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VEHICLE OWNERSHIP AND QUALITY OF LIFE IN URBAN RESIDENTIAL NEIGHBORHOODS, NORTHERN PENINSULAR MALAYSIA

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Abstract
It is widely believed that owning a vehicle affects one's quality of life. In the United States, owning a car contributes positively to quality of life while in countries such as New Zealand, this impact is not always apparent. Private cars, particularly, has become a leading mode of transport due to its inherent advantages such as privacy, comfort and unrestricted freedom. Other than income, road infrastructure, urban land use pattern and government policies are all influential factors in determining vehicle ownership and usage. It is widely believed that vehicle ownership increases accessibility to better jobs, urban facilities, and social meeting places. This study examines the relationship between owning a private vehicle and social and economic satisfaction, as well as accessibility to public facilities. A total of 1,563 households were surveyed in six urban areas of northern Malaysia. The sample was stratified according to low-, middle-, and high-income neighborhoods. Cross tabulation analysis was done on levels of vehicle ownership and other variables to determine the level of satisfaction in economic and social quality of life. Approximately 99% of those surveyed owned at least a motorcycle while roughly a third owned both a car and a motorcycle. Majority expressed indifference to public transport and considered owning a vehicle a necessity for daily activities. A direct relationship was observed between the number of owned vehicles and the level of job and income satisfaction. Similarly, social interactions with neighbors, participation in community activities, satisfaction in ethnic relations, and attendance in religious services indicated a positive relationship with car ownership. These social satisfaction and economic fulfillment, as well as access to public amenities, are positively enhanced by vehicle ownership.

Keywords: Vehicle ownership, Quality of life, Private vehicles, Public transport, Residential neighborhood

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pursue knowledge, and attaining a standard of living which surpasses the fulfillment of the basic and psychological needs of the individual, to achieve a level of social well-being compatible with the nation's aspirations."

Quality of life is considered to have improved when the society's situation has reached a level that is regarded as better. As illustrated in Table 1, the components and indicators of quality of life within the Malaysian context are presented in the Malaysian Quality of Life Index (MQLI) instituted by the Malaysian Economic Planning Unit under the Prime Minister Department.

Table 1: Eleven Components of the Malaysian Quality of Life Index (MQLI)

No.	Components	Indicators
1	Income and distribution	Real per capita income Gini coefficient and incidence of poverty
2	Working life	Unemployment rate Trade disputes and man-days lost due to industrial action
3	Transport and communications	Private motorcars and motorcycles Commercial vehicles and road development index Telephones and Internet subscribers Average daily newspaper circulation
4	Health	Life expectancy at birth and infant mortality rate Doctor-population ratio
5	Education	Literacy rate Pre-school, secondary school, and university participation rate Primary school teacher-student ratio Secondary school teacher-student ratio
6	Housing	Average price of medium-low cost house per capita income % of low-cost housing units to total low-income households % of housing units with piped water % of housing units with electricity
7	Environment	Air quality and water quality % of forested land
8	Family	% of divorces; crude birth rate; household size; juvenile crime

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9	Social participation	Registered voters Membership in registered non-profit societies Number of registered residents' associations
10	Public safety	Crime; road accidents
11	Culture and leisure	Membership in public libraries; TV viewers Domestic hotel guests

(Source: Yap (2005))

TRANSPORTATION

Transportation refers to the movement of people, goods, and information between points of origin and destination, passing through one or more points of interchange via a network in space. Each movement is associated with activities that need to be facilitated such as employment, education, recreation, shopping, and so on. Transportation is regarded as one of the key economic boosters in modern society (Dimitriou, 1992). Nowadays, motorized transport is predominant, regardless of distance. Nevertheless, non-motorized modes of transport such as walking, bicycles, and pedicabs remain significant especially for short trips of up to five kilometers (Rimmer, 1986). The impact of technological transformation in the transport sector since the late 19th century has contributed significantly to people's lifestyle, thus enhancing quality of life (Simon, 1996).

According to Kubani (2005), quality of life is considerably related to transportation. People generally aspire to live a balanced life, where they can spend more time with family rather than being confined in traffic. A combination of proper infrastructure and adequate mode of transport can make this possible. The automobile is a widely available form of transport, and owning one has become common and essential. While it may be presumed as a luxury, majority of daily activities require some mode of transport.

In developed countries such as Australia, Canada, and the United States, car ownership per 1,000 people falls within the range of 450 to 610 in 1990. European countries and Japan, meanwhile, record a slightly lower rate of ownership, between 200 to 400 cars (Barter, 2000). In Asia, as more countries like Korea, Malaysia, and China become players in the automotive industry, vehicle ownership has steadily risen. In Malaysia, for example, vehicle ownership—both motorcycle and car—was pegged at 560 per 1,000 people in 2007, with an annual increase of roughly 20 vehicles per

1,000 people since 2005 (Road Transport Department, Malaysia, 2008). Although public transport services such as bus and taxi are available in the majority of towns and cities, quality and reliability have yet to be improved. With an increasing level of vehicle ownership, private motorcycles and cars remain to be the preferred choice for commuting.

VEHICLES OWNERSHIP AND QUALITY OF LIFE

As previously stated, the level of vehicle ownership is associated with quality of life because it may signify status and personal wealth, important factors for assessing QoL. From an individual perspective, owning a vehicle helps ease the burden of realizing one's daily activities: commuting to work, attending school, shopping, and so on. Daily schedules are better managed in the arms of freedom, comfort, and privacy.

In helping residents to own a vehicle, the City of San Antonio in the United States, for example, launched a Working Family Vehicle Purchase Program (WFVPP) in 2007. The program is a joint partnership between the city's Department of Community Initiatives (DCI) and Ford Motor Company. For a down payment of US$3,000 (US$2,000 contributed by DCI and Ford plus US$1,000 contributed by the owner), the owner is required to pay only monthly payment on the purchase of new or pre-owned vehicles. By providing access to affordable vehicle ownership, the program has helped its participants find better jobs, increase their salary, spend more time with their family, and enjoy a better quality of life.

A study undertaken by the Vehicle for Change in 2003 revealed that 73% of 155 participants who own reliable cars have secured better jobs or promotions and raised their annual income by an average of US$4,558. Owning a car allowed them to be more involved in their children's school and community activities as well (City of San Antonio, 2008; Vehicle for Change, 2008).

Since 1990, Asian countries such as Malaysia, Thailand, and Taiwan have been experiencing a substantial increase in private vehicle ownership; these are among the highest in the region in terms of motorcycle ownership in their cities (above 100 motorcycles per 1,000 people) (Barter, 2000; Kenworthy and Laube et al., 1999). By the end of 2005, there were approximately 15 million vehicles on Malaysian roads, with almost 90% of all motor vehicles privately owned. The motorcycle, being the cheapest and most affordable among the different forms of motorized transport, accounts for the largest share at 7 million (47%), followed by private cars at 6.5 million (43%) (Kasipillai and Chan, 2008). Such an increase in vehicle ownership is seen to be directly stimulated by gross national product (GNP) growth, which increases

the disposable income that influences purchasing power. GNP measures the value of goods and services that the country's citizens produce regardless of location. It is an indicator of a country's economic condition and is positively correlated to quality of life.

According to Simon (1996), there is a linear relationship between countries' GNP per capita and level of vehicle ownership. In general, high-income countries tend to have higher vehicle ownership rates than low-income countries. A country such as the United States has by far the highest car ownership rate, followed by Australia and Canada; France and Great Britain trail closely behind. There are exceptions, however, as Tokyo, Singapore, Seoul, and Hong Kong record low vehicle ownership despite substantially higher GNP per capita (Barter, 2000).

As Table 2 illustrates, there exists a linear relationship between Malaysia's GNP per capita and vehicle ownership based on the statistics of newly registered cars and motorcycles from 2003 to 2007. A steady increase in the country's population and GNP per capita was recorded in comparison with newly registered cars and motorcycles, with the exception of newly registered cars for 2006 and 2007. This declined in 2006 but climbed slightly in 2007, caused by poor trade-in value for used cars and the difficulty in acquiring hire purchase financing and sales. Furthermore, the escalating price of petroleum resulted in a slowdown of car sales and the country's economy.

Simultaneously, average adult population (15 to 64 years) from 2004 to 2007 in Malaysia was approximately 63% of the total population. The latest update for 2008 from the Department of Statistics, Malaysia reported an average of 63.5% (17.6 million). Adult population can be indirectly interpreted as representing the working population, a contributing factor to the rise in the number of private vehicles. As household income is commonly the product of the number of workers in a household, the increase in the number of workers per household is strongly correlated with the increase in household income. With a household of three or more workers, the demand for transportation and options for commuting behavior will be affected in many ways (Pisarki, 2006). For the majority of low-income households with at least one worker, the motorcycle is preferred since it is widely available and affordable and offers accessibility even in congested urban areas. For medium- and upper-income households, owning at least one car has become a necessity to meet daily needs.

Table 2: New Registered Cars and Motorcycles for Year 2003-2007, Malaysia

Year	Population	GNP Per Capita (RM)	Cars	Motorcycles
2003	25,048,000	15,819	424,224	321,234
2004	25,581,000	17,577	471,780	397,977
2005	26,128,000	19,079	537,900	422,255
2006	26,640,000	20,885	458,294	448,757
2007	27,174,000	23,114	477,647	485,236

(Source: Department of Statistics, Malaysia)

The existence of various car assembly facilities is another contributing factor to the rise of vehicle ownership in Malaysia. Between 1926 and 1980, there were 11 automobile assemblers, most of which were foreign-owned companies producing commercial and passenger vehicles. In 1983, Malaysia began to venture into the automobile industry with the establishment of Proton, Perusahaan Otomobil Nasional Berhad (National Automobile Enterprise Co. Ltd.) (Spencer and Madhaven, 1989). Exempted from high import duties, the price for a Proton car is significantly lower than imported ones. Proton has enjoyed a high share in the passenger car market in the country, from 11% in 1986 to 74% in 1993. The sharing percentage has slightly decreased in recent years because of competitive prices offered by foreign-made passenger cars. In 1993, another national car manufacturer was established under the name of Perusahaan Otomobil Kedua Sdn Bhd, widely known as Perodua. Its main objective was to strengthen the local automotive industry before the start of the Asean Free Trade Area (AFTA), a trade bloc agreement to reduce or eliminate tariffs on intra-ASEAN trades. Perodua is well-known for producing small passenger cars at an affordable price. Both Proton and Perodua are protected by the Malaysian government. Their cars are affordable to middle-income households and, since the year 2000, both have recorded a total domestic car market share of 90% (Mohamad and Kiggundu, 2007).

Ironically, the increasing level of vehicle ownership can be detrimental to quality of life as well, especially in the case of neighborhoods and urban areas at large. Oftentimes, the number of vehicles exceeds road capacity, resulting in traffic congestion. This condition ultimately increases the need for adequate road space and other related transport infrastructure. Thus, the development of new highways, ring roads, and parking facilities attract more vehicles and discourage public transport. In Kuala Lumpur, for example, there are so many toll highways and ring roads that heavy traffic congestions are reported during peak hours. A recent visit to the Duta Toll Plaza in Kuala Lumpur during normal hours confined the Minister of Public Works Malaysia

himself in a 15-minute queue on the cash toll-lane. Congestion further worsens in the event of accidents or heavy rain. Despite all these, conditions in Kuala Lumpur are not considered critical yet, with an average flow of 28km/h in the central business district (CBD) during peak hours (Poboon, 2000).

Traffic congestion is known to be a major cause of air and noise pollution in urban areas. Motorized vehicles release poisonous gases and heat daily, deteriorating air quality and affecting visibility. Evidently, these have increased cases of asthma, conjunctivitis, and other related diseases (Pendakur, 1995). Emission from two-stroke motorcycle engines emit approximately 10 to 15 times more hydrocarbon and are roughly half as fuel-efficient as four-stroke engines. They release more smoke, carbon monoxide, and particular matter which can increase the risk of respiratory illnesses. Approximately 50% of motorcycles plying Malaysian roads are equipped with two-stroke engines. This engine type, which incinerates a mixture of oil and gasoline, burns even dirtier if loaded with extra weight (Potera, 2004). Statistics from the Royal Malaysian Police reported that from 2002 to 2007, the average death toll from fatal road accidents reached 6,196. This figure is considered high and alarming for a country with an average population of 26 million. In 2007 alone, there were 6,282 fatal road accidents, with motorcycles having the highest casualties at 58% (3,646), followed by cars at 20% (1,228) and pedestrians at 10% (636). Various studies have been conducted to promote road safety issues in Malaysia (Radin Sohadi, 2005; Mohd Yusof et al., 2003; Nhan et al., 2009). In addition, the Malaysian Institute of Road Safety Research (MIROS) was established in 2007 to study and evaluate the current procedures for road safety in the country.

Losing a loved one is tragic, especially if it involves the household's sole breadwinner. It poses detrimental effects on the acquisition of basic human needs such as food, shelter, clothing, and education, which are important in sustaining a sound quality of life. In the majority of developing countries, public transport is a means of traveling to work, school, and commercial areas. It is likewise a means of providing greater freedom, access, opportunity, and choices for the urban poor and those who cannot afford private vehicles. For example, the public bus service connotes the 3Cs: convenient, comfort, and cheap. Commuters seek for convenient and comfortable services at cheaper and affordable prices. While the 3Cs serve as the main motivation of public bus transport operators, quality and efficiency are often being sacrificed (Iles, 2005). In privately owned and operated bus transport systems, financial success is measured based on economic profits while operating performance is determined by ridership. Services on low-demand routes with revenues that drop below the marginal cost are reduced to cut cost even though overall input costs such as capital, fuel, and labor are stable (Fielding, 1987; Hensher, 1987).

Table 4: Number of Respondents by State, Urban Area, and Housing Scheme

State	Urban Area	Housing Scheme			Total
		Low-Cost	Medium-Cost	High-Cost	
Perlis	Kangar	100	100	78	278
Kedah	Alor Star	98	94	47	239
Kedah	Sungai Petani	95	100	86	281
Kedah	Kulim	100	94	77	271
Penang	Seberang Perai	100	100	54	254
Penang	Penang Island	100	100	40	240
Total		**593**	**588**	**382**	**1,563**

By comparing the distribution of respondents based on housing schemes, participation from high-cost housing is much lower compared to low- and medium-cost housing. Within the high-cost housing scheme, larger urban areas like Alor Star, Seberang Perai, and Penang Island have lower respondents compared to small urban areas such as Kulim, Sungai Petani, and Kangar. Since many of the high-cost houses are in the form of a gated community, accessibility to the household is a problem in addition to unwillingness to participate in the survey.

The survey questionnaire on the transportation component was structured to examine three important elements: ownership of motorized vehicles, mode of transport to work and school, and utilization of public transport services. Further, other elements being surveyed included household characteristics such as income and workers, perceptions on public facilities (physical environment), social and economic aspects of life (See Table 5). Questions on perception were devised based on respondents' level of satisfaction and perception, which were ranked from "very dissatisfied" (-2) to "very satisfied" (2). Respondents were likewise asked regarding their satisfaction in the public transport available in their neighborhoods to determine whether the quality of services influenced household decisions and attitudes on daily transport modes. For those who did not use public transport despite its availability in their neighborhoods, a list of "reasons for not using public transport" was provided. Data from the survey were cross-tabulated to examine relationships and vehicle ownership's significance as an instrument for measuring quality of life.

Table 5: Structure of Questionnaire for Transportation Component

Component	Element
Household	• Size • Monthly income • Working member • Hours worked/day
Perception -2 - Very dissatisfied -1 - Dissatisfied 0 - Neutral 1 - Satisfied 2 - Very satisfied	• Public facilities (education, health, commercial, recreational, religious, public transport service, community, security) • Social aspect of life (neighbors, ethnic and societal interactions, public safety, religious services, politics) • Economic aspect of life (employment, income, employment benefits and promotion, cost of living, housing value/investment
Vehicle ownership	• Type and number of motorized vehicles owned (car/ motorcycle) • Sufficient parking space • Mode of transport to work/school • Distance traveled to work/school
Public transport (bus/taxi)	• Availability of service • Usage and frequency/week • Reason for not using public transport

FINDINGS

Level of vehicle ownership

In the questionnaire, respondents were asked about the model(s) of the car(s) and motorcycle(s) they owned, both local and foreign-made. The summation of this data represents the total number of vehicles owned by each respondent. Results from Table 6 below revealed that merely 1% (22) of the respondents did not own any motorized vehicle while 99% (1541) owned at least one vehicle, either a motorcycle or a car, or both. From this group, approximately 94% (1,444) owned at least one car and merely 6% (97) owned motorcycles only. Over half of the respondents (56%) owned both, at least one car and one motorcycle, and 63% (980) possessed at least one motorcycle. For those who owned a car, having a motorcycle is an advantage, especially for making short trips to sundry shops and places of worship, visiting friends, or sending children to school or religious classes. It requires less petrol and is convenient in terms of accessibility and time consumed for short-distance and light-load trips.

Table 6: Vehicle Ownership (Car and Motorcycle)

Vehicle Ownership	Total (%)
No vehicle	22 (1)
0 Car and 1 motorcycle	62 (4)
0 Car and > 1 motorcycle	35 (2)
1 Car and 0 motorcycle	238 (15)
1 Car and 1 motorcycle	458 (29)
1 Car and > 1 motorcycle	99 (6)
> 1 Car and 0 motorcycle	323 (21)
> 1 Car and 1 motorcycle	252 (16)
> 1 Car and > 1 motorcycle	74 (5)
Total	**1,563 (100)**

On the ownership of the national car, over three-quarters (77%) of the total respondents own at least a Proton or a Perodua and the majority dwell in low and medium-cost housing. The national car is affordable and the quality is comparable to other imported cars with similar sizes, standards, and specifications.

Cross tabulation analysis between levels of vehicle ownership and household income (N=1536, Pearson Chi-Square=169, $p<.001$) reveals no direct relationship between increasing household income and level of vehicle ownership. Average household income in this study is RM4,400 (USD1,222). A similar pattern is visible when level of vehicle ownership is cross-tabulated with household size (N=1536, Pearson Chi-Square=48, $p<.001$) and the number of workers per household (N=1511, Pearson Chi-Square=113, $p<.001$), which is fairly associated with household income. Approximately 85% of the respondents (1,317) have less than three workers per household and the level of vehicle ownership is dominated by those who own one to two vehicles (68%). As the number of workers per household increases to three or more workers, the level of vehicle ownership begins to decrease. Although household income or the number of workers in a household is presumed to be extremely related to vehicle ownership, the findings do not support this hypothesis. The need to own a vehicle depends on necessity and the importance of mobility in fulfilling diverse daily activities as well as in sustaining quality of life. However, the ability to own a vehicle is relatively associated with income, which determines purchasing power. As Barter (2000) pointed out, factors that influence vehicle use in addition to income include the cost of owning a vehicle, land use pattern, road infrastructure, public transport service, and policies related to transport demand management.

In general, 69% (1,073) of the respondents are satisfied with the availability of parking space in their neighborhoods. Parking space in this study pertains to on-street parking within different neighborhoods. A mere 13% (197) are dissatisfied, most of them owning two to three vehicles. On the question of parking space availability for each housing unit, 67% (1,014) of respondents affirmed that parking space is adequate while 33% (495) deem it insufficient. Again, majority of those who consider that parking is inadequate own at least two to three vehicles. Such a scenario is expected, especially from those living in high-rise, low-cost housing where limited parking space is shared among residents. In the case of medium-cost housing (landed or high-rise), each unit is commonly allocated with one parking space for a car. Those who own more than one car will naturally perceive this as inadequate.

Mode of transport to work and school

Further examination on the mode of transport to work revealed that approximately 93% (1,447) of respondents worked outside their home, with 45% (648) needing to travel between 5 to 50 km to reach the work place. Approximately 78% clock in over seven hours a day and over 90% of trips are made via private vehicles; public bus accounts for a mere 1%. Although 38% of respondents know of a bus service in their housing areas, utilization of this service is very low. This indicates high dependency on private vehicles and reflects the importance of possessing a reliable mode of transport for commuting to the work place. For long-distance trips, owning a private vehicle offers better accessibility, comfort, and less time to travel to the work place. It improves QoL, whereby users enjoy the freedom and opportunity to run errands before reaching their work place.

Similarly, mode of transport to school (N=885) is dominated by private vehicles (58%), followed by van/school bus (19%), or a combination of both (11%). Other modes include walking (7%), others means (4%), and public bus (1%). A mere 18% of respondents have children who go to school located less than one kilometer away while the majority (58%) have schools between one to five kilometers from their homes, followed by over six kilometers (25%). Regardless of distance, private vehicle is the preferred choice because it offers convenience and safety for children. Furthermore, it provides respondents with the opportunity to send their children to school before continuing their journey to work, thus saving cost on additional modes of transport to school.

Public transport service

Utilization of public transport service by respondents in the study area is extremely low. As mentioned earlier, a mere 38% (599) of respondents acknowledge that a public bus service is available in their neighborhood. From this figure, only 29% (173) utilize this service for trips to work or school, shopping, visiting friends, and entertainment

while the rest rely on private vehicles for such trips. Majority of those utilizing the public bus reside in low-cost housing (61%). The frequency of availing of this service is low, with majority (51%) using it less than twice a week.

Not all areas offer a bus service, especially in areas with medium- and high-cost housing. The low utilization of the public bus service is inversely related to the high rate of private vehicle ownership. The availability of such a service is not critical or in great demands as the majority of respondents (99%) own a private vehicle. More than half of the respondents who do not avail of the bus service available in their respective areas (N=426) attribute this non-use of public transport to "having and using private vehicle" (57%) as the major reason, followed by "unscheduled bus journey" (16%), "long bus journey" (11%), "uncomfortable conditions (8%), and others (8%). This result demonstrates that the level or quality of public bus service is not a major factor influencing decisions on mode of transportation. By possessing a private vehicle, quality of life is enhanced through better accessibility, freedom, comfort, privacy, and time.

Perception

The questionnaire on the respondents' perception of quality of life is based on three major elements, namely, public facilities, social, and economic aspects of life. The respondents' answers are structured based on the level of satisfaction, and are assessed by applying a five-point scale ranging from a score of -2 for "very dissatisfied" to 2 for "very satisfied." Those who answered "neutral" are coded as 0. The Cronbach-Alpha of this scale is 0.827.

Public facilities

Perception assessment of the physical environment focuses on the quality of physical facilities and services available within the housing areas in relation to the level of vehicle ownership. As Table 7 illustrates, the majority of respondents, regardless of the number of vehicles owned, are satisfied with the quality of facilities and services available in their housing areas, with the exception of public transport. This has a mean score of -0.23, representing the dissatisfaction of those who do not own a single vehicle. Compared to other elements, public transport has the lowest overall mean score (Mean* = 0.14). This clearly indicates that quality of public transport service and facilities are not within the respondents' acceptable standards, especially those who do not own a vehicle and forced to rely heavily on public transport as their daily mode of transport. The low mean scores of respondents who own vehicles likewise signify a strong dependency on private vehicles as their mode of transport, many of which may be attributed to the low satisfaction on the public transport service and facilities in their housing areas.

Table 7: Mean Score: Public Facilities by Level of Vehicle Ownership

	QoL-Public Facilities	Educational Facilities	Health Facilities	Commercial Facilities	Recreational Facilities	Religious Facilities	Public Transport Service/Facilities	Community Facilities	Security
Level of Vehicle Ownership	0	0.77	0.68	0.32	0.14	0.59	-0.23	0.09	0.14
	1	0.81	0.74	0.77	0.47	0.72	0.07	0.30	0.40
	2	0.94	0.88	0.90	0.49	0.85	0.16	0.43	0.53
	3 – 4	1.02	0.99	0.97	0.50	0.81	0.18	0.43	0.54
	More than 4	0.95	0.92	0.89	0.32	0.95	0.24	0.34	0.34
	Significant level	p < 0.001	p< 0.001	p < 0.001	p < 0.001	p < 0.05	n.s.	p < 0.05	n.s.
	Pearson chi-square	43.10	43.20	47.53	39.37	25.87	19.70	27.08	20.81
	Mean*	0.94	0.89	0.89	0.48	0.81	0.14	0.40	0.50

Scale range from -2 for "very dissatisfied" to 2 for "very satisfied"
0 vehicle (N=22), 1 vehicle (N=300), 2 vehicles (N=724), 3 – 4 vehicles (N=479), More than 4 vehicles (N=38)
n.s.: not significant
Mean*: overall mean score for each element

Meanwhile, the satisfaction level on education facilities ranks among the highest in this group, with an overall mean score (Mean*) of 0.94. In addition, the mean score rises moderately as the level of vehicle ownership increases, but decreases slightly when the level of vehicle ownership reaches over four vehicles. This may be caused by comparisons made by respondents with over four vehicles between schools being attended by their children and schools situated in their housing areas. As mentioned

above, approximately 25% of respondents have children who attend schools located more than six kilometers away from home. This may be attributed to the better quality of education and excellent facilities offered compared to those in their housing areas. Traveling to such distances, however, requires a mode of transport that is not only reliable and convenient but provides accessibility as well. In this case, having over four vehicles in a household is a natural advantage.

Social aspect of life

Table 8 presents the mean scores of respondents' satisfaction on the social aspect of life in their respective neighborhoods. In general, majority of respondents are satisfied with the social aspect as the majority of social elements have high overall mean scores (mean*), with the exception of public safety, which has an overall mean score of 0.48. The mean scores for public safety reveal a moderate increase as the level of vehicle ownership increases from zero to two vehicles, but begin to decrease as it reaches beyond four vehicles. This may be attributed to property crime in their neighborhoods such as vandalism and car and motorcycle robbery, which are currently on the rise in most parts of the country. Since parking space in the majority of houses (landed property only) can only accommodate a maximum of two cars, owners with over two vehicles have no choice but to park these along the road. These vehicles have a higher risk of being stolen or vandalized. This problem is worsened by the lack of police visibility.

Although the means score for public safety decreases as car ownership increases, other elements associated with social interactions display a positive relationship with car ownership. These include interaction with neighbors, participation in community activities, satisfaction in ethnic relations, and attendance of religious services. In this case, owning more cars may mean increasing mobility as these interactions require movement from one place to another. In other words, owning more cars enables residents to be involved in more community activities, hence improving their social quality of life.

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Table 8: Mean Score: Social Aspect of Life by Level of Vehicle Ownership

	QoL-Social Elements	Interaction with Neighbors	Public Relations	Ethnic Relations	Public Safety	Religious Service
Level of Vehicle Ownership	0	0.71	0.64	0.48	0.14	0.48
	1	0.85	0.84	0.67	0.47	0.72
	2	1.00	0.95	0.78	0.50	0.84
	3 – 4	0.96	0.98	0.72	0.49	0.83
	More than 4	1.00	1.00	0.89	0.34	0.97
	Significant level	$p < 0.05$	$p < 0.05$	n.s.	n.s.	$p < 0.05$
	Pearson chi-square	35.44	27.10	21.94	14.84	29.01
	Mean*	0.96	0.94	0.74	0.48	0.81

Scale range from -2 for "very dissatisfied" to 2 for "very satisfied"
0 vehicle (N=22), 1 vehicle (N=300), 2 vehicles (N=724), 3 – 4 vehicles (N=479), More than 4 vehicles (N=38)
n.s.: not significant
Mean*: overall mean score for each element

Economic aspect of life

Respondents were likewise asked regarding their satisfaction with overall economic quality of life (Table 9). Five aspects were examined: job satisfaction, income generation, employment benefits, cost of living, and property investment. Based on the mean scores, the table indicates that the respondents are rather satisfied with their current economic condition in all aspects. However, they are dissatisfied with the cost of living, as reflected by the negative mean scores throughout the level of car ownership. Those without a vehicle and those with two vehicles display the highest level of dissatisfaction.

The table likewise indicates a positive relationship between the number of vehicles and the job satisfaction level. Similarly, there is a direct relationship between the number of vehicles owned and the level of income satisfaction. This may be attributed to the fact that people who own and enjoy access to private vehicles can choose jobs to their liking or have jobs with better income. The fact that people who own private vehicles have better jobs and increased income has likewise been observed in a study conducted by the Vehicle of Change (2008), as discussed earlier

Table 9: Mean Score: Economic Aspect of Life by Level of Vehicle Ownership

	QoL-Economic Elements	Job Satisfaction	Income	Employment Benefits/ Promotion	Cost of Living	Property Value/ Investment
Level of Vehicle Ownership	0	0.60	0.50	0.45	-0.32	0.32
	1	0.63	0.43	0.50	-0.10	0.38
	2	0.76	0.53	0.48	-0.40	0.49
	3 – 4	0.89	0.70	0.56	-0.20	0.58
	More than 4	0.92	0.76	0.55	-0.26	0.45
	Significant level	$p < 0.001$	$p < 0.001$	n.s.	$p < 0.001$	$p < 0.001$
	Pearson chi-square	44.23	39.19	13.89	38.26	42.61
	Mean*	0.78	0.57	0.51	-0.28	0.49

Scale range from -2 for "very dissatisfied" to 2 for "very satisfied"
0 vehicle (N=22), 1 vehicle (N=300), 2 vehicles (N=724), 3 – 4 vehicles (N=479), More than 4 vehicles (N=38)
n.s.: not significant
Mean*: overall mean score for each element

CONCLUSION

In many cases, it is observed that as household income increases, so does the number of vehicles owned by a household. However, this study observed that the number of owned vehicles is not directly related to income. The need to own a private vehicle, in this case, depends on the necessity to move around and perform daily activities.

In the Quality of Life survey conducted in 2002, the same importance of private vehicle ownership was detected as well (Economic Planning Unit, 2002). The study determined that over 60% of those surveyed mentioned cars as their main mode of transport to work, while a mere 5% availed of a public bus for the same purpose. This current study takes a step further to ascertain the reasons behind the reluctance to use public transport. Surprisingly, the quality of public bus services (or the lack of it) is not the main reason for non-use, rather it is freedom, comfort, privacy, and time-saving qualities offered by private vehicle mobility that are cited as the driving factor behind the pattern. Owning private vehicles likewise offered better accessibility and consequently contributed significantly to one's quality of life.

This finding is significant considering that crime rates, especially property vandalism, are higher in areas where the residents own more than two cars. On-street parking, result of a lack of space inside a gated compound, has become a target for vehicle burglary and break-ins. However, although security and safety are compromised and are low in satisfaction level, these do not deter the residents from owning private vehicles.

By and large, those who do not own private vehicles are generally found to have lower satisfaction in QoL compared to those who own a private vehicle. Non-ownership of a private vehicle implies limited mobility and restricted freedom. This is widely believed to hinder the achievement of a better quality of life. This is especially true in terms of access to public facilities and social activities. Increased social interaction is observed to be positively related to vehicle ownership and access to high-income jobs. In other words, vehicle ownership contributes to one's quality of life as it increases social interaction opportunities, economic advancement, and job satisfaction.

The observation that quality of life is closely linked to vehicle ownership is understandable, given the ways houses are structured in a housing development. Little consideration was accorded to public transport as a main mode of mobility when these housing schemes were designed. Given the lack of pedestrian walkways, friendly bus stops, and lay-bys, the design itself indirectly suggests private vehicles as an option for mobility. Unlike a number of developed countries, Malaysia has still a long way to go in reducing the level of private car ownership.

This leaves policy makers with two options: to educate the general public in order to increase public transport usage because it is more environmentally friendly, cost-effective, and accessible to public facilities and to reverse the notion that car ownership means a better quality of life; and to mitigate the impact of air pollution on the environment by introducing friendlier vehicles such as electric and solar-powered ones. Evidently, the latter option will not deter private ownership

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