



Hong Kong's low car dependence: lessons and prospects

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Abstract

Reducing car dependency, and hence traffic, have become key transport objectives of many cities and countries. Despite relatively high levels of wealth, Hong Kong has never become a car-dependent location. Using results of a survey of 340 young Hong Kong people and five focus group discussions, this paper argues that there are lessons to be learned from Hong Kong, and that transport policies, rather than population density, are mainly responsible for the low levels of car ownership and use. It also shows, however, that without even stricter policies, car ownership and use could increase substantially in the future.

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1. Introduction

Reducing car dependence and thereby congestion and pollution, has become one of the key transport objectives of many developed cities and countries. The Hong Kong Special Administrative Region¹ (as it is now known) is in the envious position of never having become one of the many car-dependent locations, despite relatively high levels of wealth. This paper argues that there are lessons to be learned from the Hong Kong situation, and that it is transport policies that are responsible for the low car-dependency levels. This central argument is supported by two pieces of empirical research carried out by the author as part of a wider project to more fully understand the travel behaviour of Hong Kong residents. The first is a series of five focus group discussions with members of Hong Kong's travelling public aimed at seeking to understand people's attitudes towards cars, driving and public transport. Participants covered all age bands and all major geographical areas. These discussions were carried out during the period January–June 2001 in Cantonese and subsequently translated into English by trained researchers. The discussions were tape-recorded. They provided a source of rich, qualitative data and helped to inform the content of the subsequent questionnaire.

The second is a self-completion questionnaire survey of 340 young people (between the ages of 18 and 24 inclusive) randomly chosen at locations throughout Hong Kong (i.e. including the New Territories). The aim of this survey was to reveal quantitatively the attitudes of young people to cars and public transport. Young people are the potential car owners and users of the future. Determining their attitudes should tell us something about likely future levels of car ownership and use. The survey was carried out in May 2001 and was conducted in Cantonese.

2. Car ownership and use in Hong Kong

Since the hand-over in July 1997, Hong Kong, which was previously a British crown colony, is now a Special Administrative Region of the People's Republic of China. Despite this change, there are tight borders between Hong Kong and Mainland China restricting the flow of car traffic. Residents are not permitted to drive into Mainland China without a special permit and vice versa. Driving for the majority of people is thus restricted to intra-Hong Kong trips. The government owns practically all the land in Hong Kong and therefore, dictates to a large extent, the location of geographical development.

Car ownership in Hong Kong is very low at only 48 cars/1000 population compared to, for instance, 377 in the UK, 325 in Japan and 485 in the US (HK Transport Bureau, 2001). GDP per person, however, at

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¹ Henceforth referred to simply as Hong Kong.

Table 1
Comparison of car use in selected cities

| Cities | Car use/capita (km) | GRP/capita (\$US 1990) |
|---------------|---------------------|------------------------|
| Perth | 7203 | 17,697 |
| Sydney | 5885 | 21,520 |
| Los Angeles | 11,587 | 24,894 |
| San Francisco | 11,933 | 31,143 |
| London | 3892 | 22,215 |
| Frankfurt | 5893 | 35,126 |
| Singapore | 1864 | 12,929 |
| Tokyo | 2103 | 36,953 |
| Hong Kong | 493 | 14,101 |
| Kuala Lumpur | 4023 | 4066 |
| Bangkok | 2664 | 3826 |
| Seoul | 1483 | 5942 |

Source: Newman and Kenworthy (2000).

HKD179,803 (\$US23,000) in 2000 is very similar to that of the UK. Hau (2001) shows that Hong Kong is placed 15th in the 30 wealthiest countries in the world, yet in terms of car ownership per head, it has only a sixth of the average of these 30 countries. In terms of car use, Hong Kong's figures are also very low (see Table 1). This seems to contradict the established view that car ownership and national income are highly correlated (see for instance, Dargay and Gately, 1999).

Amongst the young people responding to the survey outlined in the introduction, car ownership was very low. Fewer than 4% of the respondents owned a car themselves, although in 25% of the cases at least one member of the family owned a car. Reasons for not having a car are discussed below.

Of the respondents, 15% already possessed a driving licence and a further 3% were learning to drive. The fact that the number of respondents with driving licences exceeded the number owning cars may denote a latent demand for car ownership. The focus group discussions, however, seemed to suggest that obtaining a licence was just something to do at this stage of life and was not necessarily linked to the desire to own a car. It was perceived to be a practical skill to put on a CV.

3. The population density argument for low car dependency

There is a great deal of literature on the link between car ownership, public transport use and urban density. It is generally agreed that car ownership is negatively related to urban density (see for instance, Ingram and Liu, 1997). The literature dates back to 1962 when Tanner commented on it in forecasting traffic growth (Tanner, 1962) and subsequently was taken up in the Buchanan Report (Buchanan, 1963) and criticisms of the latter by Beesley and Kain (1964). Indeed, in some of the early forecasts of car ownership, family income and

population density were the only two variables taken into account. More recently, the debate has centred around the concepts of "New Urbanism" and the "compact city" (see Titheridge et al., 2000). These concepts relate to the particular form that urban areas should take in order to reduce car dependence or, as Cervero and Kockelman (1997) put it, to "degenerate" vehicle trips and encourage a modal switch to public transport and non-motorised modes. Research is being carried out around the world (on both a micro- and macro-level), to find the optimum use of land to discourage car use. For a review of this literature, see Handy (1996).

The principal traditional reason given for Hong Kong's relatively low levels of car ownership and use is related to density of population. There is a perennial problem in making international comparisons of urban density of ensuring like-with-like in terms of the precise geographical area under consideration. Newman and Kenworthy (2000) calculated that the density of urban Hong Kong is about 10 times that of most European cities and 30 times that of the US cities. Runnacles et al. (1998, p. 95) suggests that "Hong Kong is probably the second most densely developed major city anywhere, the dubious accolade for first place being held by Shanghai". The population density figures for Hong Kong are shown in Table 2 (locations are shown in Figs. 1 and 2).

To provide some basis for comparison, according to Ng and Hills (2000), in 2000, the density of Hong Kong was 6096 persons/km² compared to 744 in the New-York/New Jersey metropolis, 678 in Greater South East UK (i.e. London) and 1071 in Tokyo National Capital Region. By international standards, therefore, densities are thus very high on Hong Kong Island and extremely high in Kowloon. As can be seen, the density figures are increasing everywhere in Hong Kong, but are increasing particularly quickly in the New Territories and Islands. As discussed below, the New Territories are the location of the new towns, which are still being added to today.

The increasing densities are a result of the growing population (which has increased by 10.4% from 1995 to 2000, to stand at 6,796,700 in 2000). Although the average household size has decreased over this time (the number of households has increased by 17.1%), this has

Table 2
Population density in Hong Kong—persons per km²

| | 1995 | 2000 | % change 1995–2000 |
|--------------------------------|--------|--------|-----------------------|
| Hong Kong Island | 16,490 | 17,200 | 4.3 |
| Kowloon | 42,220 | 44,210 | 4.7 |
| New Territories and Islands | 2990 | 3520 | 17.7 |
| Total | 5710 | 6310 | 10.5 |

Source: HK Census and Statistics Department, 2001.

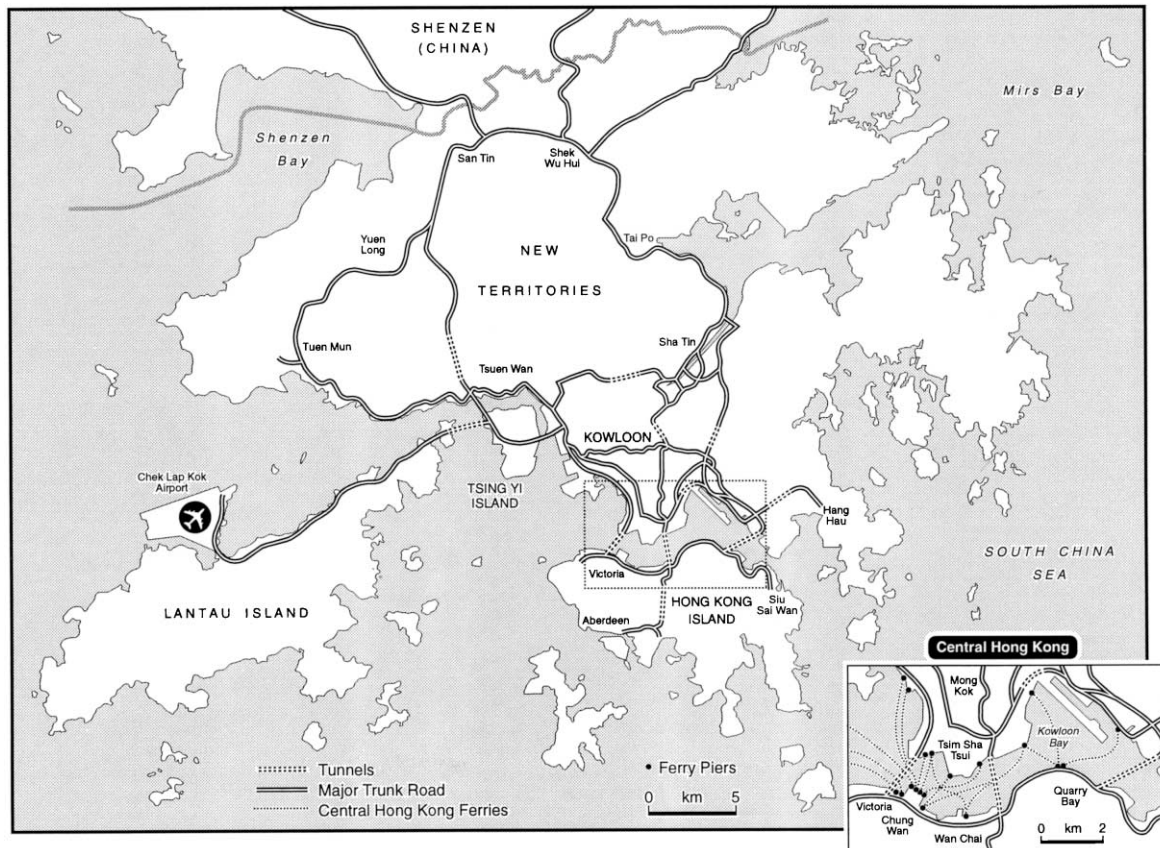


Fig. 1. Hong Kong's roads.

not been sufficient to decrease the population density figures. This can be explained by the fact that households have not moved out into the lower density suburbs as has been the case in most western countries. In Hong Kong, because of the high price of land, residential development has taken the form of ever taller skyscrapers; the location of which depends on the land made available for development by the government. Indeed, many of the traditional low-level Chinese-style village houses have been demolished to make way for new high-rise residential blocks. Thus, although there has been a great deal of *decentralisation* of residential areas, the form of decentralisation taken in HK has not so much been suburbanisation, as a shifting of the population to almost equally dense, new towns where most people live in high-rise blocks.

Initially it was considered that these new towns would be fairly self-contained, with both employment and facilities available locally. However, their construction coincided with the introduction of China's Open door policy in 1978, which had the effect of transferring most of HK's manufacturing business to the Chinese mainland (Cook, 1997). Manufacturing jobs decreased from 965,000 in 1986 to 229,000 in 2000 (HK Census and Statistics Department, 2001). Simultaneous with this, transport links to the central district

improved, particularly by rail, since most of the new towns were built close to the existing railway line. The service sector developed mostly in Hong Kong centre and people living in the new towns commute to the centre.

Table 3 shows that the proportion of residents who work within the same area as they live has decreased in nearly every area between 1981 and 1996, as has the proportion of jobs filled by residents living locally in the area. Kowloon has seen the largest changes. Shatin/Ma On Shan and Tuen Mun have bucked the trend on both accounts as they have become regional employment centres.

Approximately 800,000 cross-harbour journeys per day are made by the Mass Transit Railway (MTR) from Kowloon to Hong Kong Island (the location of the CBD) (Fig. 1). Additionally, in 1999, 118,000 vehicle trips per day are made via the cross-harbour tunnel, including 11,000 trips by bus (minibus and others). A further 90,000 vehicle trips per day are made via the East Harbour tunnel and the West Harbour tunnel (Fig. 2). Much of the commuting is done by public transport, with 'only' 78,000 private car and taxi trips per day being made on the cross-harbour tunnel and a further 74,000 using the other two tunnels (HK Transport Department, 2001).

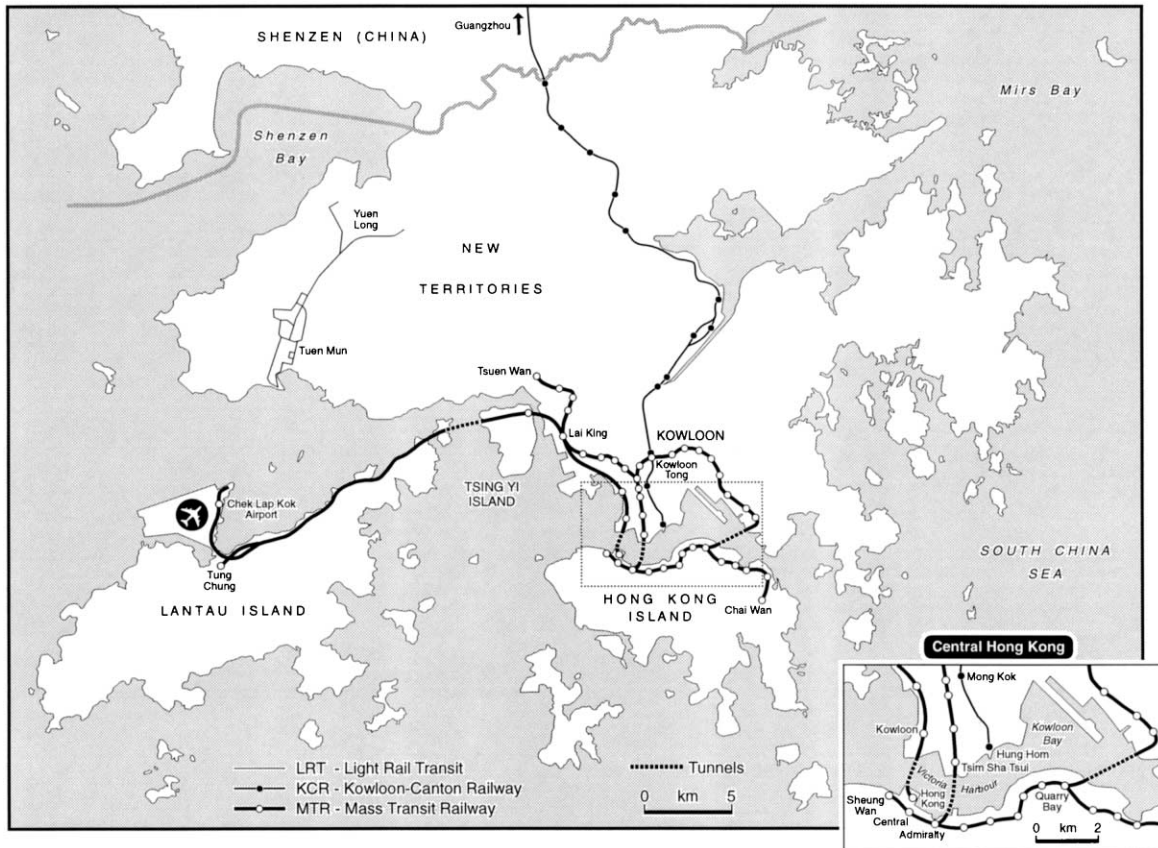


Fig. 2. Hong Kong's railways.

Table 3
Employment and residence in Hong Kong

| District | Proportion of residents who work within area | | Proportion of jobs filled by local residents | |
|------------------------|--|------|--|------|
| | 1981 | 1996 | 1981 | 1996 |
| Hong Kong Island | 81 | 75 | 69 | 58 |
| Kowloon | 75 | 59 | 80 | 55 |
| TsuenWan/Kwai Tsing | 59 | 43 | 57 | 47 |
| Tuen Mun | 48 | 28 | 44 | 64 |
| Yuen Long/Tin Shui Wai | 51 | 28 | 48 | 47 |
| Sheung Shui/Fanling | 58 | 22 | 64 | 45 |
| Tai Po | 43 | 25 | 46 | 47 |
| Shatin/MaOn Shan | 24 | 27 | 33 | 49 |

Source: Census 1981 and 1996 (Cook, 1998).

Given the very high densities that exist in Hong Kong, it seems logical to argue that it is this fact that explains why car ownership and use are so low. However, although the density argument is both plausible and convenient, it is not sufficient in itself to explain the observed phenomenon. As Newman and Kenworthy (2000, p. 111) state “The wealthy and densely settled Asian cities of Singapore, Hong Kong and Tokyo have very low automobile dependence, whilst the equally dense developing cities of Bangkok, Jakarta and so on,

are showing a new kind of automobile orientation. They are much more car using and congested than would be anticipated, with slightly higher car use levels than the wealthy Asian cities, but much lower wealth levels”. It has already been shown that density of population in Hong Kong increased by around 10% in the period 1995–2000, yet car ownership and use increased over this time. This is further evidence that undermines the established view that there is a negative correlation between density and car ownership in Hong Kong.

4. Other explanations for Hong Kong's low levels of car ownership and use

It has been suggested above that although the density argument is important, it cannot alone explain Hong Kong's low levels of car ownership and use. So what can? There may be several different explanations, some of them related strongly to policy:

1. the cost of private transport,
2. the price and availability of public transport,
3. the possibility that, with the prevalence of rail transit in HK, speeds (particularly in the morning peak) could be faster by public transport than private transport (Newman and Kenworthy, 2000),
4. the rail based transport strategy,
5. the high cost of roadbuilding,
6. the limited possibilities for driving,
7. low disposable incomes because of the high cost of housing,
8. the lack of a car industry in Hong Kong.

4.1. The cost of private transport

The private costs of motoring in Hong Kong are high. Motoring costs include both fixed costs (purchase price, licence fees, insurance, depreciation) and running costs (fuel, maintenance, tunnel fees and parking costs (which are a combination of fixed and running costs)).

4.1.1. Purchase price

The initial car purchase price in Hong Kong is not high relative to elsewhere in the world. However, for a new car, a First Registration Tax (FRT) of between 40% and 60% of the taxable value of the car must be paid (the tax is a progressive tax, becoming higher as the price of the car increases). This makes cars (particularly large ones) very expensive. To encourage the use of more environmentally friendly vehicles, there is some rebate (HKD30,000 or 20% of the tax payable, whichever is the greatest) of this FRT if the purchaser is scrapping a car older than 10 years. Hau (2001) illustrates the relationship between demand for cars and the FRT over the last 30 years.

4.1.2. Licence fees

Annual licence fees in Hong Kong Dollars (HKD)² are also high, as is shown in Table 4.

According to Gutmann and Frey (2000), automobile prices (including sales and road taxes) and maintenance costs are considerably higher in Hong Kong than in many major cities (Table 5).

Table 4
Annual licence fee (private car)

| Cylinder capacity | Petrol car | Diesel car |
|------------------------------------|------------|------------|
| Not exceeding 1500 cc | 4314 | 5919 |
| >1500 cc but not exceeding 2500 cc | 6346 | 7969 |
| >2500 cc but not exceeding 3500 cc | 8419 | 10,024 |
| >3500 cc but not exceeding 4500 cc | 10,474 | 12,079 |
| >4500 cc | 12,454 | 14,059 |

Source: HK Transport Department (1999).

Table 5
Automobile prices and maintenance costs in selected cities (US\$)

| Country | Price |
|-----------|--------|
| Hong Kong | 30,696 |
| New York | 20,720 |
| London | 21,159 |
| Paris | 18,765 |
| Sydney | 15,227 |
| Japan | 20,709 |
| Singapore | 67,014 |

Source: Gutmann and Frey (2000).

Note: figures refer to purchase price of a popular four-door standard model car. Maintenance costs includes average labour costs (not including price of spare parts) for a 15,000 km service.

4.1.3. Fuel

The price of petrol is high (currently around HKD11 per litre) relative to international standards, with around 60% of the price being fuel duty. In the case of diesel, it is currently around HKD7.00 per litre (with around 30% being fuel duty) (HK Transport Department, 2001). At present, to encourage its use, there is no fuel duty on LPG. Hence, it is by far the cheapest fuel at HKD4.00 per litre. All new taxis in Hong Kong must run on LPG from 2001.

A study by Kenworthy et al. (1997) showed that in 1990, Hong Kong had one of the highest fuel costs in the world. The Hong Kong Consumer Council (1999) supported this finding.

4.1.4. Parking

For the 350,000 cars and taxis in Hong Kong, there are 1600 on-street parking spaces and 7300 parking spaces in 13 government owned multi-storey car parks. There are an additional 163,000 spaces for public use and 369,000 designated parking spaces for private use in commercial, residential and industrial premises (HK Transport Department, 2001). Thus, there are only sufficient spaces for half of the cars in public places. Pressure for parking spaces in the CBD is intense, and on weekends and public holidays, it is intense practically everywhere. If car ownership increases, this will put pressure on the government to provide more parking spaces, using up more valuable land.

Apart from the difficulty of finding parking spaces, parking is also expensive (approximately HKD30–HKD100 per hour in many central locations). Renting a

² The HKD is pegged to the \$US at US \$1 = HKD7.7.

private parking space in a residential block is also expensive and the number of spaces are limited, with many residential blocks holding lotteries to allocate spaces.

4.1.5. Tunnel and bridge tolls

Tunnel and bridge tolls add to the cost of many journeys. In HK there are 11 tunnels; nine of them (including the three cross-harbour tunnels connecting Kowloon with the Island) are toll charging. A trip from the New Territories to Kowloon will almost inevitably involve passing through at least one tunnel (Fig. 1). A trip from the Northern parts of Hong Kong to the Island can involve passing through three tunnels in each direction. Tunnel tolls vary from HKD5 to HKD35 per car. Additionally, the Lantau Link bridge built as part of the new airport transport infrastructure has a toll of HKD30 per car (payable only in one direction) (HK Transport Department, 2001).

Many of the costs of car ownership and use were increased substantially in the mid 1990s and this had some impact on car usage. Over the longer run, however, their impact has diminished and car ownership and usage is increasing again.

4.1.6. Focus group discussion points

The young focus group participants identified the cost of motoring as being the biggest deterrent to owning a car. One young female participant stated “I can’t afford to own a car. Owning a car is very expensive. Insurance, petrol costs and other things, all these costs cover more than half of my salary”. Another participant said “I don’t have a driving licence or a car. In Hong Kong it’s very expensive to buy and maintain a car. The car itself costs a lot, the parking lot costs a lot too. I have thought of learning to drive and buying a car, but not at this stage”. Two young participants (referred to as W and A) in another focus group stated the following: W: “Parking is very expensive. To rent a car space for one month is about HKD3000. Rather than paying this parking fee, why don’t I go by taxi? HKD3000 parking fee divided by 30 days, I could use HKD100 per day to travel by taxi”. A: “If I rented a car space for HKD3000 a month, it’d be more economical to sleep in the car every night!”

4.2. Price and availability of public transport

4.2.1. Description of Hong Kong’s public transport

The public transport system consists of a mixture of rail and road based transport. The rail based transport consists of an underground or MTR (74 km), a heavy rail line (known as the KCR) linking Kowloon with China (approximately 34 km), a light rail transit system in the west of the New Territories (32 km) and a tram system on the North side of Hong Kong Island (16 km) (Fig. 2). Until October 2000, the MTR and the KCR

were wholly owned by the Hong Kong government. In October 2000, 20% of the MTR was privatised.

Turning to the buses, there are five privately owned franchised bus companies (Kowloon Motor Bus Company Ltd., New World First Bus Ltd., Citybus Ltd., Long Win Bus Company Ltd and New Lantau Bus Company Ltd). The largest of these is the KMB with 4031 buses in July 1999, four times larger than its nearest rival, Citybus Ltd., with 954 and New World First Bus with 719 buses (HK Transport Bureau, 2001). There are a total of 573 bus routes. Many routes are non-exclusive except for the New Lantau Bus Company which is confined to the largest island, Lantau.

There is also a system of minibuses (or public light buses) with not more than 16 seats. Minibuses are red and green, with the green ones having exclusive rights on a fixed route determined by the Transport Department. Fares are fixed and are generally a little higher than the franchised buses. Red minibuses are free to operate anywhere except where special prohibitions apply, without control over routes or fares. The green minibuses run scheduled services and the red ones operate non-scheduled services. The number of minibuses is fixed at a maximum of 4350 vehicles. In 1999, there were 2305 green minibuses and 2045 red minibuses (HK Transport Bureau, 2001). Both are privately owned and non-franchised.

Ferry services are run by two companies. The four cross-harbour routes, run using 13 vessels, are operated by the Star Ferry Company Ltd. Two of the routes are franchised and the other two are licensed. The 11 routes to the main outlying islands are franchised and are now run mainly by New World First Ferry Ltd. (Fig. 1).

Finally, there is an escalator and walkway system between areas known as central and mid-levels. This is a system of 20 reversible one way escalators and three travelators plus covered walkways. This system is used by about 34,000 people daily.

The breakdown of journeys by public transport mode is illustrated in Table 6.

Table 6
Average daily passenger journeys by public transport mode, 1999

| Mode | Journeys (000's) | Percent |
|--------------------|------------------|---------|
| Underground (MTRC) | 2135 | 20.1 |
| Heavy rail | 757 | 7.1 |
| Light rail | 314 | 3.0 |
| Tram | 241 | 2.3 |
| Railways subtotal | 3447 | 32.5 |
| Franchised buses | 3960 | 37.3 |
| Minibuses | 1570 | 14.8 |
| Buses subtotal | 5530 | 52.1 |
| Ferries | 158 | 1.5 |
| Taxis | 1310 | 12.3 |
| Other | 180 | 1.7 |
| Total | 10,625 | 100 |

Source: HK Transport Bureau (2001).

Thus, buses are the most frequently used mode of transport, accounting for 52% of the public transport market, with rail accounting for a further 33% of journeys.

4.2.2. *Public transport service levels*

Public transport frequencies in Hong Kong are generally very high, contributing to a “turn up and go” mentality. Apart from overcrowding at peak times, all public transport is also very comfortable. The franchising of the bus and ferry services has led to an upgrading of the vehicles, so that most are now very modern. In addition, partly because of the frequency of the services, integration between modes, operators and vehicles is fairly easy. This is aided considerably by the existence of the plastic, contactless electronic smart card, the ‘Octopus’, which can be used on much of the public transport (all MTR services, all KCR services, all the main ferry services and around 70% of the bus services).

4.2.3. *Public transport fares*

Public transport fares are generally low, despite the fact that public transport operators receive no subsidies and are profitable. MTR fares range from HKD4 to HKD26. KCR fares range from HKD3.5 to HKD9 for local journeys and HKD33 to the border with China. Buses in general charge between around HKD2.4–HKD11 for urban trips and up to HKD34 for trips to the furthestmost points of the New Territories. According to Gutmann and Frey (2000), the cost of a 10 km public transport trip in Hong Kong is the same as in New York or Sydney, cheaper than in London or Tokyo but more expensive than Paris or Singapore.

4.2.4. *Survey responses*

Public transport in Hong Kong is generally perceived very favourably. In the survey of young people, only 24% of respondents disagreed with the statement “public transport is so good I do not need a car”. Fifteen percent strongly agreed. Asked to give a score out of 10 for overall satisfaction with each of the main modes of transport, the MTR scored 7.6, the KCR scored 6.9, franchised buses scored 6.5 and minibuses scored 6.4. These are pretty good scores.

Participants in the focus group discussions also identified good public transport as being a key reason for not needing a car. One young respondent says “It is convenient to go to work by public transport ... I can sleep on the entire journey. When you live far away from the place you work, we get up earlier than people living in urban areas. If I travel by bus, I can sleep, read newspapers and listen to music ... very happy”. Another respondent says “I don’t have a driving licence or a car. Nowadays most residential estates are built along major roads or railways. It’s unnecessary to buy a car.

And there are many types of public transport to be chosen”.

4.3. *Traffic speed*

Ingram and Liu (1999, p. 328) suggest that the underlying economic reason why car ownership increases with income is to do with the value of time. “Income growth raises the value of time, shifting demand from slower, cheaper modes of transportation to faster, costlier modes, such as the automobile”. Speed is an important determinant of mode choice. Newman and Kenworthy (2000) show that in wealthy Asian cities, public transport is faster than private transport, with public transport speeds around 31 km/h compared to car speeds of 27 km/h. Car speeds in the morning peak in HK in 1999 were 20.5 km/h on Hong Kong Island, 27.8 km/h in Kowloon and 44.6 km/h in the New Territories (HK Transport Department, 2001). Rail-based public transport would almost certainly be faster than this. However, where a car is faster than public transport in Hong Kong is in radial intra-New Territories trips, where public transport is not so good (and is invariably bus based).

One young participant in the focus group discussions stated “At present having a car is not very important. Maybe, in the past, travelling by private car is faster than travelling by bus. But there are many different transport modes nowadays”.

4.4. *Rail-based transport strategy*

As highlighted above, the backbone of Hong Kong’s public transport system is its rail based modes. With the expansion of both the MTR and the KCR in hand, the third comprehensive transport study (CTS3) (HK Transport Department, 1999) forecast that rail will become the dominant mode in Hong Kong by 2016. A massive rail expansion plan is currently underway. Six new railway lines are planned between 2002 and 2005, expanding the railway by 40% (HK Transport Department, 1999).

Following the railway expansion, 70% of the population and 80% of employment opportunities will lie within 1 km of a railway station (HK Transport Department, 1999). Stead (1999) studied the effects of land use on car ownership and found that proximity to a railway station and frequency of the bus service were two of the most important factors. Kenworthy and Laube (1999) in their study of transport in 46 cities across the world, came to the conclusion that cities with a higher level of rail services within their transport systems generally have higher use of public transport and lower car dependence. The likely reason for this is that non-rail based public transport suffers the same congestion problems as cars and have become less reliable in

the past few decades causing patronage to decrease and a modal switch to cars to occur.

4.5. The high cost of road building

Ingram and Liu (1999) state that urban growth should increase the demand for urban roads and that as congestion increases, and with increasing per capita incomes increasing the value of time, the cost of road building diminishes in relation to the cost of vehicles. Despite the low vehicle ownership in Hong Kong, it has one of the most densely used road networks in the world as is shown in Table 7.

Thus, Hong Kong has four times as many vehicles per km of road than the UK (a country which is often assumed to have a very high vehicle density) and 8.5 times as many as the USA. The reason why Hong Kong has such a high vehicle density is that land is in very short supply and the cost of land is very high. When a new road is built, it often requires the land to be reclaimed first, adding tremendously to the costs. In the last decade, around 1280 ha of land have been added to the central harbour area of Hong Kong. Included in this is 450 ha in West Kowloon and Central/Wanchai which were needed to support the new airport links to the Central district. Of these 450 ha, half have been used for roadbuilding (Planning, Environment and Lands Branch, 1995, in Cook, 1998).

Between 1995 and 2000, the length of public roads increased by 10.9% whilst the number of cars increased by 16.4% and the number of goods vehicles increased by 10.9%. There has also been a widening of some roads, particularly in the New Territories, which partly explains why morning peak speeds have not changed on the Island or in Kowloon and have actually increased substantially (24%) in the two years 1997–1999.

The high cost and time taken to build new roads as well as the costs of congestion are great incentives for the government to seek to maintain levels of car ownership and use at low levels. Congestion imposes considerable costs on both passenger and freight transport. The largest container port in the world (in terms of

throughput) is located within the city boundaries and the majority of the containers handled by the port are transported (both inwards and outwards) by goods vehicles. Congestion, therefore, is a major threat to the economy. It would be far cheaper to invest more in improving public transport and persuading people to use it, rather than to build more roads or suffer the consequences of increasing congestion.

4.6. The limited possibilities for driving

The pressure for car ownership to increase in HK may be tempered by the fact that there is really nowhere to drive. Hong Kong itself is very small and (in good traffic conditions) it only takes around an hour to drive between the furthest points. At present it is not possible to drive through to Mainland China (the only land link) without a special permit. If the borders between the Mainland and HK open up, then pressure for car ownership and use to increase will be inevitable.

4.7. Low disposable incomes because of the high cost of housing

It could be argued that despite relatively high GDP levels per capita, because housing is so expensive (housing accounts for 28.83% of the weighting in the Consumer Price Index compared to 7.77% for transport (HK Information Services Department, 2001)), many people find it difficult to afford a car. According to Ng and Hills (2000), using a cost of living index where New York = 100, Hong Kong's cost of living (153) is lower than Tokyo (166), just higher than Shanghai (140) and substantially higher than Singapore (106) and London (112). On the other hand, income taxes are substantially lower in Hong Kong. The percentage of gross wages accounted for by taxes and social security contributions is 7% in Hong Kong compared to 23% in London, 19% in Tokyo, 20% in Singapore and 22% in Shanghai (Ng and Hills, 2000). This compensates to some degree for the high costs.

4.8. The lack of a car industry

It might also be argued that Hong Kong does not have (and has never had) a car industry, so the government has not endured the dilemma of trying to control car ownership whilst simultaneously seeking to promote economic growth through its car manufacturing industry.

4.9. Discussion

The Hong Kong government has taken an active role in producing policies to discourage car ownership and use. These policies have included a package of integrated

Table 7
Road utilisation in Hong Kong

| Country | Length of public roads (km per 1000 population) | Vehicles per km of public road |
|-------------------|--|-----------------------------------|
| Hong Kong | 0.28 | 275 |
| UK | 6.68 | 70.2 |
| Japan | 9.14 | 44.9 |
| Singapore | 1.0 | 220 |
| Taiwan | 0.93 | 260.2 |
| USA | 23.82 | 32.6 |
| Mainland China | 1.0 | 31 |

Source: HK Transport Bureau, 2001 (1997 figures).

and balanced measures to encourage the provision of excellent public transport and simultaneous disincentives to car ownership and use. The success of public transport is aided by the density of population, but does not result directly from it. Public transport is comprehensive, frequent, integrated, of high quality and is fairly cheap, with the result that car ownership is not an inevitable desire or expectation.

5. Pressures

Car ownership has increased by 13.3% between 1996 and 2000 (nearly double the increase in GDP/person). Official government forecasts (HK Transport Department, 1999) are that, assuming sufficient roads are built to accommodate additional traffic, car ownership will increase by between 29% and 208% by 2016, although the forecasts are that between 85% and 90% of trips will be made by public transport. Although there may not be a direct relationship between increasing car ownership and use, it is clear that car use will increase if the forecasts of ownership are correct.

In the survey outlined in the introduction, respondents were asked to say which of four statements best describes their situation. Responses are shown in Table 8. The results of this table are at the same time comforting and dangerous. On the comforting side, 24% of respondents stated that they had no intention of buying a car in the next 10 years. A further 41% replied that buying a car was not a priority. However, 27% said that they would buy one when they can afford one and 8%

said they would buy one only parking is too difficult/expensive. Thus, 76% signalled at least some intention of buying a car. When further asked about the likelihood of them buying a car in the next five years, 10% answered very likely, 35% quite likely, 35% not very likely and 19% not at all likely. An analysis of differences in intention to buy a car between gender showed that young men were significantly more likely to want to buy a car than young women.

In order to understand more about young people's attitudes to cars and traffic matters in general, respondents were asked to state their level of agreement with a number of statements on a five-point Likert type scale (Grimm and Wozniak, 1990) from 5 = strongly agree to 1 = strongly disagree. The results are shown in Table 9.

The results of this table show another worrying finding; notably that 39% of respondents would be much happier if they had a car. The level of agreement with this statement is another indication of the pressure for car ownership to increase. On a more positive note, nearly 40% agreed that public transport was so good they did not need a car. Just over 50% of respondents disagreed that people suffer without a car.

6. Conclusions

Despite Hong Kong's unusual position as a bordered municipality, there are both lessons to be learned for other cities in the world and consequences to arise from the results of the argument and empirical results presented in this paper. It has been argued that although density is undeniably important in determining the level of car dependency, density alone is not sufficient to explain the low levels of car ownership and use in Hong Kong. Strict controls on parking and the high costs of motoring together with the prevalence of convenient and cheap public transport are policies which have been purposely implemented by the Hong Kong government to suppress the demand for private transport.

Making comparisons across cities is fraught with difficulties (because of such issues as culture differences), but it appears that when comparing Hong Kong with other major cities around the world, car dependency

Table 8
Intention of buying a car

| Statement | Number | Percent |
|---|--------|---------|
| I intend to buy a car one day, but it is not a priority | 133 | 41 |
| I will buy a car as soon as I can afford one | 86 | 27 |
| I have no intention of buying a car in the next 10 years | 78 | 24 |
| I would buy a car now, but parking is difficult/expensive | 26 | 8 |

Table 9
Agreement with attitudinal statements % of respondents in each category

| Statement | Strongly agree | Slightly agree | Neutral | Slightly disagree | Strongly disagree |
|-----------|----------------|----------------|---------|-------------------|-------------------|
| 1 | 16 | 23 | 29 | 18 | 14 |
| 2 | 4 | 14 | 34 | 21 | 26 |
| 3 | 15 | 32 | 29 | 18 | 6 |
| 4 | 3 | 13 | 33 | 34 | 17 |

Statement 1: I would be much happier if I had a car.

Statement 2: People would think more of me if I had a car.

Statement 3: Public transport is so good I do not need a car.

Statement 4: People without cars suffer because modern life favours people with cars.

has, to date, been successfully controlled. Probably the closest comparison with Hong Kong is Singapore, where despite far higher car prices, electronic road pricing and a strictly enforced vehicle quota system, car ownership is still considerably higher than in Hong Kong. The focus on the provision of quality, affordable public transport in Hong Kong seems to have paid off.

Having said this, despite the current low levels of car ownership and use in Hong Kong, there appear to be substantial pressures for these levels to increase. Young people are keen to be car owners and over 70% of the respondents to the survey showed some intention of buying a car in the future. If intention is translated into action, without appropriate policies to further suppress car ownership and use, such levels will rival those of other developed countries, bringing with them all the attendant problems.

At present, policies are aided by the fact that Hong Kong is a small municipality with tight boundaries which constrain driving possibilities. Shenzhen special economic zone (with a population of around six million) lies just across the border in Mainland China and is developing both its industrial and residential bases at a phenomenal rate. Cuthbert (1998) noted that one possibility after the handover was that there would be 'considerable population movement' between Hong Kong and Shenzhen as skilled workers from Hong Kong were persuaded to work in Shenzhen. This now has become a reality. Currently most of the movement takes place by train and bus. However, if the border controls on car traffic between the two areas are relaxed, this could persuade people to drive rather than using public transport, creating additional pressure to own a car. Similarly, many former Hong Kong residents are moving permanently across the border to take advantage of cheaper housing whilst still working in Hong Kong (to take advantage of higher wages in Hong Kong). Again, if the borders are relaxed, they may start to drive to their workplaces in Hong Kong, creating additional traffic. Twenty-eight thousand people per day cross the border by public transport; if only a fraction of these switched to private transport, traffic in Hong Kong could increase considerably.

Consideration of policies which will have an appropriate dampening effect on car ownership and use is a difficult task. Hau (2001) showed that increasing the FRT substantially diminished car demand for around eight years until people became acclimatised to the higher prices. At present, with interest rates so low, financial penalties on car ownership would have to be huge to overcome the advantage of the low interest rates. The Government has looked into introducing electronic road pricing and concluded that it was not required because peak traffic speeds were not sufficiently low to warrant it. This may prove to be a regrettable decision. Other possibilities include reducing car parking

provision still further and encouraging corporate parking charges and/or reductions in car parking spaces. This has worked well in the US (Meyer, 1999). Alternatively, or perhaps simultaneously, switching road space from cars to public transport (through, for instance, more bus lanes) may improve the speed and reliability of buses and psychologically dissuade potential car owners from becoming so. Policies may need to be integrated with advertising campaigns extolling the environmental virtues of public transport using catchy slogans such as the one in San Diego which proclaims "You are the solution to transport pollution".

It has been shown by several authors (Goodwin et al., 1995; Dargay, 2001) that once a car has been acquired, its status soon changes from being a luxury to a necessity. With this change in status comes an unwillingness to part with the car. If the Hong Kong Government is serious about controlling pollution and congestion, therefore, car ownership must be suppressed now, before it is too late.

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