URBAN AREAS
AND INTEGRATED URBAN TRANSPORT

20 September 2007 (a.m.)

TECHNICAL COMMITTEE 2.3
URBAN AREAS
AND INTEGRATED URBAN TRANSPORT

INTRODUCTORY REPORT

CONTENTS

EXECUTIVE SUMMARY

As a result of the work of the TC2.3 “Urban Areas and Integrated Urban Transport” this report is highlighting three subjects.

The first part deals with the results of the working group **Human powered transport**. Their goal was to find reasons for cycling and walking in many cities all over the world in their objective of achieving sustainable transport. A series of questionnaires, fact sheets and personal contacts were used to obtain the current state of the practice in the use of human powered transport. An analysis ensued which contained both qualitative as well as quantitative metrics.

Based on the above analysis, the work group developed a series of pertinent recommendations and attendant considerations. An explanation of how current use of human powered transport can benefit from these recommendations is included in this report. Others who are considering this mode of transport as part of overall transport network can also benefit as to “how to get started”.

The second part of the report contains the results of the working group on **Mega-cities**. This working group was established to synthesize the current practices in transportation management and congestion mitigation. Instruments used to assess the methods used included personal contacts, internet sites, surveys and other research. Data was also collected from other sources.

The analysis consisted of a series of qualitative and quantitative approaches. Past and future population trends as well as transport policies were analyzed. But the principal objectives were to determine if there is commonality in deployed strategies that have worked across wide socio-economic and cultural divides in the selected cities. Careful consideration was also given to the practicality for the recommendations from an economic standpoint. Although, there is great deal of diversity among the analyzed cities, the overall objectives of the residents remain which could be stated as less congestion and a better environment and quality of life.

The third part of the report presents the results of the working group on **Congestion**. As congestion is an urgent problem, much effort has been exerted to investigate cause of congestion, and to plan and implement countermeasures for alleviating, preventing and managing (either recurrent or non-recurrent) congestion. Much of this work has been carried out in the developed countries with resources and technical know how. Those countermeasures have been characterized by nature/degree of congestion, socio-economic situation of individual region and cities, level of development of individual countries, etc.

The study focuses on countermeasures against recurrent congestion on urban roads, actually implemented in various cities in PIARC member countries. Some 20 cases studies were collected (but not many from developing countries) and analyzed.

The study identified the following four categories of congestion preventive countermeasures: Traffic and transport policy, Infrastructure construction, regulatory measures, Soft and technical measures. The combination of the above is recommended to achieve desired results.

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1. INTRODUCTION

1.1. Scope of the study

According to a World Bank analysis, the developing world’s urban population will increase within the generation by 2.5 billion – equal to the present day total world urban population. Urban sprawl is likely to occur, encouraging auto-dependency, disadvantaging public transport service supply and hence reducing accessibility to employment and to urban facilities for the poor , especially those living in high density peri-urban settlements outside the range of existing urban facilities (World Bank, 2000).

Urban problems are not unknown in the developed world either. Some 80% of Europe’s citizens live in urban areas and experience it is here that the effects of many environmental problems are felt most strongly. Noise, poor air quality, heavy traffic, neglect of the built environment, poor environmental management and a lack of strategic planning lead to health problems and a lower quality of life. (EU COM, 2004)

From the wide range of problems related to Urban Areas and Integrated Urban Transport, this report highlights the following three issues.

Human-powered transport
Based on an analysis of current practices, the work group developed a series of pertinent recommendations and attendant considerations. It will be shown how the human powered transport can benefit from these recommendations. Others who are considering this mode of transport as part of overall transport network can also benefit as to “how to get started”.

Megacities
Large cities represent particular problems for sustainable mobility. Four cities were selected for analysis; Tokyo, Mumbai, Paris and Mexico City. These cities serve as cultural, tourist destination, commerce hubs. They have existed before the advent of land use planning. Thus, conventional traffic management tools are not and cannot be readily deployable. The recommendations contain a starting point to achieve sustainable transport.

Congestion
Congestion is a big problem in most cities, influencing economic growth and the welfare of citizens. Congestion must be managed in many ways. Most regulatory measures like parking policy, road pricing, preferences for public transport and traffic management will have good effects. They should be supported by soft and technical measures as telematics, mobility management and reallocation of road space for non-motorised transport modes.

1.2. Sustainability

For the purposes of this work, the World Bank definition of transport sustainability was chosen. It satisfactorily takes into account the interaction of transport systems with other systems and puts the concept of “future needs” into economic terms.

“To be effective, transport policy must satisfy three main requirements. First, it must ensure that a continuing capability exists to support an improved material standard of living. This corresponds to the concept of economic and financial sustainability. Second, it must generate the greatest possible improvement in the general quality of life, not merely an increase in traded goods. This relates to the concept of environmental and ecological sustainability. Third, the benefits that transport produces must be shared equitably by all sections of the community. This we term social sustainability”. These three dimensions of sustainable develo-ment are shown in Figure 1 (World Bank, 1996).

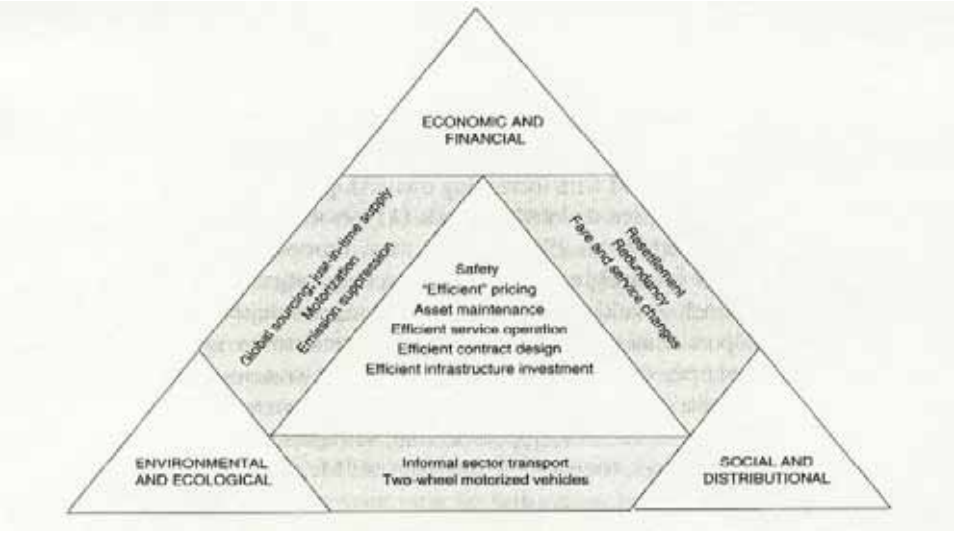

Figure 1: Three Dimensions of Sustainable Development: Synergies and Tradeoffs

2. CYCLING AND WALKING IN CITIES AROUND THE WORLD

2.1. Framework

Human powered transport provides vital mode not only for recreational but also for other purposes such as work, shopping and in some instances for inter-urban travel. Walking and cycling are the most common forms of sustainable, non motorised transport in the world. However, in some developing countries, rickshaws provide a key mode of travel for all trip purposes. We now see rickshaws in some developed countries also used for short distance travel in urban areas. This is often used like a taxi in fair weather. The human powered transport still makes a significant contribution to transport all over the world, particularly in developing countries. As can be readily seen, the human powered transport has less negative environmental effect as compared to the motorized vehicle use.

Human powered transportation may include the following forms:

- walking; including rollers blades, skateboards, kickboards;
- cycling; including rickshaws (and other cycle taxis)

All over the world human powered transport modes are considered as the most environmentally friendly form of travel. Human powered transport modes are also the most economical form of transport as they cost less than 1 eurocent per kilometre.

Human powered transport modes require minimum space both in terms of road space as well as parking area.

Most of the human powered transport modes are good for people's health, especially for those who are required to spend a major part of their daily job at their desk and for schoolchildren.

To explain the different bicycle usages and walking patterns, we compared the use of human powered modes in 20 different cities, most of them situated in Europe, through the distribution of a questionnaire. To obtain further information about bicycle use and walking, a second questionnaire survey was carried out in 6 of the originally selected cities.

Further analysis was also carried out to compare the design standards used in a number of the surveyed cities. The purpose of this exercise was to determine whether or not any lessons could be learnt based on good and ´bad examples of design. (AASHTO, 2004; Certu, 2005; CROW, 2007; FgSV, 1995; MET, 2006; Stockholms Stad, 2005)

2.2. Survey results

Our initial analysis of the data has shown the following results:

Bicycle ownership

There is a large correlation between the modal share of cycling and the number of bicycles per household.

There is a very small positive correlation between the lack of bike lanes in general and the modal share of cycling. A connection can not be deducted.

On the other hand, the correlation between the modal share of cycling and the availability of bike lanes along trunk roads, in central business districts (CBD) and in suburban areas tends to be moderately positive. There might be an interrelation.

It is surprising to see that there is a small negative correlation between the availability of other kinds of bike lanes, including the availability of bike lanes along main arteries, and the modal share of cycling. Possible reasons for this observation are illustrated below.

There is no correlation between the modal share of cycling and the regulation for cyclists to use cycle paths. Almost no coherence seems to exist between the regulation for cyclists to use bike lanes and the effective number of cyclists.

The correlation between the regulation for cyclists to use sidewalks and the modal share of cycling is moderately negative. An explanation could lie in the lacking willingness for cyclists to share the lane with pedestrians.

Permission of bicycle transportation in public transport

There is no correlation between the modal share of cycling and the prohibition of bicycle transportation in buses as well as further, not specified permissions to take bikes along. The correlation between the modal share of cycling and the permission of bicycle transportation in buses is slightly negative. Possible reasons for this are illustrated below.

Only the correlation between the modal share of cycling and the permission of bicycle transportation on trains is largely positive.

Modal share of walking

There is a small negative correlation between the modal share of walking and the number of cars per household. This means that walking becomes more important if the household does not have access to a car.

Generally there is no correlation between the availability of non specified pedestrian lanes and the modal share of walking.

The correlation between the modal share of walking and the availability of pedestrian lanes along trunk roads is slightly positive. In contrast, the correlation between the modal share of walking and the availability of pedestrian lanes in central business districts (CBD), in suburban areas, along main arteries and in residential districts is moderately negative.

The results have to be treated with care. Making conclusions based on statistical population of only 20 sample cities is too unreliable for it to be considered a representative result. Furthermore, the compared cities are very heterogeneous as to their structural conditions.

Certain sociological, demographic and infrastructural parameters that influence the modal share are not taken into account. These are, for example, the different background and tradition in the analysed cities and countries, the average covered distances or the topography.

2.3. Conclusions and open questions

To promote the use of human powered form of travel, there needs to be a better integration between transport and land use policies. It has been shown that implementing policies on creating a mix of land uses, which reduces the need to travel, and creating a higher density in urban areas have helped to promote a higher share of travel on foot or cycling. Although in western countries, more attempts are made to provide dedicated cycle and pedestrian facilities, this may not be the case in the developing countries as they see the need to provide more road space for car users is a better way of managing the congestion. Review of data obtained from some European cities, in particular, Munster and some cities in the Netherlands, we have seen that one of the encouraging factors are a flat area, an attractive town centre, an attractive landscape in the surrounding areas and also a combination of students and elderly people which has contributed to a higher use of bicycle and walking.

Political and financial support could be one of the additional reasons for encouraging a higher share of human powered transport in urban areas. In those cities, cycling and walking are on the main agenda of all parties. It is important to have combination of measures including development of walking and cycling supplies such as a network of cycling facilities, contra flow system for cycle lanes, traffic calming measures, facilities for bike and ride, cycle parking facilities, safety and comfort measures in roads and at intersections, signing and marketing. For instance, at the moment the city of Muenster has a yearly budget of 680.000 Euros for cycling supporting measures plus budgets for road designing and extra-ordinary measures like parking garages including bicycle facilities.

Initial recommendations to promote walking and cycling are:

- Make short distances with a well prepared spatial planning possible
- Provide cycling facilities in the city centre and in the living quarters (incl. parking facilities)
- Make the use of combined transport modes as easy as possible (Bike and Ride, parking garages at main stations with services, bicycle transport in trains and buses, mobility management)
- Develop area-wide network and find two routes for walking and cycling from every A to B: (1) an attractive one, safe and far away from traffic e.g. in public parks and (2) a fast and direct and secure one for daily use
- Reduce very quickly hot spots of pedestrian and cyclists accidents
- Develop a progressive signal system for cyclists on main routes
- Look especially on left turns of cyclists at all intersections in your city and make it safe
- Support the orientation with attractive sign-posting
- Look regular for a good quality of the walking and cycling supply in your city
- Begin very early with the education of young children concerning bicycle use and safety
- Offer Administration and Office Bicycles for the Employees
- Support Rikshaws
- Inform about all opportunities via Internet, on maps, leaflets and so on
- Employ a mobility manager (or better a manager team) at the municipality who is responsible for non-motorized transport
- Do as much marketing as you can
- Find archetypes and well known people who care for walking and cycling and make it public
- Organise yourself together with other cycling friendly cities in societies, alliances or associations

It is considered that the bicycle is a good alternative for car for distances less than ten kilometres. So, why is the bicycle considered as the poor man's Mercedes?

In the design standards, there are various measures available for both cyclists and pedestrians. In reality, most of the time cyclists and pedestrians have to share the 'left overs' after the road space is properly designed for motorised transportation modes.

We believe that it is never too late to start designing pedestrian and cyclists facilities into our urban environment.

3. SUSTAINABLE TRANSPORT IN MEGA-CITIES

3.1. Framework

Mega-cities represent particular problems for sustainable mobility. They have been called mega because of their size (greater that 10 million inhabitants, and up to 34 million). Not only are they large, but some of these cities are exhibiting phenomenal rates of growth: the populations of Delhi, Jakarta and Karachi will increase by a factor of about three over the thirty years between 1985 and 2015, whilst that of Dhaka will increase by a factor of four, and Lagos by five. Other cities have very little growth: the populations of Tokyo, Shanghai, Osaka, Beijing and Paris will increase by a factor of less than 1.2 over the thirty years; Tokyo's population is even expected to begin declining after 2020.

Four cities were selected for analysis; Tokyo, Mumbai, Paris and Mexico City. These cities typically serve as governmental, cultural, tourist destination, commerce and trade hubs. Their extremely rapid land use development in the past, or now, has out-paced, in varying degrees, the ability to provide transport infrastructure, regardless of whether it was sustainable. Governments of those cities are therefore playing catch-up in terms of infrastructure provision and use of conventional tools that are readily deployable for congestion management or sustainable transport. The size of that catch-up is mega in dimension, also, because of the sheer size of mega-cities.

This suggests that it may be way too late for the approaches to city planning that have been employed up to now to have any effect. Does this mean that more drastic measures are needed, or will global social forces begin to turn the situation around?

3.2. Survey results

As the four sampled mega-cities differ vastly in character, related to economic development, climate, topography, style of governments, culture, commerce, trade, tourism, etc., so do their transport systems. This is illustrated by basic statistics about transport mode share, as illustrated in Figure 2.

The statistics can be misleading. Take, for example, the two sets for Mexico City. One includes only the motorized modes, the other includes walking. When the walking mode share of 58% is included, the car mode share falls from 16% to 7%. The Paris figures do not show bus/tram, but that is because the source quoted public transport, which includes rail, bus and tram. None of the sources include motorcycle as a transport mode, except Paris (not shown).

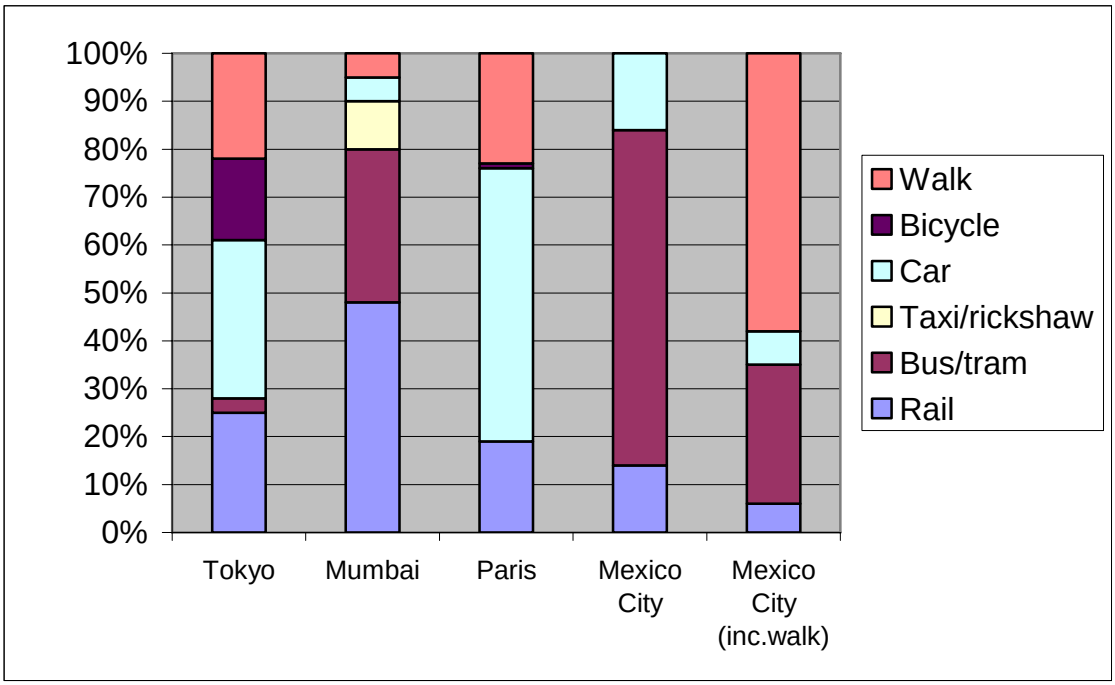

Figure 2: Transport mode share in sampled mega-cities

However, some key characteristics can be understood despite the issues with data comparability. These are summarized in Table 1.

In all cities car usage continues to grow, but other modes carry significant shares. While jurisdictions in Tokyo and Mexico City in particular have policies to expand their metros in both capacity and coverage, this is at a rate insufficient to arrest the growing car share.

No evidence was found of initiatives to encourage non-motorised modes of travel in any of the cities, but bicycle is a significant mode of travel in Tokyo.

All of the cities have, or express plans for congestion management or sustainable transport in two areas:

- Provision of additional transport infrastructure to service:
    - New land development (greenfields);
    - Land redevelopment (brownfields); and
    - Current demands
- Getting the best out of existing transport infrastructure, in particular management of the system to achieve a switch from private car to public transport; and

None of the plans for the four cities mentions travel demand management by road pricing. This initiative for reducing congestion and/or raising revenue has been implemented in London, another mega-city, Singapore, Oslo and Bergen, and is being debated in other cities like Melbourne.

The sustainability criteria are:

- Economic and financial – continuing capability to support an improved standard of living
- Environmental and ecological – generating the greatest possible improvement in the quality of life, not merely an increase in traded goods
- Social – the benefits that transport produces must be shared equitably by all sections of the community.

Table 1: Descriptions of transport characteristics in sampled mega-cities

Transport mode	Tokyo	Mumbai	Paris	Mexico City
Walk	More walking evident than statistics would suggest, may be reported as primary mode only (not in combination with, say, metro)	Ubiquitous, statistics probably constrained to primary mode for work trips	More walking evident than statistics would suggest, may be reported as primary mode only (not in combination with, say, metro)	Possibly reported as both primary and secondary mode
Bicycle	Used as both a primary mode and secondary, in combination with public transport	Bicycle and non-motorised rickshaw evident in pictures of Mumbai	Not a significant mode share	Not reported as a mode share but internet searches reveal not only travel, but commercial use such as bicycle taxi, bread, ice, soft drink and newspaper delivery, courier and vehicle breakdown repair
Motorcycle	Not reported, evident from personal observations, not significant	Not reported as a mode but evidence of some motorcycle usage from websites	Not reported, evident from personal observations, not significant	Not reported as a mode but evidence of some motorcycle usage from websites
Taxi/auto rickshaw	Only cars used as taxis	Ubiquitous	Only cars used as taxis	Many choices available
Bus	Local services by large buses complement the metro	A range of large bus services throughout the city	More common mode with distance from centre	Ubiquitous minibus and microbus services of low productivity
Rail	Comprehensive coverage of city, high service levels, system being expanded in capacity and to serve land re-development	One of the highest rail mode shares in the world, highest crush density of passengers, calls for upgrading and expansion	Modern high class service, well used in the inner city area. Service coverage declines with distance from centre	Comprehensive metro service, a combination of older and more modern services. Extensions to the system are in the planning phase.
Car	Significant and growing mode share	Mode share growing at the expense of public transport, some infrastructure improvements being implemented, but said to be the wrong ones.	Generally only viable alternative in outer suburbs. Major road system still being added to.	The road system is being continually expanded with additional motorway links. The road system carries many inefficient vehicles of low productivity.

All sampled mega-cities have elements of sustainability in their transport systems; the walking and some public transport modes, together with bicycle. Nevertheless, overall, whilst transport policies and plans have elements which head towards sustainability, the critical measures of sustainability, relating to the environment and society are still heading in the wrong directions. Air quality is not improving and the communities are becoming more inequitable.

If air quality is an environmental measure of transport sustainability the four cities may be ordered Paris, Tokyo, Mumbai and Mexico City, based on particulate air pollution (World Bank, 1995 data).

Mumbai, in particular, addresses issues of inequitable sharing of benefits produced by transport improvements. A feature of action initiatives in transport plans that have been implemented are projects to relocate the poor people living informally on road and rail reservations (MMRDA 2004). Unfortunately, observers report disappointing progress (Chopra (1999), Patel and Sharma (2000)).

All sampled mega-cities have complicated organisational arrangements with no level of government or jurisdiction having sole, clear administrative, financing or political responsibility. Management theory suggests that this would make difficult the task of focusing on a coherent plan to meet clear goals of sustainability. However, the evidence suggests that progress towards sustainable transport systems is not related to organizational arrangements. Nor is it related to presence or absence of transport plans.

All of the mega-cities studied have urban development and transport plans. Continuous effort at implementing plans is evident in Tokyo, Paris and Mexico City but progress in Mumbai has been reported as poor. The apparently more sustainable transport systems are less “laissez faire”, more driven by plans. This requires strong political will and continuity of plan implementation across successive governments. Continuity of laissez faire results in even worse situations.

3.3. Conclusions and open questions

The only conclusion that can be drawn from this study of four mega-cities is that, whilst two of them may be edging towards transport systems of greater sustainability, none can be said to be sustainable now. Their transport systems may be contributing to an improved standard of living in aggregate, but it is not being shared equitably by all sections of the community (the gap between rich and poor is growing in all cities). The environmental indicators also demonstrate that they are not generating the greatest possible improvement in the quality of life.

All four mega-cities have urban development and transport plans. Based on the above outcomes it could be argued that the plans are not bold enough. But all cities are behind target in their implementation of transport plans to various degrees.

Does this mean that sustainability cannot be achieved by intervention in transport systems? Will change occur in other ways, for example as Tokyo’s population declines as a result of Japan’s falling fertility rate? Will personal motorised mobility decline as fossil based fuels become more scarce and expensive? We have not been able to manage it so far.

4. CONGESTION AND ITS COUNTERMEASURES

4.1. Framework

Due to rapid increase in transport demands during the past decades, congestion has become a quite common and a major problem for human mobility, either in developed or developing countries.

Congestion is a highly complex phenomenon, influenced by socio-economic, technical, and even human factors. Thus, no common consensus has yet been reached either on its precise definition, assessment of its diversified impacts, or on effectiveness of countermeasures.

On its definition, however, it can generally be agreed that congestion is the rupture of the level of service caused by the imbalance of supply and demand in relation to road space and time in a day.

From the point of cause of congestion, however, two patterns can obviously be identified, i.e. recurrent and non-recurrent congestion. While the former results from a permanent lack of capacity, the latter is caused by incidents that reduce capacity temporally in a limited area.

Moreover, uninterrupted flow on freeways and interrupted flow on urban roads have to be distinguished.

As congestion is an urgent problem, much effort has been exerted to investigate cause of congestion, and to plan and implement measures for alleviating, preventing and managing (either recurrent or non-recurrent) congestion.

Those countermeasures have been characterized by nature/degree of congestion, socio-economic situation of individual region and cities, level of development of individual countries, etc.

The study focuses on countermeasures against recurrent congestion on urban roads, actually implemented in various cities in PIARC member countries. Some 20 cases have been collected (but not many from developing countries) and analyzed.

The study identified the following four categories of congestion preventive measures:

- Traffic and transport policy
- Infrastructure construction
- Regulatory measures
- Soft and technical measures

4.2. Survey results

Traffic and transport policy

Importance of overall traffic and transport policy can never be overstressed. Two points can be raised. Recurrent travel demand is basically influenced by land use. For instance, low density suburban housing development tends to increase longer commuting travel demand and dependence on the car, because such low density demand cannot be supported by public transport. Thus, overall transport policy should be tied to land use policy endorsed by reliable development control.

The other point to be raised is the importance of modal shift policy. One of the keys to reduce dependency on the car is to provide or improve alternatives to the car. It is reported that investment to public transport increased its patronage, and that the increase can be intensified, if coupled with active restraints on car use in city centre.

Infrastructure construction

Infrastructure construction has long been and still is a traditional and effective countermeasure. The analysis of 20 cases shows that many cities still pursue enlarging the capacity and removing bottlenecks of their road network. However, adding new road infrastructure tends to be limited, or will be limited in the future, due to several factors such as follows: expensive realization, high land use, long planning periods, and limited space in urban areas.

Therefore, investment on infrastructure should also be addressed to enlarging capacity of public transport, esp. of rail/transit network, based on the said comprehensive transport plan.

Regulatory measures

Traffic and transport policies and infrastructure construction could be effective over the longer term, but cannot be seen as a short term solution of today's problems. The study identified several countermeasures under the category of "regulatory measures", such as follows; parking policy, pricing, traffic management, time management, and different use of the existing infra capacity.

The analysis of 20 cases shows that traffic management through signals and signs have long been and still are implemented in many cities with reliable effectiveness. Traffic management can well be further sophisticated and/or specially expanded, in line with the evolvement in the field of telemetric/electronics. Different use of the existing infrastructure capacity includes conversion of road surface into transit right of way, conversion of carriage-way into bicycle path or side walk, and other type of conversion aimed at reduction of road capacity in central city to reduce dependency on the car.

Parking policy in the context of congestion preventive measures aims at limiting the supply of parking space and/or charging heavily for their use in central city. On the other hand, supply of parking space is pursued at park and ride sites in the suburbs or at fringe sites around pedestrianized central areas. Although parking policy can well be an effective measure, actual application of the policy may well be controversial, depending on the nature and degree of limitation and/or charging, and on the political and social-economic background of cities and countries concerned.

Pricing aims at reducing traffic demand by shifting it to other time periods or modes by charging for entering trips to central city. Pricing is reported to be effective in Singapore, and recently in Stockholm, Sweden and in London and the other British cities. However, actual application of pricing way has political nature, inviting controversy on whether such regulatory measures would be acceptable for citizens, whether the other alternatives would be sufficient, or whether such measures would have adverse socio/economic impacts.

Soft and technical measures

Soft and technical measures include utilization of telematics, reallocation of road space in favour of non-motorized and public transport modes, mobility management and promotion of soft mobility. Technical measures supported by recent evolvement in telemetries/electronics have expanded the scope of traffic management, intelligent transport systems, and analyses of current traffic situation. In the past years, the quality and volume of traffic data available has reached higher levels.

4.3. Conclusions and open questions

The congestion is not a natural phenomenon, that it can be controlled durably by implementing adequate mix of congestion preventive measures, based on carefully designed and politically supported traffic and transport policy. Future directions of the four categories of congestion preventive measures are as follows.

Infrastructure constructions

Infrastructure construction is still an important countermeasure to reduce traffic congestion. More particularly, provision of ring roads has substantial effect to alleviate down town congestion. For developing countries, expansion of road network is necessary to meet increasing demand for passenger/freight transport, triggered by economic / social development.

In developed countries, where road infrastructure provision has long been effected and reached a considerable level, further expansion of road network has become a more difficult and costly measure. In addition, fundamental question has been posed, whether effectiveness of infrastructure provision would be sustainable. Among others, a major point of argument is whether efforts for infrastructure provisions should be shifted from road, and should be addressed more to public transport and / or non-motorized transport.

Regulatory measures

Basically, regulatory measures are effective tools to reduce congestion and vary from politically challenging ones to temporally or trial ones. Whenever introducing regulatory measures, various stake–holders are to be involved. Therefore, it is desirable to examine various alternatives in detail and to implement public discussions and hearings before reaching conclusions.

The other objective of regulatory measures is securing environment. In general, issue of global environment has become a major concern in recent years. To reduce exhaust emissions, more and more countries will introduce strict gas regulations or charge fiscal pricing for vehicle owners. Consequently, it might be more difficult to own and use the car than before.

Soft and technical measures

Soft and technical measures seem to have more possibilities to control traffic flow and reduce congestion in the future. Advanced telemetric and new ideas will be used for smooth and safe traffic flow.

Reallocation of road space in favour of non- motorized transport and of public transport should be pursued under adequate the modal-shift policy. In addition, to encourage use of public transport, soft policy options such as public fares initiatives and better travel information are being pursued in many cities. In some cities, soft measures such as car sharing and traffic education are introduced.

Traffic and Transport policy

Congestion preventive measures above-mentioned (infrastructure construction, regulatory, or soft/technical measures) should be adequately mixed in order to form up a consistent and effective set of traffic and transport policy. At the same time, adequate land use and modal shift policy are to be incorporated.

The adequacy of such mixed traffic and/or transport policy may significantly differ from city to city and from country to country, because individual cities and countries have different socio/economic/political background, different demographic size and characteristics, different nature/degree of congestion problem, different level of existing infrastructure provision, and deferent level of economic development. Therefore, the cities/countries may require their own original sets of traffic and transport policies.

Finally, the Study proposes two recommendations. The first is to enhance research on effectiveness and sustainability of congestion preventive measures; because only little is yet known in this field and the knowledge on it may be indispensable in formulating traffic and transport policy.

Secondly, it is important to exchange information, experience and views on measures to alleviate, prevent and manage congestion. In spite of the mentioned diversified nature of congestion, information on and experience in some city/country may well be informative and may present good reference for the other cities/countries.

A fundamental question arisen in the course of the Study is the effectiveness and sustainability of congestion preventive measures. Among 20 cases analyzed by the Study, less than half of them included quantified effectiveness indices, resulted by the post-fact surveys. Aside from quantifiable effectiveness, varieties of non- quantifiable effectiveness may have arisen for those cases.

Further question on effectiveness is whether effectiveness of congestion preventive measures would last longer or not, and, in other words, whether those measures could be sustainable or not.

Regarding infrastructure provision, it has been frequently argued that increase of road traffic capacity may induce additional traffic and thus level of congestion would be no better than before on the long run. This notion, however, may not undermine the necessity of infrastructure provision by itself, because expanded road transport capacity may well contribute to regional economy, etc.

Regarding the effectiveness of regulatory measures, argument may much more be complicated, because such measures inevitably involve political, economic and other aspects.

At present, our knowledge on the effectiveness and sustainability of congestion preventive measures is quite limited, both in quantifiable / non- quantifiable and short / long terms.

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DRAFT CONCLUSIONS

Human powered transport

To promote the use of human powered form of travel, there needs to be a better integration between transport and land use policies. Although in western countries, more attempts are made to provide dedicated cycle and pedestrian facilities, this may not be the case in the developing countries as they see the need to provide more road space for car users is a better way of managing the congestion.

It is important to have combination of measures including development of walking and cycling supplies such as a network of cycling facilities, contra flow system for cycle lanes, traffic calming measures, facilities for bike and ride, cycle parking facilities, safety and comfort measures in roads and at intersections, signing and marketing.

It is considered that the bicycle is a good alternative for car for distances less than ten kilometres. So, why is the bicycle considered as the poor man's Mercedes?

Mega-cities

None of the four mega-cities studied have sustainable transport systems. Their transport systems may be contributing to an improved standard of living in aggregate, but it is not being shared equitably by all sections of the community (the gap between rich and poor is growing in all cities). The environmental indicators also demonstrate that they are not generating the greatest possible improvement in the quality of life.

Does this mean that sustainability cannot be achieved by intervention in transport systems? Will change occur in other ways, for example as Tokyo's population declines as a result of Japan's falling fertility rate? Will personal motorised mobility decline as fossil based fuels become more scarce and expensive? We have not been able to manage it so far.

Congestion

Congestion must be managed in many ways: a good sustainable transport policy is necessary, rail network should be developed but road infrastructure construction will also be needed. Mostly regulatory measures will give good effects on congestion. They should be supported by soft and technical measures as: road telematics, mobility management and reallocating road space for non-motorised transport modes.

Regarding infrastructure provision, it has been frequently argued that increase of road traffic capacity may induce additional traffic and thus on the long run the level of congestion would be no better than before. This notion, however, may not undermine the necessity of infrastructure provision by itself, because expanded road transport capacity may well contribute to regional economy, etc.

At present, our knowledge on the effectiveness and sustainability of congestion preventive measures is quite limited, both in quantifiable / non-quantifiable terms, and short / long terms.