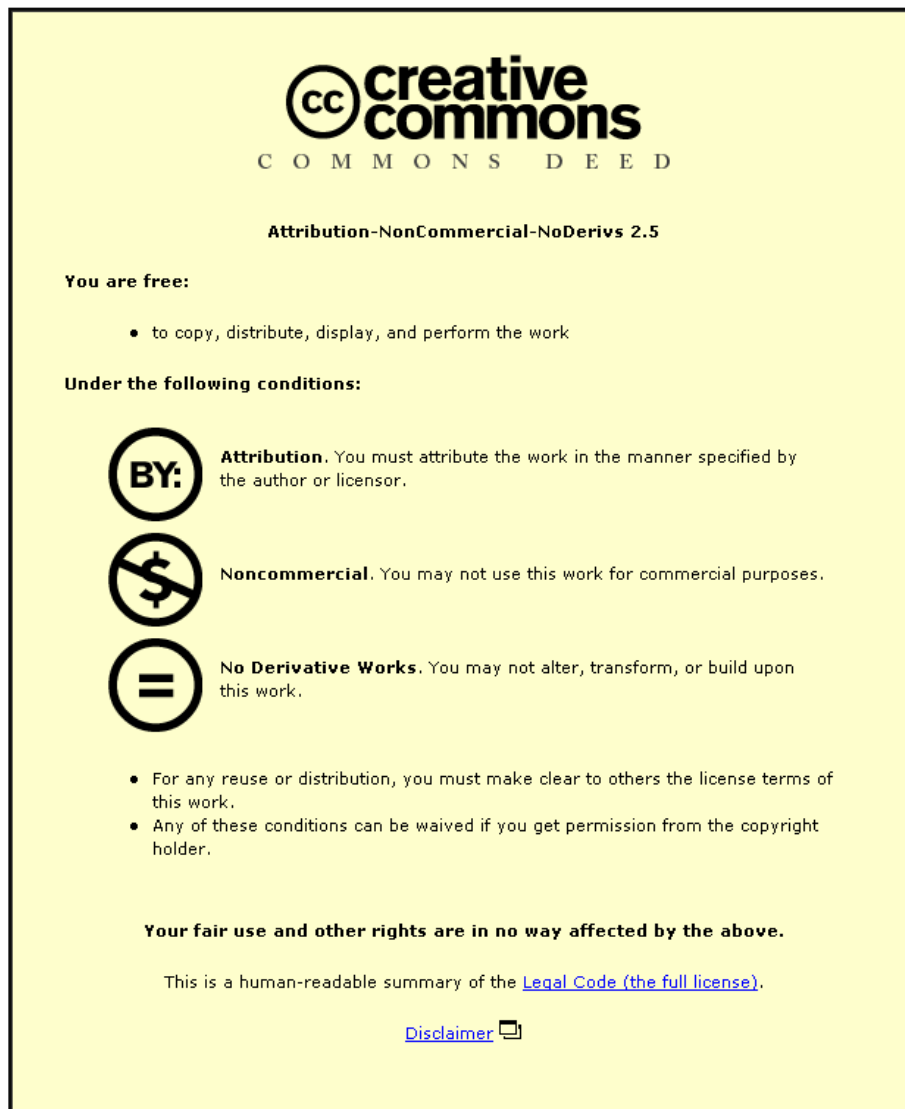


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Transport policy and organisation in Japan

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Abstract

In transport terms, Japan has an enviable reputation for effectively operating an incredibly complex road and rail system. However, relatively little is known about how this is done or about the issues that are facing policy makers and shapers there. The purpose of this paper then, is to investigate how land passenger transport is organised in Japan, and to begin to evaluate how effective this is. This is done by drawing on a literature review and on findings from a scoping study based on a series of semi-structured in-depth interviews with key practitioners. Overall, the findings suggest that national and local transport policy in Japan faces a number of key challenges across all modes in the land passenger transport system, in particular relating to the fragmented approach to policy development, implementation and operation and to the growing role of the car.

Keywords: Japan, case study, land passenger transport operation, national policy, regional development, local planning.

1. Aim, method and structure

In transport terms, Japan is widely perceived to effectively operate an incredibly complex transport system, with statements such as 'Japan has an efficient public transportation network... characterised by its punctuality, its superb service, and the large crowds of people using it' (Japan Guide, 2007), being typical. Yet despite this, the literature available in English to explain how the public transport, as well as the wider land passenger transport system, is organised or how it works in practice is limited and is becoming dated. The purpose of this paper then, is to establish key hypotheses as to how well the transport policy and organisation framework in Japan is performing.

Specifically, the paper examines a range of land passenger transport modes and reports the findings of a state-of-the-art review of the literature and on a scoping study. This consisted of a number of semi-structured in-depth interviews with transport and planning academics, consultants, and local and national policy makers conducted during August and September 2005 (see Appendix for interviewees). The interviewees were initially selected based on there having published work in the area in English and subsequently by recommendations from those interviewed early in the process, and were asked to offer their on the context, current organisation, current performance and future of transport practice and policy in Japan. The findings therefore, should be treated more as informed hypotheses for future testing than as *de facto* conclusions as to the current situation of transport in Japan. It should be noted that this paper is focused on the findings relating to the organisational structure of transport in Japan and that findings relating to the context and development of Japanese transport policy are to be published subsequently.

The paper is structured as follows: Section 2 provides a brief background, while section 3 details how the various sectors of the Japanese land passenger transport system are organised and how policy is applied in each case. Section 4 then draws this evidence together and presents conclusions in the form of future hypotheses that could be subsequently tested in a more detailed research exercise. Finally, it should be explained that evidence from the literature and in-depth interviews has been combined throughout the paper.

2. Background

Located to the south-east of China, Japan consists of four main islands - Hokkaido, Honshu, Shikoku and Kyushu. Japan has a population of 127 million, nearly half of whom live

within the three 'megacities' of Tokyo, Osaka and Nagoya which are linked together in an extreme concentration of population and economic power in a crescent along the Pacific Coast (MIAC, 2005b). This is partly because while only slightly smaller than France in area, less than a fifth of this is suitable for development and agriculture due to "great stretches of towering mountains and jumbled hills" (Reischauer, 1966). Economically, Japan has third-largest economy after the US and China and is the second most technologically powerful economy in the world after the US. Its Gross Domestic Product (GDP) grew from ¥JPY48 trillion (\$US 400 billion)¹ to ¥JPY500 trillion (\$US4.2 trillion) between 1955 and 2003 as the result of a booming economy (although it did suffer during the 1974 oil crisis and during a severe economic recession during the 1990s from which it is only now recovering) (MIAC, 2005a, 2005b; EIA, 2004).

Table 1 provides a brief snapshot of some contextual and transport characteristics in Japan compared with those in the USA and European Union.

Characteristics	Japan	USA	EU-25
Population (2004)	127.8 million	293.5 million	457.2 million
GDP (\$/capita, 2004)	32,540	43,780	28,990
Area of Country (km ² , 2004)	380,000	9,360,000	3,970,000
Population Density (people/km ² , 2004)	336	31	115
Population Growth Rate (% , 2003-2004)	0.1	0.9	0.8
Percent Urban Population (% , 2004)	66	81	80
Road network (1000 km all roads, 2003)	1,117	6,394	4,818
Road network (km/person, 2003)	0.087	0.218	0.105
Rail network (1000 km all roads, 2003)	23.7	207.2	199.7
Rail network (km/person, 2003)	0.019	0.007	0.004
Cars and light trucks (/1000 people, 2003)	413	759	468
Modal share private passenger (% , 2003)	61	87	77
Modal share bus and coach (% , 2003)	6	3	8
Modal share rail based systems (% , 2003)	27	1	7
Modal share domestic air (% , 2003)	6	10	8
Energy spent on transport (% of total)	27.5	39.5	30.4

Table 1: Key shaping and transport indicators for Japan, the USA and the European Union (Based on EC, 2006; MLIT, 2004a; MLIT 2004b; Ohta et al, 2004).

The authors also intend to publish further details on specific issues to do with contextual factors and their influence on transport policy in Japan sometime in the near future. However, a summary of these results is presented in Table 2.

Type of factors	Impact on transport
Geographic	Preponderance of mountains, rivers and forest concentrated development in valleys and on three main coastal plains, limiting early road building and facilitating rail development.
Demographic	Japan has a population of 127 million. However, this is ageing rapidly due to very low birth rate and is set to decline from 2007. Despite this, urban areas - particularly Tokyo, Osaka and Nagoya – continue to grow as people leave the rural areas.
Political	Politics long dominated by so-called 'iron triangle' of Liberal Democratic Party (in power for almost all of the last fifty years), Government Officials and Big Business. Has tended to favour large scale infrastructure projects. Some pressure now growing from tax payers and environmentalists to oppose such moves.
Economic	Economy in Japan grew very strongly from 1950s to late 1980s (with blips during 1970 oil crises). 1990s known as the 'lost decade' due to recession. Economy now growing again. Japan has strong technology industries and has the third largest economy in the world. Heavily reliant on external energy supplies.
Social and cultural	Traditionally, Japanese respect collectivism, consensus and hierarchy. But these are now becoming less important as car use rises (among other things). Japanese are also seen as being a 'Confucian' in outlook, and hence scores highest on 'secular rational' values (as opposed to 'traditional' values) and has mildly 'self expression' (as opposed to 'survivalist') values on a par with France and Italy. Therefore new schemes

¹ Based on the exchange rate of ¥JPY and \$US dated 20 November 2006. Visit www.xe.com.

	tend to be introduced very efficiently and effectively.
Historic	Tokugawa Shogunate from 1600-1868 cut off contact with outside world; restricted wheeled traffic to the Emperor; restricted bridge construction.
Institutional	Government power very concentrated at the national level. Functionally, policy seems fragmented and lacking in strategic vision.

Table 2: Contextual factors and their impact on transport development in Japan

3. Policy and organisation by sector

Historically in Japan Government power has been heavily concentrated at the national level, due in no small part to its historical and geographical legacy (see Table 2), and in this way is not unlike the UK. Specifically, national legislation always takes precedence over local legislation, while even quite detailed local policy and budget programmes must be approved by national Government (McCargo, 2004). For instance, Interview C notes that prior to deregulation, even decisions as to whether bus and rail services could be altered were taken through local offices of central government (although they typically consulted Tokyo) and McCargo (2004) reports the complaint of former Prime Minister Morihiro Hosokawa (1993-1994) that a prefectural governor needs permission from Tokyo even to move a bus stop! On top of this, although National Government has slightly devolved power recently it still controls the money (around 60% of local government revenues typically comes from the national Government), and still often appoints prefectural officers directly (Interview H). However, national Government is not strong enough to push through projects without local support – and so local councils therefore effectively have veto powers at least (Interview C).

In addition, Heidenhaimer et al. (1990) note that historically, like France and Sweden, Japan entered the modern era with strong carry-overs from the feudal institutions of the past, meaning it had a well-developed state bureaucratic apparatus that predated both large scale industrialisation and widespread commitment to democratic participation. Feldhoff (2002) suggests that from this a so-called “iron triangle” has developed out of the close interplay between the bureaucracy (Government Ministries), politics (the Liberal Democratic Party has been in power since 1955), and big business (transport, construction, and real estate companies).

In the transport sector, the Ministry of Land, Infrastructure and Transport (MLIT) is the key Government Agency at the national level in Japan. This was created on 6th January 2001 as part of a general reform which saw the number of ministries reduced from 23 to 13 (McCargo, 2004). MLIT was formed from the Ministry of Transport (responsible for surface, marine, and air transport) and the Ministry of Construction (principally concerned with planning and building roads and expressways) as well as the Hokkaido Development Agency and the National Land Agency, in a bid to generate productivity savings and a more consistent approach to policy formulation and delivery (Doi, 2000). However, critics argue that there are risks in such an approach. Specifically, while the merger was supposed to weaken the power of the bureaucracy and the centralism of the administration, it has actually concentrated state power because the new ministry controls 80% of the central government's entire budget for public works (or ¥JPY10 trillion or \$US83 billion in FY2000) (Feldhoff, 2002). A fundamental reform would, however, mean that Japan would have to abandon the ‘state of public works’ which in view of the ailing economy is unlikely because of the essentially unforeseeable negative results for the branches profiting from the current conditions. In practice, the financial savings were made (APTA, 2005), but from a policy view the results so far seem mixed in that while policy formulation has slowly become more integrated, the road and public transport elements effectively remain separate entities (Interview B). Interestingly, a merger occurred in the UK in 1997 for similar reasons (i.e. ‘joined-up policy making’), when the Department of Transport and the Department of the Environment became the Department for the Environment, Transport and the Regions. However, in 2001 the planning functions were removed from the renamed ‘Department of Transport, Local Government and the Regions’, and in 2002 yet more powers were taken as the ‘Department for Transport’ was re-tasked with focusing specifically on transport issues rather than with being side tracked on wider planning and local government functions.

In Japan, this issue of ‘functional’ decentralisation or fragmentation is seen as a problem. “In particular, the fact that it has never been clear which government office is in

charge of private automobile transportation is one cause for the delayed response to motorisation". Interviews C and H concur, and suggest that even after the MLIT merger there is still no real link between infrastructure and services although this is now slowly starting to change (see later), as does Interview J: "I don't think that National Government has ever issued an overall unconditional statement about how transport should be developed". Interview D too agrees, and notes that while this was fine when the economy was growing and everyone was benefiting from increased incomes and increased quality of life, it is not when increased quality of life objectives are not necessarily matched by increased incomes as is the case now. Lastly on fragmentation, Interview E bemoans "many separated departments and agencies, each with different objectives and no real strategic direction. In central government, the MLIT has the Environmentally Sustainable Transport Programme in place, but this has no support from other departments and so is not really going anywhere." Having said this, there is also a view that while there is "no policy on vehicle ownership or usage, there is a sort of nod to TDM and a realisation in the old MoC that road building cannot meet demand so TDM is needed as an alternative" (Interview J). And, it should not be forgotten that while policy making generally has not proved to be a success, the one exception to this has been in investment levels which have been high.

Also at the national level, the road traffic regulations remain under the jurisdiction of the National Police (Doi, 2000), and this was seen as a major barrier to progress (Interviews E, H and K). Interview J notes that "the Police are a barrier to all kinds of policy. For example, there are no large scale cycle lane or bus lane networks due to police reticence. And, while Japan probably has the most advanced hardware for traffic control anywhere it does not have the software to use it. Moreover, the Police prevent road safety researchers from having no access to police data so that there is no real scientific basis to policy formulation for instance with talking escalators, signalised crossings (where timings are designed to reduce conflicts etc)". Finally, Interview K points out that the Police control on-street parking (although since 2006 new regulations mean that local authorities can de-criminalise parking as in the UK), and that even in Tokyo where the Metropolitan Government pays a substantial proportion of the income of the police, local authority influence remains fairly weak.

At the regional level, there are eight administrative districts which, while not endowed with transport powers as such are responsible for setting regional development policy which are then implemented through five-year public works plans for each sector in line with economic planning programmes and within the land planning system (see Ohta, 1989 for further details). Below this, there are 47 Prefectures; three of which (Tokyo, Osaka and Kyoto) are cities and one (Hokkaido) is a region but with the same legal status. With the exception of Tokyo (which is formed of 23 Wards or *Ku* – not unlike the Borough level in London), the prefectures are then divided into Municipalities, which in turn are designated according to three categories: cities (*Shi*), towns (*Cho*) or villages (*Son*) (UNESCAP, 2005).

Both Prefectures and Municipalities have transport powers which vary from district to district in how they are shared out. Typically though, Prefectures exercise powers over intra-regional scale land use developments, roads and public transport systems, while the interests of Municipalities is at the more localised level. Here, Ohta (1989) points out that the physical expansion of urban areas beyond the administrative boundaries, has made the promotion of comprehensive transport planning at the urban level increasingly difficult, meaning that each urban area is now tending to respond through ad hoc adjustments. Interview H comments that while there is a road construction plan and a (weak) public transport plan (separated by mode) there are no transport plans at a local level and even in the largest cities the authority has very little influence over public transport. This tends to mean that local governments in smaller cities do not bother with public transport as they do not have any formal control. More positively, despite the strongly centralised framework, both Prefectures and Municipalities are able to collect a range of local taxes specifically to pay for road improvements for example (see later).

Roads

Historically Japanese roads were not well developed. Indeed until the Meiji Restoration in 1862 only the emperor was allowed to use a wheeled vehicle, while bridge building was also restricted by the Shogunate. Such regulations coupled with the mountainous terrain and

frequent river crossings and the fact that land was expensive made travel by foot, horseback and coastal shipping the only viable options. Meanwhile after 1862 it was the railways that began to dominate travel (see later) so that even by the early 1950s Japanese roads and highways among the poorest in the developed world and there was no impetus for road building. Interestingly, at this point the situation changed thanks to the adoption of the 'Fuel Tax' in 1954 and the motorway toll system have helped Japan improve its nationwide motorway network. Yet despite this, the quality of roads in Japan is still quite low compared with those in the West and as late as 1978 most roads were less than 3.5m wide – almost too narrow for road traffic.

Currently, Japan has 7,300km of motorways, 700km of urban motorways, 53,000km of national roads and one million kilometres of prefectural and local roads. In financing roads, there are three funding elements (Interview D):

1. General tax revenues (income tax levels very variable)
2. Earmarked fuel and vehicle weight taxes (not quite so variable)
3. Post Office savings (huge amount of money saved by people – four times annual budget level) used to invest in infrastructure (very stable so used to stabilise investment profiles).

Of these, the justification of the earmarked funds for highway improvement and toll road systems are that (Nakagawa and Matsunaka, 1997):

1. People who benefit from using the road pay the cost of using it
2. People who damage the road pay costs

Eight taxes are collected by central and local government and directed towards specific roads funds and are the main cause of a steady increase in road investment (see Table 2, later). In addition, toll roads are utilised for all expressways, some general roads, tunnels and bridges.

In building toll roads, most are financed by some form of debt (guaranteed government bonds, public enterprise bonds and private placement bonds) whereby Central Government grants subsidies to local governments and invests in the four roads-related public corporations. The local governments also invest in the public corporations and provide subsidies (Nakagawa and Matsunaka, 1997).

Toll rates are determined under three principles (Nakagawa and Matsunaka, 1997):

1. Reimbursement – all expenditures on the road including interest should be made by the continuous collection of a fee for a period of time;
2. Rational – a rational fee should be charged considering the balance of the burden capability of the users and the fares for other transport; and
3. Benefit equivalent – fees should be charged in a range which does not exceed benefits gained from using the road.

In terms of how this system performs, Interview E reports mixed feelings among road users. On the one hand he suggests that people accept vehicle charges/taxes in the main, but that there is a strong feeling amongst motorists that urban expressway tolls are too high (although he notes congestion continues to grow suggesting the opposite may in fact be true). However, the high cost of buying a car seems to push people to use it as much as possible as a way of getting value for money (Interview J), who continues that this is being steadily reinforced by the fact that very few taxes recently have given messages to motorists to use their cars more sensibly (with the exception of the hybrid subsidy programme). Instead, there was a recent decision to reduce weight tax for highest capacity cars which does not seem sensible when petrol mileage has been dropping due to an increase in average engine sizes. All in all there is a feeling that the future of the road tax regime is reaching a critical stage (Interviews D, G and H). This is because both local and expressway road construction has slowed (especially given the privatisation of the latter in October 2005 meaning that taxes will no longer be spent on building highways). Interview E also notes that road building is not fashionable any more because ordinary people do not think infrastructure is so necessary any more, roads especially. Indeed, existing infrastructure is often criticised as being useless or

over specified, especially in rural areas. In particular while the motorist lobby wants reductions in the road tax burden, environmentalists (whose power is growing) would like the money currently earmarked to be spent on other transport projects as well as roads.

For the road sector such a heavy user pays emphasis, whereby not only highway tolls but a significant proportion of acquisition, ownership and fuel taxes have been directly earmarked to road building and maintenance over such a long period (50 years) is unusual. Moreover, it is ironic that while Japan is under internal political pressure to abandon this link elsewhere, for example in the European Union, the policy pressure is increasingly focused on adopting a 'polluter pays' or user pays approach to transport (e.g. see CEC, 1995 and CEC, 1998).

Cars

Given the historical development of the road network, unsurprisingly car use has been low in Japan. In 1912, the number of cars was 535; in 1920 it was 7,952 and in 1930 it was 88,708 – very small compared with leading European countries which had between ten and twenty times as many cars on the road. McShane et al. (1984) note that car ownership really began to rise during the 1950s due to a growing car manufacturing industry (which offered extremely competitively priced cars in the domestic as well as the international marketplace) in addition to increased incomes that resulted from a rapidly growing economy. Since then, the number of cars has steadily risen from 1.6m in 1960 to 12.2m in 1970, 23.6m in 1980, 36.2m in 1990 and 47.9m in 2000 (MLIT, 2004a). Looking from a slightly different perspective (i.e. from vehicle rather than car ownership data), Dargay et al. (2006) report that vehicle ownership in Japan increased from 19 per thousand population to 599 (in 2002). Equivalent figures in the US were 411 vehicles per thousand in 1960 and 812 in 2002 and in the UK were 137 and 515. Over the period 1960 to 2000 meanwhile, the amount of passenger car traffic in Japan increased from 8.8 million vehicle kilometres to 438.2 million vehicle kilometres (MLIT, 2004a).

This increase is in spite of McShane et al. (1984) suggesting that buying, owning and using a car is difficult – e.g. driver licensing procedures are complex and time consuming to understand, as is the bureaucracy for licensing a vehicle, verifying that one has a parking space and applying for the various road worthiness tests. In addition, McShane et al detects a cultural barrier in that the use of the car for personal travel is "officially frowned upon" (although this may not be as evident almost a quarter of a century later).

Regarding the culture surrounding car ownership, while it is an exaggeration to say that the Japanese scrap their cars too early as is often perceived in the West, it is true that many Japanese like to own their car and that often these are new (often because cars must be inspected every three years and it can be very expensive to make the car safe and clean enough to pass this – although not as much as a new car (Interview C). Perhaps strangely, while the car leasing market is small as people want to own their cars, company cars are commonly offered by employers as benefits (although they are not always registered as such so that only 263,000 cars were classed as being 'business' in 2003 – see MLIT, 2004a). Companies also tend to pay for commuting expenses (usually cash to the value of a rail ticket).

In terms of acquisition, ownership and use restraints on cars, there are several types in place in Japan. Table 3 identifies the range of tax measures in place.

	Tax	Use of tax	Tax Rate	Tax Income FY2004 (billion ¥)
National Governm	Gasoline Tax	100% earmarked to road construction	[provisional tax rate] ¥48.6 per litre	2836.2
	Established 1949. Earmarked for roads since 1954		[basic tax rate] ¥24.3 per litre	

	Liquefied Petroleum Gas Tax (1966)	50% for national road construction. Remainder passed to local government for road construction.	[basic tax rate] ¥17.5 per kg	14
	Motor Vehicle Tonnage Tax (1971)	One third for road construction and remainder for general revenue. But in practice almost 80% spent on roads.	[Example: home use passenger vehicle] [provisional tax rate] ¥6300 per 0.5 tonne p.a. [basic tax rate] ¥2500 per 0.5 tonne p.a.	582
	Sub Total			3432.2
Regional and Local Government	Local Road Transfer Tax (1955)	100% for regional and local roads. Applied with Gasoline Tax.	[provisional tax rate] ¥5.2 per litre [basic tax rate] ¥4.4 per litre	304.1
	Liquefied Petroleum Gas Transfer Tax (1966)	50% for regional and local roads. Rest general revenue	[basic tax rate] ¥17.5 per kg	14
	Motor Vehicle Tonnage Transfer Tax (1971)	One third for local roads. Rest general revenue	As for Motor Vehicle Tonnage Tax	374.6
	Light Oil Delivery Tax (1956)	100% for regional and local roads	[provisional tax rate] ¥32.1 per litre [basic tax rate] ¥15.0 per litre	1075
	Automobile Acquisition Tax (1968)	100% for regional and local roads	[provisional tax rate] 5% of purchase price for private motor vehicles [basic tax rate] 3% of purchase price	457.2
	Sub Total			2224.9
Total				5657.1

Table 3: Taxes on cars in Japan (MLIT, 2006).

The key points to note are that the car tax system in Japan is extremely complex with limited revenue application (often roads only). Moreover, it has high tax rate differentials e.g. between petrol and diesel and perhaps most importantly, a higher ratio of ownership and acquisition taxes than elsewhere, meaning that the marginal cost of driving is relatively probably lower than it could be (Nagamatsu, 2004). Instead, there is a view that increasing the proportion of user taxes vis a vis ownership and acquisition taxes would perform rather better at managing travel demand (Kanemoto et al, 2001). Interestingly, this weighting is what is used for example in France, Germany and the UK – all three of which in 1997 incidentally reported very similar overall annual average road transport tax takes to Japan (Hayashi et al, 2001). In assessing the impact of altering the car taxation regime on CO₂ emissions, Hayashi et al. (2001) report that increasing purchase tax by ¥JPY10,000 (\$US83) a year would cut CO₂ by 0.3% (i.e. insignificantly); increasing ownership taxes by ¥JPY10,000 a year would reduce it by 1.3% (through encouraging people to own smaller cars) and increasing usage taxes by the same amount would result in a 3.6% reduction (through encouraging people to drive less).

Meanwhile the 'green tax' introduced in Japan in 2001 where certain 'clean' vehicles are given tax breaks while more polluting vehicles are taxed more is credited with effectively internalising the external costs of environmental damage by adding them to the operation costs (Nagamatsu, 2004). In addition, it is seen as directing consumers to buy clean vehicles while encouraging them to reduce their use of cars for unnecessary trips and give manufacturers greater development incentives. Thus, it concludes that the tax has resulted in an earlier achievement of regulatory standards, although it has not significantly reduced carbon dioxide emissions. However, Kanemoto et al. (2001) disagree, and find that the measure may not be the most effective way of reducing carbon dioxide while imposing large welfare costs on users. As for programmes where drivers buying clean vehicles are subsidised, Nagamatsu (2004) reports that these are not sufficient for mass dissemination. The report also notes that the regulatory mechanisms on mandatory emissions and fuel economy have proved effective at controlling performance but restrict consumer choice.

To summarise, McShane et al. (1984) note that from the early 1920s, the Japanese Government promoted small cars to suit the income level, road conditions and the physical shape of the Japanese people. It goes on to state that while in some ways car ownership has in some ways been suppressed, in others “the government has been selective in designing restrictions which de facto favour some vehicle types over others, particularly the domestically-produced mini-cars; but has in other ways been as accommodating to the automobile as have other countries, given its late start”. McShane et al concludes that such an approach has “probably helped keep the automobile population in Japan growing at merely a rapid pace – compared with the explosive growth which probably would have occurred in the absence of such controls”.

Parking policy

Turning to parking policy, with the increase in congestion in urban areas from the late 1950s, in 1971 the Government adopted a policy to promote a conversion from traditional street parking to off-street parking – i.e. to increase the supply of parking facilities. However, despite the new policy, the volume of vehicular traffic has continued to increase faster than the supply of parking facilities (Fukuchi, 1994).

As a consequence, street parking is forbidden in Japan except where parking meters are located. But there are problems. For instance, where street parking for a maximum of five minutes is allowed, many vehicles are observed to exceed the limit; and to make matters worse, double parking is a common occurrence. Furthermore, law enforcement against such illegal parking has been intermittent and ineffective (although from 2006 local authorities can now de-criminalise parking enforcement). The principal cause of urban street congestion in Japan’s urban areas is illegal parking such as this; and the primary offender is long term parking of small trucks and commercial vehicles for handling goods (Fukuchi, 1994). Worse, parking meter charges are typically based on the cost of provision – not on value of spaces to the users, meaning that charging levels are the same across Tokyo (Interview H).

For off-street spaces, in some urban areas residents require permit from police proving they have a parking space before they can buy a car. Otherwise though, as in many places local authorities have no real powers to control private non residential parking. Moreover, parking provision is widespread because in city centres many small plots of land are waiting to be developed and so become temporary parking lots (although here users tend to be charged at the market rate) (Interview E). And, because of the ineffective planning regulations (see later), there is also an issue that large mechanised structures can be built on very small plots of land next to residences (even with the noise) (Interview J).

Regarding proposed spaces, the predict-and-provide approach remains very much on force with national parking regulations requiring urban developers to provide a minimum level of parking spaces if they are to be granted planning permission, which can still be quite high even in central urban areas (Interview E). Unsurprisingly, local authority officials would prefer this to be switched to maximum standards (Interview K).

To summarise, the powers of local authorities to control parking are actually very weak, with the Police in charge of enforcing the regulations – a role that is usually low down on their list of priorities (although legislation passed in 2006 now allows enforcement to be decriminalised), while the city, prefecture and the private sector also being involved. Because of this, it often proves very difficult to devise a parking strategy with so many players and so in many cities parking measures tend to be implemented on an ad hoc rather than an area-wide basis, further limiting their effectiveness (Interviews C and K). Despite the problems though, there have been changes and so while ten years ago the Government subsidised parking facilities, for the last three or four years parking has been thought of far more as a TDM tool instead.

Public transport - rail

Japan’s rail infrastructure consists of 20,000km railways operated by six regional companies (JRs) which once formed Japan National Railways (JNR); 2,900km of railways operated by 15 major private railway companies in large cities and 3,400km of railways

operated by about 100 local private railway companies in rural areas. In addition to railways, there are 600km of subways operated in nine cities (Fujii, 1994).

Japanese railways developed from 1872 when the first railway was built, from which point they grew rapidly. As noted earlier, because of the geographical and historical restrictions, rail transport plays a very crucial role in Japan. Tanishita et al. (2003) indicate that the large and efficient rail networks in metropolitan areas, together with high parking costs and severe traffic congestion, keep car ownership per capita and average travel distance per car per year at a low level overall as compared with the EU and the US. Thus, in 1955 the ratio of railway transport in terms of passenger-km was 82% and although currently the figure has dropped to 27%, this still compares very well with the UK's 6% railway/metro modal share. In contrast, the amount of freight carried by rail is fairly low in terms of tonne-km (53% in 1955, 5% in mid 1990s). A big percentage of freight is instead carried by coastal shipping (Fujii, 1994). One notable exception to this decline in rail use is the example of Tokyo. Here, the train is still used for 95% of commuting trips to central Tokyo and for around 70% of commuting trips throughout the 23 wards. This is largely because the railways were built before the war, and then the city was rebuilt around them while car ownership levels were not very high (Interview A).

JNR's first deficit was incurred in 1964. To redress this, efforts were made in three directions – raising fares, improving productivity through redundancies and mechanisation, and by seeking subsidy from Government. However, none was very successful, and so most of the deficit was covered by private and government loans. By 1987, largely because of the huge pressure to invest, the level of debt was ¥JPY25 trillion (\$US200 billion) – more than the combined national debts of several developing countries (Imashiro, 1997). Because of the debt, reform was first suggested in 1982, and after a series of committee reports, JNR was split into several regional parts (known as JRs) and privatised from 1 April 1987. Initially good results were experienced due to the release from its debt burden, the strong economy, reduced labour costs and positive marketing efforts of the new companies. It was also because before privatisation, JNR was invested with new rolling stock and new infrastructure. As the sale price more than recovered this additional investment this was very successful. Luckily, while economic theory suggests track and vehicles ought to be separated (to maintain fair access to track), this did not happen and so has made things easier (unlike in the UK where infrastructure company unable to react fast enough to changing market conditions) (Interview D). However, the economic recession has revealed problems, in particular the scale of the bureaucracy regulating the railways (Imashiro, 1997).

In terms of future planning, the Shinkansen improvement plan (1970) is the only nationwide trunk railway plan – see Nakagawa and Hatoko (2007) for further information about this high speed railway network. There is no five year plan as for roads, airports and harbours. Moreover, there are no specific public resources for railway improvement (Nakagawa and Matsunaka, 1997). Instead, as with roads improvements are largely financed by loans and bonds to be paid off by fare revenues after opening. However, high land prices have forced up construction costs and there is now a need for new sources of revenue (Hayashi, 1989).

Also, while there are no specific funds for the railways, Central Government does use general funds to provide grants to public subways and new town railways, while local authorities use general funds to invest in and give grants to public subways. Debt from the central government is used in the case of Teito Rapid Transit Authority and the Japan Railway Construction Public Corporation, while debt from the private sector is used in the case of other authorities. Private railway companies however, do not receive subsidies other than through a preferential tax system (Nakagawa and Matsunaka, 1997). Accordingly, a traditional method for private railway companies to develop new lines has been for them to buy land along a proposed route, build the line and then benefit from the increase in land values that accrued as a result of the improved level of accessibility. In addition, the rail operator will often develop museums, shopping centres, leisure centres etc near the stations to encourage strong leisure flows in the opposite direction to the main commute and provide feeder buses from residential areas to the stations/new developments. Consequently, services are usually well used – poorly used services act as a brake on unrealistic schemes – and subsidy is very low. Most rail companies raise more money from sideline activities than from running train services (Priemus and Konings, 2001). As a result, in one sense it could be

argued that Japanese public transport systems are extremely well integrated. In a more conventional sense though, the Japanese transport system is extremely fragmented even in large cities in terms of physical integration (e.g. stations are often separated into company areas), information, ticketing and timetabling, never mind operationally or strategically.

Public transport – Intermediate systems

Apart from a well-developed railway network nationwide and region wide, Japan has also established a complex urban transit system consisting of Subways, Buses, Light Rail Transport systems (LRTs), Monorails, AGTs, Linear-motor Metros (Small Cross-section Subways), Urban Aerial Cable Cars, Trunk Bus Systems, Guideway Buses and High Speed Surface Transport systems such as MAGLEV (Nehashi, 1998). Such diversity (in particular the development of guided bus systems), is partly due to the institutional problem that local authorities had when faced with developing a LRT system. This was caused because prior to the formation of the MLIT, LRT schemes required permission and funding from both the Ministries of Transport and Construction because they ran both on rails and road (Interview H). Such systems are operated by a mix of public-sector and private operators. However, since the creation of the MLIT there have been moves (particularly by senators) towards reintroducing LRT (although this has been hindered by a distinct lack of national leadership) (Interview J).

Public transport – Bus, DRT, Taxi and Car Clubs

Bus and taxi services in Japan are provided by private companies operating a mix of commercial services and some 'socially necessary' services subsidised by the National Government. In addition, some larger Municipalities operate bus services directly (e.g. Nagoya). National Government is also responsible for regulating transport operators to ensure financial and technical competence (Watanabe, undated). However, this culture is slowly changing as bus operators realise that local government is sometimes willing to help subsidise some services and so partnerships are now being established in some areas although officially municipalities can only decide where to site bus stops. In Japan there are two types of buses – standard service bus (no deviation allowed) and chartered buses – can deviate and charge non-standard fares. In addition, there are two types of taxi trip – individual contract (hire vehicle and use the meter) and as a bus – using individual fares. In Japan all public transport vehicles of ten seats or less are taxis – whether or not they run bus services or not (Interview F).

Post World War II, Japanese Government policy was driven to grow economically as rapidly as possible in order to catch up with other developed countries. To this end, Government led the push to upgrade the bus system (so as to prevent it limiting the push to growth) while at the same time aiming to control the level of transport supply and demand through restrictions on private transport operators (Watanabe, undated). With the increase in influence of a neo-conservative agenda across the political spectrum during the 1990s, this policy changed dramatically and Government decided to abolish the restrictions on supply and demand through a staged deregulation of the buses between 2000 and 2002. This aimed to facilitate free competition so as to enhance and diversify public transport services and reduce the cost to the consumer and the tax payer (Interview B). In principle, deregulation occurred as in the UK but with additions (Interview F). In practice, this means that operations are still fairly controlled. For example, operators suggest services which are then approved or not by the regulator. Second, fares in particular areas are effectively set by the first operator to operate there, so as not to confuse the public of that area (chartered bus services not included in this and so the Shibuya DRT service actually charges half the regular area fare). However, Central Government is now becoming rather more flexible in this.

But there have been a number of problems. For instance, Interview F reports that post deregulation not a lot happened regarding more companies and services, with only a few taxi companies starting to compete with existing services. High entry barriers seemingly put off the others. Meanwhile Interview J states bus ridership has dropped significantly in the cities – even in large metropolitan areas – and even more in smaller settlements where sometimes services only run hourly if at all. This evidence is confirmed by Government statistics (MLIT,

2004a), which suggest that the number of bus passengers almost halved from a peak of 11.8 million passengers in 1970 to only 6.3 million in 2002. Interestingly, the level of service offered actually increased from 5.39 million vehicle kilometres in 1970 to a high of 7.18 million veh km in 1991, before falling back to 6.62 million veh km in 2000. Interview J suggests that “MLIT has been very harmful to transit because it has insisted far too heavily on minimising subsidy meaning that fares have risen and patronage has switched elsewhere over the long term and accelerated the vicious circle of decline”. Thus, while acknowledging that although some cost control was probably necessary because public agencies have been inefficient regarding wages and so forth, he laments there being no real recognition of the public service angle and suggests that “one reason for so many illegal bikes at stations is the high level of bus fares”. He adds that public transport is facing a crisis and that Kyoto is quietly selling off franchises or routes to the private sector.

Watanabe (undated) points out that in some cases market principles are in conflict with passenger interests, for example where interchange between the services of two or more companies is necessary. And, in rural areas, with the decline in patronage caused by increased car use and an ageing population there is a tendency for services that are not commercially viable to be cut when this may not be desirable from a public policy perspective. This latter point is supported by Interview J with the observation that often public transport is not effective in low density areas meaning that costs are quite high and that here people need cars. Other alternatives now being considered include the emergence of non-profit organisations in the community bus sector, as well as the idea of Special Districts (introduced in 2004) which allowed prefectures (or large cities) to apply to operate innovative forms of transport such as ridesharing taxis and community buses (Interview H, J). DRT schemes too, are an option. Interview F suggests that maybe 20-30 such schemes exist in Japan. Most of these are an extension of dial-a-ride, operate in rural areas and are very simple and small scale, relying on telephone bookings and manual route planning systems (Interview F).

Finally, as of summer 2006 four commercial car clubs – in Kyushu, Nagoya, Yokohama and Tokyo – are currently operating in Japan (Interview H) which work because of the expense and shortage of car parking in urban areas, and because there are lots of spaces around with temporary uses that would be suitable for car club sites. Interestingly, this has only become possible thanks to the adoption of Special Districts which mean that car clubs can be operated without the previous barrier being in place whereby car rental firms needed to have permanent staff to check driving licences etc. Consequently, Government (central and local) is now starting to support the car club concept.

Green modes

Replogle (1992) reports that in 1990 the share of walk and cycle trips in Japan was 40%-50%, and that on a typical November day in 1987 there were some three million bicycles are parked at railway stations across Japan. This, it suggests is because from the late 1970s the dominance of walk and feeder buses for accessing rail stations began to be impacted by suburbanisation and the decline of the bus, and more recently thanks to cheap Chinese bicycle imports which sees bicycle ownership as almost universal. Subsequently, bicycle use has remained important and currently accounts for around 20-30% of trips (particularly still for commuting to stations). Because of this, illegal bicycle parking (particularly at stations) is seen as being a major problem. Overall, bicycles are not seen as being a treasure, they are purely a utility good because Japanese cities usually have streets that are too narrow for cars (Interview B). One policy innovation here is that bicycles must be registered with local authorities, with the fee included in the sale price.

Land Use Planning

Because of the shortage of usable land and the continuing shift of people from the countryside to the large metropolitan areas, Japan's land prices in metropolitan regions are notoriously high and constantly rising. They account for 35% of housing costs compared with 15-20% in Europe. Historically, from a transport perspective this (along with other reasons discussed earlier) has led to a land use pattern that has heavily favoured rail transport. And, it has also led to a whole raft of land use planning regulations being developed. Therefore in

theory, Japanese town planning law requires Prefectures to develop a master plan within which Urbanisation Promotion Areas (UPAs) and Urbanisation Control Areas (UCAs) are defined whereby development is restricted to the former (Interview C). To enjoy the benefit of urbanisation (i.e. increased land values) developers are supposed to contribute to society and construction costs.

However, unlike in the UK or the USA for example the local authorities are not able to use levies or fees to mitigate the additional impacts caused by the new development on the existing infrastructure and so the law suggests that where there is not enough capacity to support the additional traffic then the plan must be rejected. Instead, a form of land readjustment (known as *kukakuseiri*) has typically been executed in promotion areas to allow new roads, railways and public spaces to be developed (Interview A). This has evolved because Japanese law makes it possible for groups of private property owners to temporarily pool their holdings so as to allow land parcels to be more effectively arranged for development. Once the project is completed, the cooperative disbands, and each member is given an equitable share of land (which may or may not be the tract originally owned). This frees up the council from paying for the costs of new roads and infrastructure. Instead, the local and national governments provide only partial grants or loans for infrastructure, and private banks supply the rest of the capital (Heidenhaimer et al, 1990). More information relating to the use of land readjustment, in particular related to rail development projects, can be found in Sorensen (2000).

However, in reality these planning rules often do not work particularly well for several reasons.

In particular, for land use planning there are no legally-based metropolitan planning agencies coupled with a lack of Government local planning guidance (although this is now being addressed) there is some degree of inconsistency (Interview H). This means that while in theory land use is planned first in Japan and then the transport plan tries to satisfy that, many areas have the same regulations but different interpretations, such that Tokyo, Nagoya and Toyota all interpret the regulations differently for example (Interview G). Worse, Heidenhaimer et al. (1990) note that tax laws actually assist land speculators to hoard their properties by assessing agricultural lands, even those that lie well within metropolitan areas, on their agricultural rents and not on their potential value to developers. This has meant that “smaller settlements are now auto dominated and that the landscape is far more uniform as a result with the same shops in malls etc” Interview J).

Other points of note include concerns to do with changes in land use. “Zoning is only applied to new developments, so there is nothing to stop developers converting existing developments to other uses” (Interview H). So for example Interview K reports that “after factories closed during the recession, several sites became out-of-town retail sites” because “although the City Council can check the plan and make minor recommendations, it cannot stop such a development going ahead”. Meanwhile the “planning system does not consider traffic or transport impacts – apart from the police checking to see if road widths are adequate and that the entrance/exit road traffic does not adversely impact on the existing network” (Interview H). Thus, because there are no powers for planners “to point out even simple points like where a shop is put next to a bus stop, cars and delivery lorries constantly occupy the bus stop space” (Interview J). In addition, planning obligations are limited to large scale developments outside of the UPAs where permission is needed – severely curtailing the power of planners. Even here, there are no clear criteria meaning that sometimes informal ad hoc discussions occur when land readjustment schemes take place (Interview H). On top of this, Interview H points out that the standards on division are not explicit and vary by prefecture. “Often land owners effectively determine the boundaries” (Interview H).

Essentially, these problems are ascribed to being due to a strong culture among the Japanese relating to the rights of the landowner which means that the Government is reluctant either to restrict private landowners from using their land as they see fit or to expand public land ownership (Interview A). “If you own a piece of land you can do anything” (Interview J). Consequently, in the absence of any effective system of land use regulations or incentives, other suburban areas in addition to those alongside railways now came to be developed as residential districts, leading to a sprawling extension of conurbations in particular, and a further increase in urban traffic levels (Nakamura et al, 2004; Interview B).

In summary, local planners feel there is “no real Government support with land use or transport”, essentially because “controlling land use is seen as restricting people’s choice”. [Local authorities] would “like stronger powers but are unlikely to get them because even with zoning decisions currently there are problems” (Interview K).

4. Conclusions

In terms of how the transport system performs then, there are a number of core issues (or more accurately hypotheses) that emerge regarding transport policy as applied in Japan from such a ‘sector by sector’ analysis, and these are noted below together with some observations as to likely future developments in each case.

First, in the public sector financial, political and regulatory control is focused very much at the national level. Specifically, national legislation always takes precedence over local legislation, while even quite detailed local policy and budget programmes must be approved by national Government. On top of this, although National Government has slightly devolved power recently it still controls the money and still often appoints prefectural officers directly. Meanwhile the physical expansion of urban areas beyond the administrative boundaries has made the promotion of comprehensive transport planning at the urban level increasingly difficult, meaning that each urban area is now tending to respond through ad hoc adjustments. Furthermore, while there is a road construction plan and a (weak) public transport plan (separated by mode) there are no transport plans at a local level and even in the largest cities the authority has very little influence over public transport. This tends to mean that local governments in smaller cities do not bother with public transport as they do not have any formal control.

As reported, while there have been moves towards some decentralisation of powers from the national level in the current climate it seems unlikely that any radical change will occur in the near future. More likely is that these incremental moves will continue, particularly where regions and municipalities seek to test new and innovative mobility management techniques as is already happening for example in cities like Kanazawa. Probably the most crucial test will come when Government decides how to reform the car taxation system – i.e. will it maintain the status quo; reduce or remove the taxes (as lobbied for by the car industry); or will it allow cities greater flexibility in spending its hypothecated road funds to allow this money to be spent on public transport or transport demand management measures (and hence properly devolve power).

Second, from a ‘functional’ perspective, the administration of transport is decentralised or fragmented and coordinating the different offices is a problem. In particular, it is unclear which government office is in charge of private automobile transportation, even after the MLIT merger (although this is now slowly starting to change). However, while policy making generally has not proved to be a ‘success’, the one exception to this has been in investment levels which have been consistently high.

Here again it would seem that change is slow, but progressing towards more joined-up policy making, and once again it would seem that the issue of funding – in particular the earmarked Road Fund – is key to how this story evolves.

Third, the overall role of the public sector in delivering transport in Japan is actually relatively limited when compared with developed economies elsewhere in the world. Instead, the task of providing transport is basically left to the private sector, with the Government guaranteeing a minimal level of service as far as the safety and environmental aspects are concerned. The main role of Government is to formulate transport policies aimed at creating a free market for the sound development of transportation, and also for the development of transport infrastructure as an important element of the social overhead capital. One further key part of this, is the acceptance of the full cost principle whereby usage fees cover all expenditures. As reported, this principle has become more and more commonly applied to expressways, railways and airports and user fees now often cover operation, construction and even land purchase costs. In practice, this means that users cover a higher proportion of the costs of transport provision than otherwise – i.e. it means that levels of public subsidy are relatively low. This has various implications. One is that transport users are perhaps more fully aware of the real social cost of making journeys than elsewhere (although as the

construction costs of more and more projects are paid off, the public expectation is that the fees are removed). Another implication has been that subsidy levels for public transport are very low (when compared with European countries for example) because it has never been seen as a Government obligation and so there is not the same social rationale in place to support such a policy. In some rural areas particularly, this is rapidly becoming a serious problem.

On this issue the most obvious signs are that if anything the private sector is continuing to extend its influence across the transport sector thanks to highway privatisation, rail privatisation, airline deregulation, bus deregulation, and most recently parking decriminalisation. However, under the surface things are changing. For instance, some municipalities are starting to subsidise commercially unattractive but socially necessary bus services to serve the ageing population, while road building (and the acceptability of road tolls) is becoming increasingly politically unpopular. Therefore, it may be that Government is persuaded to rethink how transport is planned and managed such that the public sector takes a more direct role. More probable though, is that the private sector will retain its dominant position and continue to deliver a relatively cost efficient transport system as currently. Regarding transport finance meanwhile, and the full cost principle in particular, as with almost all national Governments the pressures to keep public spending levels as low as possible. This is especially true in Japan where the economy has only really began to recover in the last three years or so after a severe recession in the 1990s. Thus, while public subsidy may start to be applied in specific circumstances (e.g. for public transport to the elderly in rural areas) this is only likely to be for very localised schemes. Instead, if user fees are to fall then the main outcome will probably be a corresponding reduction in the level of transport investment.

Fourth, and directly related to the point above, operationally the transport system is extremely fragmented in physical terms as well as in ticketing, timetabling, information and service planning, even in the largest urban areas and this can make using especially the public transport system difficult.

In the past a significant barrier to overcoming this 'integration' problem was to do with revenue allocation but technology in the form of smart cards has now overcome this. The barrier that remains is the perceived competitive advantage gained by limiting interchange opportunities to those under the private operator's control meaning that things are unlikely to change unless the market does. Tellingly, if experience elsewhere (e.g. in the UK) is any guide, then this is doubtful.

Fifth, enforcement (or the lack of it) is a key problem. In particular, serious concerns are expressed regarding the ineffectiveness of supposedly tough land use regulations on restricting urban sprawl which potentially threatens the viability of public transport systems in the longer term. More immediate repercussions meanwhile result from the non enforcement of on-street parking regulations, which is also seen as a key problem when dealing with urban congestion.

The 2006 decriminalisation of parking enforcement has offered local authorities a tool to address the non-enforcement of parking, although as yet it is still unclear as to how effective they will prove nor how widespread. However the prospects for overcoming the apparently ineffective land use regulations would really require a fundamental review of how they are applied. Given the fragile economic position (and consequent strong position of private business) combined with the current Government's political preference for deregulation this would seem highly unlikely in the near or medium term.

Finally, public attitudes are apparently shifting in two contradictory directions. So, on the one hand there is a shift away from the traditional community-minded culture towards a more individualist attitude, which in transport terms means a greater 'need' for the car and a reduced willingness to contribute to public projects. On the other hand though, there is also increasing concern for the environment and a recognition that unrestricted road building may not be the best way forward for Japan.

For the future, the impacts generated by these conflicting pressures on the transport system and on society more generally are probably the most difficult to predict, purely because the reaction of individuals to even similar influences (never mind the huge range of

factors encountered by different people) can be so variable. Yet it is the cumulative outcome of all of these personal decisions that will ultimately govern the future of the transport system.

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Appendix A: Details of Interviews Conducted

Code	Interviewees	Affiliation	Interview location	Date
A	Professor Haruo Ishida, Tsutsumi Morito, Naohisa Okamoto and Danielle Guillen	University of Tsukuba	University of Tsukuba, Tsukuba	29 August 2005
B	Professor Satoshi Fujii and Ayako Taniguchi	Tokyo Institute of Technology	Tokyo Institute of Technology, Tokyo	30 August 2005
C	Yasushi Sukegawa (formerly of MLIT), and Kaichi Takakuwa, Kiyoshi Yamasaki and Keiichiro Saito	Ministry of Land, Infrastructure and Transport	Ministry of Land, Infrastructure and Transport, Tokyo	31 August 2005
D	Professor Yoshitsugu Hayashi	Nagoya University	Nagoya University, Nagoya	5 September 2005
E	Toshiyuki Yamamoto	Nagoya University	Nagoya University, Nagoya	12 September 2005
F	Fumihiko Nakamura	Yokohama National University	Nagoya JR Station, Nagoya	14 September 2005
G	Ryosuke Ando	Toyota Transportation Research Institute	Nagoya Urban Institute, Nagoya	16 September 2005
H	Professor Katsutoshi Ohta	Toyo University	Toyo University, Tokyo	21 September 2005
J	Professor Ryuichi Kitamura	Kyoto University	Kyoto University, Kyoto	22 September 2005
K	Hideki Haneda, Sumi Yoshiaki and Ken Maeda	Nagoya City Council	Nagoya City Hall, Nagoya	26 September 2005