Sustainable transport policies in Japanese cities: barriers to implementation

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Abstract

A recent benchmarking survey of current land-use, transport and environmental policies in cities outside of the two major conurbations of Tokyo and Osaka together with parallel research into implementation barriers based on interviews with government officials in Nagoya allows us to identify the contemporary situation in Japanese cities. Barriers to the implementation of environmentally sustainable transport policies are: funding sources; the existing legislative framework; administrative arrangements; and stakeholder positioning. These problems are highlighted with particular reference to light rail transit (LRT).

Keywords: urban transport, sustainability, policy, light rail transit, implementation barriers.

1 Introduction

Traffic and transport has adverse influences on the urban and global environment. Among Western countries, the necessity for EST (Environmentally Sustainable Transport) concepts has been widely recognized and various policy instruments have been formulated. However, such instruments have not yet been adequately implemented in Japan, where they have been advocated, most of them are carried out somewhat temporarily and experimentally. This paper poses the question: “Why in Japan are not the environmentally sustainable transport measures implemented systematically?”
In March 2003, the Nagoya International Conference on Transport and Environment (by OECD, Ministry of Environment, Ministry of Land-use Infrastructure and Transport) stressed the necessity of prevailing EST measures in Japan. Our research has included surveys of government officials to determine the problems that prevent them from being implemented. This paper identifies barriers to implementation using the specific case of light rail transit as an example.

2 Problems in introducing EST policy instruments

Interviews with municipalities departments of transport and environment were carried out but in a separate survey to that described by Hayashi, (et. al., 2004). Based on these discussions, problems in introducing EST policy instruments were identified. The following three questions were asked during the interview:

a) What are the Environmentally Sustainable Transport policy instruments currently being implemented?
b) Elaborate on matters in implementing those instruments
c) What is the current situation of citizens’ taking part in the transport planning and making consensus process?

The specific EST policy instruments focused on here are as follows: 1) Introducing LRT into the city centre, 2) Making transit appear to be seamless, 3) Construction of bicycle lanes and parking lots, 4) Road pricing, 5) Car sharing, 6) Restriction of car parking spaces in the city centre, 7) Park and ride facilities. These can be regarded as typical EST policy instruments identified in cities in Europe and elsewhere and these are now being introduced tentatively in Japan.

The problems identified in the process of implementing policy instruments are as follows.

1) Source of revenue and funds: financial support is the most essential problem in implementing every instrument.
2) Legislation: existing laws and regulations sometimes prevent new policy instruments from being implemented.
3) Administrative organization: administrative organizational structures may cause conflicts between several departments.
4) Stakeholders: without the consensus among the sectors that regard a policy instruments as disadvantageous, it is difficult to implement them.

These difficulties are illustrated with particular reference to light rail transit.

3 Problems in introducing LRT

3.1 Outline of LRT

LRT has several advantages compared with other motorised transport modes. For example, accelerating and breaking properties are well developed. Low-floor vehicles enable passengers to get on and off easily. Construction cost is less than underground railway systems. LRT contributes to increase livability in the
city centre. The impact on the environment is much smaller than automobiles and buses. Despite the development and renewal of light rail being mentioned at the Central Council on Urban Planning in 1998, LRT systems have not yet been introduced in Japan. An overview of the nature of the problem in introducing LRT is shown in Figure 1.

Figure 1: Structure of problems in introducing LRT.

3.2 Problems with the source of funds

Figure 2 compares the ratio of public construction costs on railways and roads in Germany, Netherlands and Japan. The amount of public funds on the railways in Japan is far smaller amongst these three counties. In European countries, the establishment of public transport infrastructure is generally supported by subsidies from the government and local municipalities and some of them make much of railway networks in their strategic transport and environmental planning. In Japan, there is a limited case permitted to apply a subsidy for construction of railways despite the fact that the road network is always constructed making exclusive use of a specific tax that includes fuel tax, vehicle acquisition tax, and vehicle registration tax. Therefore, every kind of railway transport in Japan is always confronted with a shortage of funds as well.

To examine more fully the problems of the financial system they are divided into the establishment stage and the operating stage. At the establishing stage, shortage of subsidies has already mentioned. For example, 1) the range of application of public subsidies is strictly limited to the part of track passing on the road with its pavement, its foundation and the floor of the track. 2) In spite of the existence of a system for modernization of tramways, which provides subsidies for improving the existing lines, the scope for applying this subsidy is strictly limited. Public transport operators can be supported only under the condition that they suffer from ordinary losses at the target line and, moreover, they also suffer from it for all of their business, or are applicable to the operator whose ordinal profit ratio of real estate is below 5%.
Based on this requirement the financially well-operated sectors as a whole that might try to establish a new line cannot get any subsidy. At the operating stage, the railway companies in Japan are compelled to maintain their self-supporting accounting system. However, the return from patronage is getting lower today. To operate the railways or trams it is also very difficult to gain subsidies from governments and municipalities.

Lack of subsidies for construction directly connects to a high debt. Moreover, it may sometimes lead to high fares and may deteriorate the rail condition because of the shortage of maintenance funds. To solve this problem, the way that construction of infrastructure is undertaken by the public sector and the operation of railway systems by private sector, is called “vertical separation”. This method enables improvement to the financial problem because of the avoidance of high rates of interest for the private sector.

As a source of revenue for the construction of public transport, transferring the special fund for road has been discussed for a long time. Transferring the funds must be justified because the development of railway systems will have an effect to reduce car traffic. In Germany funds from the vehicle fuel tax, which is regarded as special fund for road in Japan, is available for development of local railway systems. However, in Japan, transferring the special fund for road into funds for railway systems is now partially admitted to develop infrastructure such as new transport systems, multi-level crossovers and open space in front of railway stations.

3.3 Problems in the legislation

Track Law, which applies to trams, was put in force in 1921. After revising it several times, there exist many issues preventing LRT from being introduced.
The main issue is on the speed limit of its vehicles. Because of this law, trams are regulated to a 40 km/h of maximum speed. However, the average speed may not be much more than 20 km/h taking into consideration stops at stations. In most large cities in Japan, the average speed of cars is approximately 15-25 km/h, so the projected average speed of trams in Japan is not acceptable for automobile users. On the other hand, the average speed of trams in the USA is much higher, as Figure 3 shows [2].

The average speed of 8 lines is about 43km/h, which is even higher than the maximum permissible speed in Japan. This situation affects not only on travel time of passengers but indirectly on the amenity in the vehicles because speed limit deprives operators of incentive to improve both light rail vehicles and its rail. The Track Law has other inadequate issues for introducing LRT that are beyond the scope of this paper to discuss. Revision of the law or unification with the normal Railway Operation Law is widely thought to be required.

![Figure 3: Average speed of LRT in USA.](image)

### 3.4 Problems in the administrative organization

Since LRT systems usually run on the road surface, both executive authorities for roads and railways are in charge of it. There are discrepancies in the way of thinking between both organizations about legislation and subsidies. A well-coordinated organization includes both of them, with appropriately assigned jobs and responsibilities. This is rarely observed and is a requirement to allow sustainable solutions to be implemented.

### 3.5 Complaints by stakeholders

In the case of introducing LRT on an existing road, broadening or sparing the road are inevitable. As a matter of course, broadening the road needs new land and it also decreases the effect of LRT itself than introducing it with sparing the
road space due to constant capacity of road. Therefore, sparing the space is more favorable. Nevertheless, decreasing road capacity stimulates complaints from car users and logistic companies. Furthermore, LRT running on the street adds a burden to manage the traffic by traffic policemen. This makes it difficult to acquire the consensus from all parties involved.

4 Classification of problems in the process of introducing EST instruments

The problems in introducing LRT has been examined above but more generic barriers to implementing sustainable transport policies in Japan are shown in the Table 1 [1,3,4,5,6]. Based on this table, the common problems and future works on the EST measures can be summarized as follows.

4.1 Resources for funds

Current institution arrangements to establish transport infrastructure in Japan are inclined to invest in roads and it is difficult to transfer to the other infrastructure such as funds for implementing measures of transport demand management. Moreover, if local government tries to introduce some uniquely effective EST policy instruments suitable to the situation of their own cities, the financial load might be too heavy for local governments. Therefore, the most essential thing is to ensure the steady flow of funds to introduce EST policy instruments by transferring special funds for road into developing public transport systems and introducing green tax or special funds for transport seem. As a germ of this movement, a trial of transferring the funds for road into a community bus service started in 2003 in Gifu prefecture in the central region of Japan.

Another source of funds that can be considered is to make the best use of land-related taxes for compensating for the construction cost. With this means, residents along the traffic infrastructure pay back their land price growth based on the concept of burden-sharing by beneficiaries. This kind of method will mitigate the burden of construction cost of transport infrastructure.

4.2 Legislation

Current laws and decrees concerning transport cannot necessarily be regarded as EST policy instruments. The speed limit of light rail transit that has been mentioned above is a typical example. The problem can be distinguished into three types by their characteristics. The first is the type that laws have an inverted effect against instruments such as the enforcement of a maximum number in the regulation of parking lots according to the floor size of retail stores. The second is that laws decrease the effects of instruments, and the third case is that there no laws that support instruments such as legislation systems for car sharing and road pricing.
Table 1: Summary of problems on implementing EST policy instruments.

<table>
<thead>
<tr>
<th>Source of Funds</th>
<th>Legislations</th>
<th>Administrative organizations</th>
<th>Stakeholders</th>
<th>Other problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) LRT (Introducing new transit)</td>
<td>Expensive construction cost</td>
<td>Limit of maximum speed</td>
<td>Assignment of jobs and responsibilities</td>
<td>Car user</td>
</tr>
<tr>
<td></td>
<td>Limited subsidies</td>
<td>Limit of vehicle number</td>
<td>Traffic Lights</td>
<td>Traffic police</td>
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<tr>
<td></td>
<td>Traffic Lights</td>
<td></td>
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<tr>
<td>2) Seamless policy on transit</td>
<td>Investment for facilities and ticket system</td>
<td>Weak power of enforcement to improve transit between companies to be seamless</td>
<td>Weak power of persuasion to transport operators</td>
<td>Public transport operators (to invest facilities and to negotiate between companies)</td>
</tr>
<tr>
<td>3) Construction of bicycle lane and parking</td>
<td>Investment for parking and signs of lane</td>
<td>Uncertainty of lanes for bicycle users and pedestrians</td>
<td>Low motivation to new measures</td>
<td>Car user</td>
</tr>
<tr>
<td></td>
<td>The way to expend the fee</td>
<td>Legal ground</td>
<td>Uncertainty of authority in charge of</td>
<td></td>
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<tr>
<td>4) Road pricing</td>
<td>Investment for toll facilities</td>
<td>Responsibility for accident</td>
<td>Low motivation to new measures</td>
<td>Car user</td>
</tr>
<tr>
<td></td>
<td>The way to expend the fee</td>
<td>Duty of inspection,</td>
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<td></td>
<td>Legal ground</td>
<td>Constraint for rent</td>
<td></td>
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<tr>
<td>5) Car sharing</td>
<td>Low profitability</td>
<td>Low motivation to new measures</td>
<td>Rent-a-car company</td>
<td></td>
</tr>
<tr>
<td>6) Restriction of parking lot</td>
<td>Heavy subsidies to put parking lot in city center</td>
<td>Duty on putting parking lot correspond to floor area</td>
<td>Concentrative management on parking in city center</td>
<td>Car user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exemption and reduction of taxes in city</td>
<td></td>
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<tr>
<td>7) P&amp;R</td>
<td>Heavy subsidies to put parking lot in city center</td>
<td>Lack of legislation to promote P&amp;R</td>
<td>Assignment of jobs and responsibilities</td>
<td>Car user passing near parking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Residents near parking</td>
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</tbody>
</table>

: bottlenecks to implement

4.3 Administrative organization

Current administrative organizations in charge of transport and the environment are divided into numerous offices. Each office has little awareness of the overall responsibility for transport and environment policies. Therefore, they adhere only to achieve their part of the problem. Eventually, this situation may cause some policy instruments to become inconsistent with others. The need for discussion amongst several offices is growing because few EST policy instruments can be introduced by a single department.

To solve this problem some large municipalities have started to establish a department for integrated transport policy that coordinates several offices in charge of transport and environment. However, this approach does not have enough power to make integrated transport policies and to coordinate them between the offices especially the traffic administrator who is in charge of traffic management and traffic safety. In this situation, to implement EST policy instruments development of a framework to coordinate among all the interest offices is required.

As another problem is the lack of priority by policy-makers when considering the environment. This is demonstrably not high when making transport policies.

4.4 Consensus building

Implementing EST instruments involves many stakeholders. Therefore, it is necessary to have some system for allocating jobs and responsibility and providing the opportunity to communicate with other sectors to build consensus among all sectors. However, public authorities have an interest to maintain a neutral position as a facilitator.

5 Conclusions

In this study, the obstruction factors in implementing EST policy instruments are examined from four aspects; source of funds, legislation, administrative organizations and complaints by stakeholders. A specific case study of LRT has been described. Since some EST policy instruments have influences on the effect of other instruments and have other interactions, it is necessary to combine the measures in order to have positive influences from one to another. Without being additive the measures have no relation to each other. To build such a strategy, a back-casting approach that has a set of clear objectives based on concrete visions of EST and performance indicators to measure progress is considered to be what is required to achieve long-term sustainability of urban development and transport.

Acknowledgements

The following organizations kindly cooperated with this research project: The City of Nagoya, General Affairs Bureau, Department of Planning, The City of Nagoya, Environmental Office, Traffic Antipollution Measure Division, The City of Nagoya, Public Works Bureau, Department of Bicycle Policy, and The City of Nagoya, Urban Housing Bureau, Department of City Planning. Funding from the Japan Society for the Promotion of Science allowed Professor Black to collaborate on research into sustainable urban transport policies in Japan.

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