) than average of Malaysia (5.8%). For the state of Perak, this rapidly increased in GDP was due to development and the fast advancement of industries as well as the increased in housing areas and in-migrants from other states.

Table 2. Change in private motor cars per 1000 population and per capita GDP

State	Year 2005		Average annual % change		% change from 1998 to 2005	
	Private motor cars per 1000 population	Per capita GDP *	Private motor cars per 1000 population	Per capita GDP *	Private motor cars per 1000 population	Per capita GDP *
Johor	269.82	18,733	6.9	6.3	59.08	53.24
Kedah	102.58	12,132	5.8	6.5	47.87	55.39
Kelantan	105.62	8,638	5.6	6.8	46.40	58.14
Melaka	264.41	21,410	7.7	6.6	68.15	56.64
N. Sembilan	220.96	17,555	6.4	6.7	54.48	57.74
Pahang	153.08	14,549	5.9	6.9	49.69	59.12
Perak	*200.38*	*18,616*	*5.6*	*7.2*	*46.40*	*62.21*
Perlis	52.44	15,166	6.0	7.1	50.48	61.26
P. Pinang	430.89	28,581	7.6	6.3	67.30	53.25
Sabah *	107.83	11,323	7.0	4.5	59.77	36.52
Sarawak	176.85	16,861	8.2	6.0	73.49	49.88
Selangor **	166.62	21,286	3.5	4.1	27.07	32.80
Terengganu	104.82	29,516	5.7	5.6	47.68	46.38
W.P. Kuala Lumpur	1,249.97	39,283	8.4	5.4	76.25	44.26
Malaysia	247.75	19,189	6.7	5.8	57.43	48.53
Perak - 2007			*5.3*	*6.8*		
Malaysia - 2007			*6.3*	*5.9*		

Note: *) constant 1987 prices, **) include W.P. Labuan, ***) include W.P. Putrajaya

The number of cars per 1000 population is proportional to per capita GDP among of states in Malaysia. Among the 14 states, the highest effect of per capita GDP to the increasing of number of cars per 1000 population was experienced by Kuala Lumpur followed by Sabah, Sarawak and Pulau Pinang. Their effects of per capita GDP were over the average of Malaysia. Sequentially, the effect of per capita GDP which lower than the average of Malaysia occurred in Melaka, Johor, Terengganu, Negeri Sembilan, Kedah, Selangor, Pahang, Kelantan, Perlis and Perak.

According to the model results, all parameters values were statistically significant and overall goodness-of-fit of the model was very good. In whole of Malaysia, the parameter (b) represented the fixed income elasticity, which was estimated to be 1.115. It means that one percent increase in income level caused 1.115 percent increase in passenger cars per 1000 population. Highest value of parameter (b) was found for federal territory Kuala Lumpur (1.542) and the lowest was for Perak (0.781). Meanwhile, the meaning of (a) parameter was the heterogeneous increase of motorization in the sates after controlling for income growth. The highest (a) was found for Perak State (0.0926) and the lowest was for Kuala Lumpur (0.0001) (See Table 3).

Table 3. Estimation results of regression analysis of private motor cars per 1000 population

State	Parameter (b)	R	t Critical = 1.89
			t Stat
Perak	*0.7813*	*0.9984*	*-15.72*
Perlis	0.8142	0.9944	-17.00
Kelantan	0.8303	0.9946	-17.69
Pahang	0.8728	0.9987	-17.32
Selangor **	0.8807	0.9939	-28.41
Kedah	0.9021	0.9941	-18.54
N. Sembilan	0.9231	0.9942	-17.94
Terengganu	1.0361	0.9968	-21.80
Johor	1.1027	0.9991	-19.19
Melaka	1.1051	0.9968	-18.13
Malaysia	1.1154	0.9967	-18.66
P. Pinang	1.2209	0.9982	-19.41
Sarawak	1.3626	0.9913	-20.37
Sabah *	1.4894	0.9261	-26.33
W.P. Kuala Lumpur	1.5424	0.9990	-22.88

REALITIES AND CONSEQUENCIES OF MOTORIZATION

Car Ownership

Experience from many highly-motorized countries show that road construction alone is not sufficient to solve traffic congestion in cities and that other policy measures such as high parking charges, strict enforcement of parking and traffic regulations, public transport development and high fuel taxes are equally important. There is a general agreement among practitioners and academics that emphasis on road construction only attracts more private vehicles [iii].

Malaysia's recent rapid growth in car ownership particularly in Kuala Lumpur offers evidence that rising incomes are the major driving force for car ownership. This is due to the economy has grown at an average of 8.5 percent each year, making it the fast-growing economies. In 1998, Malaysia had a person-to-car ratio of 1 to 6.4, which changed to be ratio of 1 to 3.7. Perak had a person-to-car ratio of 1 to 7.3 (1998) and changed to be ratio of 1 to 4.6 (2007). In the case, Kuala Lumpur had a person-to-car ratio of 1 to 1.4 (1998) and changed to be ratio of 1 to 0.8 (2005).

As the important state populated by 8.6% of total population in Malaysia, Perak continues to be flooded with newly-registered motor vehicles each year. The registered motor vehicles in the whole of Perak was 1,525.93 in 2007 rising from 1,078.16 (2000) by 42%, otherwise, with the annual rate of 5.1% (2000 to 2007). Table 4 shows the number of vehicles registered in Perak and their growth rate over period 1986-2007. The table shows the decreasing growth rates of vehicle registered during recession period 1986-1988 and after economical crisis 1997. At

that time, the annual rates were less than 6.6% of whole of Malaysia (1986-2007). Additionally, the average number of vehicles registered grew at an average annual rate of 5.4% during the Eight Malaysia Plan period (2001-2005) compared with 6.8% during Seventh Malaysia Plan period (1996-2000). Its annual rate was less than annual growth rate of 8.5% during Sixth Malaysia Plan period (1991-1996). It was also low rate of 4.3% during early of Ninth Malaysia Plan period (2006-2007).

In Malaysia, the vehicle composition in 2007 (%) covered such as 44.1% motorcycles, 47.2% cars, 0.4% taxis & hire cars, 0.4% bus,5.2% lorry & van (good vehicles) and 2.6% other vehicles, and their consecutive average annual growth rate (from 1986 to 2007), such as 7.4%, 9.4%, 5.3%, 6.2%, 7.3% and 7.8%. Other vehicles included government motorcars, trailers and driving school vehicles. The average annual growth rate of whole Malaysia was 8.2% (1986-2007).

Table 4. Number of vehicle (in '000s) in Perak and annual growth rate (1986-2007)

Year	No of Vehicle	Growth rate (%)	Year	No of Vehicle	Growth rate (%)
1986	400.31	-	1997	922.09	9.0
1987	417.45	4.3	1998	969.23	5.1
1988	439.17	5.2	1999	1,025.12	5.8
1989	472.06	7.5	2000	1,078.16	5.2
1990	516.62	9.4	2001	1,134.65	5.2
1991	561.45	8.7	2002	1,190.42	4.9
1992	597.55	6.4	2003	1,252.13	5.2
1993	642.57	7.5	2004	1,324.35	5.8
1994	717.53	11.7	2005	1,402.27	5.9
1995	775.75	8.1	2006	1,480.19	5.6
1996	845.69	9.0	2007	1,525.93	3.1

Source : Road Transport Department, Malaysia

The number of motor vehicles registration Malaysia from 1986-2005 reported by Road Transport Department, Malaysia [iv]. The proportion of vehicles by state, in 2005, sequentially were Kuala Lumpur (22.9), Johor (13.9), Selangor (11.9), Pinang (10.7), Perak (9.5), Sarawak (6.1), Kedah (5.1), Negeri Sembilan (4.1), Pahang (4.0), Sabah (3.9), Melaka (3.4), Kelantan (3.1), Terengganu (2.2) and Perlis (0.4). And the annual rates of increase were such as, 9.4, 8.4, 7.2, 8.1, 7.2, 9.3, 8.7, 8.2, 7.4, 9.8, 8.0, 8.2, 8.4 and 10.3, respectively. In whole of Malaysia, the rate was 8.3.

Public Transport Use

Nowadays, there are a number of current issues in public transport operation. First, the number of population has increased as well as followed by the dramatically raising of private vehicle ownership. Second, many people change for using public transport instead of driving their own car due to the fuel price hike. Third, the number of accident is sharply increase by more than 30% within last 7 years in Malaysia (2001-2007). For example (See Table 5), currently, the daily statistic of

number of users using three main types of public transport at Klang Valley before and after restructuring fuel subsidies which influenced fuel price hike [v].

Table 5. Number of users using three main types of public transport at Lembah Klang

Type of Services	Number of users (people)		Percentage (%)
	Before	After	
1. Komuter KTM	94,000	101,000	7
2. Bas RapidKL	365,111	392,654	7.5
3. LRT RapidKL	313,753	326,095	4

Source: Berita Harian Malaysia, Wednesday, 16 July 2008

Bus System

Kuala Lumpur has one of the lowest public transport passenger levels in Asia due in part to the raising levels of private car ownership and use. The Kuala Lumpur Structure Plan 2020 [vi] revealed that public transport accounted for only 20 percent of total Kuala Lumpur passenger movements compared to 80 percent for private transport.

Generally, there are two type of terminal system for transit service in Perak, main bus station (in Capital State, Ipoh) and sub terminal (in Capital of District). In Capital State, Ipoh, there are Medan Gopeng bus station which mainly to facilitate inter State link and Medan Kid bus station for serving within urban (inner city) movement function. Beside Medan Gopeng and Medan Kid bus station, there are sub terminal, such as sub teminals in each district, Batang Padang, Manjung, Kerian, Kuala Kangsar, Larut Matang, Hilir Perak, Hulu Perak and Perak Tengah.

From the case study in Ipoh-Lumut corridor in 2006-2007, clearly obtained that the use of existing bus service as public transport in this corridor (rural area) was quit low. It can be expressed by the low load factor of 40%. The performance service had been observed include number of passengers, frequency/headway, number of bus, operating period, operation speed, trip productivity (passengers/day, passenger-km). Based on the advance analysis, the regularity and on-time performance were quite low. The on-time performance of less than 5 minutes was not exceeded than 25% and the service regularity ($\pm$ 5 minutes) less than 30% [vii].

Railway System

In spite of the highway facility provided, the people mobility in Perak State is also served by the available of railway system which is operated by Kereta api Tanah Melayu Berhad (KTMB). There are about 12 train services passing Perak State among total of 24 services of the international railways. In fact, the existing railway system has been contributing to the growth of economic and social among states in Peninsular Malaysia. Table 6 shows the length of railway track in Malaysia [viii].

The length of railway in Perak State is about 264.7 km which is spanned from Tanjung Malim to Parit Buntar. Its length is about 16 percent of total length of railway system in Peninsular Malaysia of 1,667.375 km. There are main railway stations within Perak State, such as Tanjung Malim, Tapah Road, Ipoh and Taiping. Beside that, there are some small railway stations, like as Slim River, Sungkai, Kampar, Batu Gajah, Sungai Siput, Kuala Kangsar, Bagan Serai and Parit Buntar.

*Table 6. Road and Railways *)*

Item	2000	2001	2002	2003	2004	2005	2006
Total length of roads (km)	66,445	71,814	72,165	77,200	77,695	78,458	78,458 (b)
Length of railway track (km)	1,949	1,949	1,949	1,949	1,949	1,949	1,949
Number of passenger journeys by train (thousands)	3,825	3,511	3,437	3,362	3,628	3,675	3,794

Note: (a) Excludes roads maintained by Local Authorities, (b) Assumed as the same of 2005
Source: Public Works Department, Malaysia

Highway Development

Length of Perak's road in 2005 which its growth rate of 5.1% per year was 9.1% of total road in Malaysia, less than Sabah (20.7%), Selangor (12.6%), Pahang (10%) and Johor (9.2%). In that time the growth in whole Malaysia was 3.4% per year. For instance, between 2000 and 2006, Malaysia experienced a 21% decrease in kilometers of road per 10,000 vehicles. This decrease was particularly due to higher growth rate of increase in vehicles, which grew by 7.1% per year compared to 3.4% per year for roads. Meanwhile, at Perak, there was a 6% decrease in kilometers of road per 10,000 vehicles due to the higher growth rate of increase in vehicles, which grew by 5.4% per year compared to 5.1% per year for roads.

From the indicators of road development by state in Malaysia 2005 (Ninth Malaysia Plan 2006-2010), Perak have density of road 0.34 km per km^2 area of Perak, service rate of 3.13 km per 1000 population and the road development index of 1.03. In whole of Malaysia the indicators were 0.24, 2.97 and 0.85, respectively.

CHALLENGES IN FUTURE TRANSPORT

Road Accident as Traffic Safety Indicators

From the RTVM 2005 [ix], the daily vehicular traffic at Perak from 1996-2005 are as following, 8,009 (1996), 8,242 (1997), 8,048 (1998), 8,664 (1999), 8,814 (2000), 11,225 (2001), 9,068 (2002), 10,235 (2003), 10,438 (2004) and 10,460 (2005). The daily vehicular traffic at Perak has increased by 3.5% per annual (in vehicle units) from 1996 to 2005. The characteristics of traffic at whole Perak in 2005 are indicated, such as, 24-hours volume of 20,486 vehicles, peak-hours volume of 955

vehicles per hour. The composition of traffic consisted of 47% car and taxi, 10% van and utility, 9% medium lorry, 5% heavy lorry, 2% bus and 28% motorcycle.

In that time, at Kuala Lumpur, the characteristics of traffic were as follows, 24-hours volume of 186,614 vehicles, peak-hours volume of 15,833 vehicles per hour. The composition of traffic consisted of 71% car and taxi, 9% van and utility, 4% medium lorry, 1% heavy lorry, 1% bus and 14% motorcycle. Kuala Lumpur experienced traffic with normal growth 3.6% per year, as follows, 137,341 (1996), 154,764 (1997), 151,938 (1998), 149,698 (1999), 160,299 (2000), 142,014 (2001), 176,100 (2002), 180,981 (2003), 195,387 (2004) and 194,436 (2005).

Traffic safety is generally described by number of accident and its fatality. The improvement in traffic safety is gained if the accident rate is decreased. Motorization had been affecting the achievement of traffic safety program. Below, there were facts about accident rate in whole of Malaysia and specifically in Perak.

Hundreds of people die on Malaysian roads every year. We can see the sobering numbers specially compiled by Royal Malaysia Police, these statistics serve as a traffic safety reminder for us and all other road users. Between 1994 and 2000, the number of accidents reported in Malaysia increased by 68% from 148,801 to 250,429. In next period, during 2001-2007, the number of accidents had increased by 37% from 265,175 to 363,319. If we see Table 7, in 2007, there was 31 accidents happen in 1000 drivers. It rose compared to 28 accidents per 1000 drivers in 1994. Otherwise, it increased by 11%. However, the number of accident per 10000 vehicles decreased by 10% from 241 to 216. It was due to the higher rate of growing vehicles than the driver.

It was reported by estimation in Malaysia [x], the total accident cost increased by 4% from RM 8,492.56 million in 2001 to RM 8,872.49 million in 2007. The serious number is about percentage of cost in death case which having 85% (RM 7,538.40 million) of total cost in 2007. The case of serious and light injuries spent cost of 13% and 2%, respectively. Other fact was decreasing fatalities index (a number of deaths in accident each 10,000 vehicles and of 100,000 population).

Table 7. Road Accidents Facts

Year	No of accidents per 1000 driver	Accidents Index (10 000 vehicle)	Fatalities Index (10 000 vehicle)	Fatalities Index (100 000 population)
1994	28	241	8	27
1995	27	239	8	28
1996	30	246	8	30
1997	32	252	7	29
1998	29	231	6	26
1999	29	225	6	26

2000	31	236	6	26
2001	32	235	5	25
2002	32	218	5	24
2003	33	233	5	25
2004	34	237	5	24
2005	33	222	4	23
2006	33	216	4	24
2007	31	216	4	23

Source: http://www.panducermat.org.my

The total number of accidents in Perak was 27,225 in 2005, 27,432 (2006) and 29,203 (2007) [xi]. Its percentage share of accidents in whole of Malaysia was 8.3%, 8.0% and 8.0% in 2005, 2006 and 2007, respectively. From data 2007 Perak was the fifth place in number of accidents with 8.0% of total accidents in Malaysia. Above Perak there were Selangor, Kuala Lumpur, Johor and Pinang with percentage share of 27.3%, 13.6%, 12.8% and 9.3%, respectively. The percentage was not exceeding than 5% for other states in Malaysia. In Perak, the number of accidents changed by 7% from 27,225 (2005) to 29,203 (2007), less than in Malaysia, which changed by 11% from 328,268 (2005) to 363,319 (2007).

Table 8 shows the number of accidents, deaths and injuries in Perak for the years 2000-2006. In this period, the number of accidents increased with annual rate of 3%, while the number of deaths increased by 1% annually. But, both the number of serious and minor injuries decreased by 3% and 5%, respectively.

Table 8. Number of road accident and casualties reported in Perak from 2000 to 2006

Year	Number of road accidents	Number of deaths	Number of serious injuries	Number of minor injuries
2000	na	713	1,715	5,028
2001	23,700	725	1,445	5,787
2002	25,245	712	1,300	5,709
2003	25,948	739	1,403	5,296
2004	27,514	807	1,207	5,882
2005	27,225	716	1,341	4,997
2006	27,465	763	1,397	3,512
2007	29,203	na	na	na

Source: Ibu Pejabat Polis Kontinjen Perak PDRM [xii]

More specific data in 2006, for whole of Perak, a number of victims of accident were distributed by vehicle involved as following, 65% of motor cycle, 18% of car/van, 6% of pedestrian, 5% of bicycle, 4% of tractor/truck/trailer and 2% of bus. If we look into the whole of Malaysia, in 2006, the highest percentage of vehicle involved in accident was car/van (68%) followed by motorcycle (16%), tractor/truck/trailer (10%), bus (2%), taxi (1%), bicycle (less than 1%) and others (2%). The fact was that the number of victims decreased annually by 1%, 5%, 5%

and 1% which involved with pedestrian, motorcycle, bicycle, car and van, respectively. Those were different for other vehicles involved which increased by 11%, 3% and 3% for bus, tractor/truck/trailer and others, respectively.

Perak's Challenges in Public Transport

A number of aspects which is necessary to be considered for transportation development are following:

1. Accessible and affordable public transport

Government should providing accessible and affordable public transport for all society in rural and urban. It is important to provide public transport to support the rural and urban development. In other case, it was also the facilitation for poor society on accessibility to economic activities with reliable and affordable public transport. This strategy is able to reduce urbanization and private car use.

2. Increasing tourist arrival to Perak need for better public transport

Beside the tourism is necessary to provide quality human management, tourism also necessary to offer better supporting public transport facilities.

3. Traffic congestion and fuel consumption

Traffic jam will cause congestion and will result waste of time. Waste of time in movement will reduce the time productivity. Fuel consumption may increase along with the increasing vehicle ownership and frequently congested traffic.

4. Traffic safety is getting important

The high rate of accident is necessary to decrease in the future in line with transportation development. The use of private cars and motor cycles was the most type of vehicles involved in many accidents. The car ownership is growth faster than the supply in infrastructure and management of transportation. Transport management in which promoting of public transport use being priority can encourage people use public transport than driving by cars. Using cars will reduce and traffic accident rate may also be reduced.

6. Issues on public transportation facilities

The two main issues on public transportation use include rural public transportation and promoting public transport for reducing the private car use. In fact, rural public transportation is less developed than urban public transportation. Increasing car ownership and fuel price hike are both of reasons why people change to use public transport and reduce the using of private car.

7. Encouraging public/private participation in transportation development

There are some advantages of public/private participation in providing quality of public transportation, as follows:

a. to support the nation's economic growth and to help the government in overcoming the explosive of motorization compared with growth of road length;
b. to help the government in road construction through private investment;
c. to support the government for improvement of road traffic safety;
d. to enable the public to enjoy public transport facilities with relatively earlier compared to if the government build these facilities itself through the government's budget allocation; and
e. to speed up the improvement of public transport service and transit facilities, as an alternative for reducing traffic congestion, air pollution and fuel consumption.

CONCLUSION

The motorization is seriously increasing throughout Malaysia. Now, motor vehicles have become one of the transportation facilities for the Malaysian society. Every year thousands new motor vehicles are registered in this country and has increased year to year. Motorization trends had been estimated against per capita GDP by non-linear equation model. The regression model was estimated by using 8-year-14 states data set in Malaysia. The result gave a fixed income elasticity (parameter b), which is estimated to be 1.115 for whole Malaysia, for Perak the parameter (b) to be 0.781. In other side, motorization in whole Malaysia, even in Perak will produce negative impacts in congestion, noise, pollution, road accidents, wasting in fuel consumption and other social impacts. Those are very important and serious challenges in transportation development near future time.

The road development is very important to connect inter city or state in Malaysia. Road development was extremely encouraged by the fast-growth in economy. In order, road development then can drive the motorization. The existing road will not able to accommodate high growth of motor vehicles. The extending and widening of the road will also potentially create congestion at other points of road intersection, even many road accidents happen. Therefore, an alternative of promoting public transport use may be chosen to maximize people movement rather than vehicular traffic. This might be able to reduce private cars use. Government and public, together, must be active to promote using of a good public transport service.

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