

## CRITICAL ISSUES IN TRANSFORMATION OF TRANSPORTATION POLICY IN KOREAN METROPOLITAN AREAS

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**Abstract:** This paper reviews current and past transportation policies which have been implemented in Korean metropolitan areas and their experiences in identifying transportation issues and problems. The policy making process is also examined and attention is focused on its role in the development of transportation policies, plans and programs. Using the information from government authorities and transportation operators, the paper examines whether or not transportation policy and planning schemes in these cities can cope with the transportation problems. As policy recommendations for transforming the current transportation systems the paper suggests the strategic guidelines associated with transportation policy and planning for metropolitan areas. Rather than promoting the construction of new roads, these guidelines encourage more efficient use of existing public transportation facilities, which ultimately benefit public transportation passengers while improving social costs of congestion and air pollution on automobile users on the basis of a polluters pay principle.

**Key Words:** sustainable transportation, traffic congestion, mobility, accessibility

### 1. INTRODUCTION

Over the last three decades a number of transport policies have been introduced in major Korean metropolitan areas. Some of the policies have led to improvements in public transport systems, transport demand management schemes and in traffic engineering. However the majority of transport policies have mainly focused on the mobility of automobiles and the supply of road networks. As a result, many cities are currently suffering from severe traffic congestion, heavy air pollution, higher energy consumption and a lack of accessibility for certain social groups in urban areas (Kim and Gallent, 1998; Hwang, 2001).

In recent years the United State along with many European countries have suggested strategic guidelines associated with transport policy and planning for metropolitan areas (for example, see Lowe and Bloom, 1995; Rosenbaum, 1998; Banister, 2000; Banister et al, 2000; OECD, 2000; Janic and Reggiani, 2001). Rather than promoting construction of new roads, these guidelines encourage more efficient use of public transport facilities,

which ultimately benefit public transit passengers while improving social costs of congestion and air pollution for automobile users on the basis of a polluters pay principle. These guidelines also suggest the linkage of land use and transport in the city planning process, and expressway tolls in urban areas.

For instance, in 1998 the U.S. federal government enacted the Transportation Equity Act for the 21st Century (TEA-21), which builds on the initiatives established in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This Act combines the continuation and improvement of current programs with new initiatives to meet the challenges of promoting efficiency of existing facilities instead of providing new transportation facilities, addressing environmental problems resulted from transportation, and ensuring more benefits to disadvantaged mass transit users. Also covered under the Act is the imposition of social costs on auto users, who it is felt are more responsible for congestion and air pollution, based on the polluters pay principle, and the charging of highway tolls.

The British government also published a White Paper entitled 'New Deal for Transport: Better for Everyone' which is considered a wide-ranging document with an innovative vision of transportation for the 21st century in Britain (DETR, 1998; Goodwin, 1999). The document proposes transport solutions to environmental problems, programs centered on public transit services, and the observance of a polluters pay principle in urban transportation. The document also covers transport policies focusing on the integration within and between different types of transportation mode, the integration of transport and the environment, as well as land use planning, and other policies for education, health and wealth creation. Proposed actions supplant current practices by using state-of-the-art technology to maintain and manage transportation more efficiently in order to tackle traffic problems based on thorough demand forecasts.

The Singapore government has also issued a white paper focusing on the building of a world-class land transportation system (Willoughby, 2001). This paper addresses the supply and improvement of various public transportation services, and the integration of land use with transportation planning. Managing travel demand based on economic principles, development of a comprehensive road network, and the harnessing of technology to maximize network capacity are also addressed within the scope of the paper. In 1998 the electronic road pricing (ERP) system was introduced to replace the area-licensing scheme (ALS) using more advanced technology such as smart card system (Goh, 2002).

The common philosophical basis of 21st century transportation vision documents issued by developed nations has as a central focus the recovery of equity. The key areas of effort being made by these nations relate to the improvement of the environment, the strengthening of public transportation system, the management of traffic based on the beneficiary pay and polluter's pay principles, and the construction of integrated systems of public transit including more socially integrated system of traffic management. This suggests a strong intent to take a positive attitude to address problems through rational regulations on social costs derived from congestion, air pollution, and car accidents.

This paper reviews current and past transportation policies which have been implemented in Korean metropolitan areas, with particular attention being given to the city of Seoul and the surrounding areas. The policy making process is also examined and attention is paid on its role in the development of transportation policies, plans and programs. The way in which central and local government agencies interact is also explored. Using information from government authorities and the transportation operators, the paper examines whether or not transportation policy and planning schemes in these cities can cope with the transportation problems likely to be experienced in the future. Based on proposals for a new transportation paradigm eight transportation policy alternatives are suggested.

## **2. THE NEED FOR A NEW PARADIGM OF TRANSPORTATION**

### **2.1 Changes in Transportation Circumstances**

Since mid-1980s most metropolitan areas in Korea have suffered from a variety of transportation problems as a result of significant increases in income, highly dense urban developments, a swell in car ownership, and a sharp rise in land prices coupled with a shortage of available land. Other factors such as large-scale development of satellite cities and new towns, a shortage of rail networks, and a continuous concentration of economic activities particularly centered around the Capital region have also led to a worsening of the transportation system. The recent recovery from an economic crisis managed by the International Monetary Fund (IMF) combined with a drop in the efficiency of transportation investment has also led to the deterioration in the current traffic situation on the whole. Therefore, appropriate policy measures are required to meet the challenges that most Korean metropolitan areas face currently.

According to the recent report on traffic conditions in seven metropolitan areas published by the Ministry of Construction and Transportation (MOCT), the number of registered vehicles in 2000 increased by about 7% up to 5,602,000 cars, or 366,000 cars from a year earlier (MOCT, 2001). Given a considerable number of these new vehicles use liquefied petroleum gas (LPG) or other low-priced oil products such as diesel, the average traveled distances per vehicle in Seoul increased to 61 km in 1999 from 51 km in 1997 in spite of high gasoline prices. In the case of LPG vehicles, which include taxis, the average traveled mileage per vehicle increased by as much as 35 km over the same period due to the relatively low fuel cost burden associated with such vehicles. Besides the policy failure of oil pricing, unclear priorities and a lack of direction combined with unfavorable changes in the external environment of the transportation system, traffic conditions have been even further exacerbated.

In Seoul, the average travel speed for auto decreased from 21.2 km per hour in 1999 to 18.5 km per hour in 2000 (SMG, 2000). With the exceptions of Incheon and Kwangju cities, similar decreases in average speed have also been experienced in other metropolitan areas. Moreover government reports show that in most metropolitan areas the bus ridership has steadily decreased in market share whereas automobile use has

increased (MOCT, 2000, 2001). However, it is worth noting that medium- and small-sized cities with poor quality transit services are relatively highly dependent on auto use compared to the large cities. For example, Seoul's automobile use share of total trips in 1996 was 21% in comparison to Chunan and Ahnyang, two medium-sized cities where automobile use was 30% and 28% over the same period of time respectively. In addition, because parking facilities are not well established within urban areas, illegal car parking is now a common practice becoming an obstacle to the fulfillment of business functions within cities.

Nevertheless, energy consumption in the transportation sector decreased by as much as 18.4% for the year 1997 to 1998 as a result of the IMF intervention. Unfortunately, the year 1999 witnessed an increase of 7.7% over the previous year in energy consumption. Yet, despite the significant rise in the price of gasoline, the transportation energy consumption accounted for 19.7% of the total industrial energy consumption in 1999. This suggests that the government was not successful in implementing an energy-efficient transportation system, as it costs over \$20 billion yearly to purchase oil with the resultant impact upon national finance (Lee, 2000).

Though diesel costs only half the price of gasoline, the exhaust fumes of diesel engines make up over 88% of air pollutant emissions, producing considerable environmental problems. As the price gap between diesel and gasoline widens, particularly after the 1997 economic crisis, diesel engines for transportation of passenger as well as commercial goods increased in number and as such air pollution came to the fore as a serious social problem. In Seoul, the level of dust emissions increased 12  $\mu\text{g}/\text{m}^3$  over the 1997 level however carbon dioxide emissions have remained at the 1997 level. In 1999 the ground-level ozone was 0.016 ppm, which is higher than the 1995 level (SMG, 2000). As a result, alert systems for ground-level ozone and compressed natural gas (CNG) buses were introduced in Seoul, but are yet to have a favorable impact.

## **2.2 Analysis of Problems and the Necessity for the Establishment of a New Transportation Paradigm**

At the core of transportation problems in the metropolitan areas of Korea is internal discord among transportation policies, for without any controlled policy paradigm the objectives of separate policies have no order of priority and often run counter to one another. For example, if policy goals like 'high mobility' and 'human-oriented and environmentally friendly transportation' coexist without priority, the action plans in total have no proper procedure and may even cancel each other out. In addition, there is external discord among related sectors, e.g., between the administrative authorities concerned and interested parties.

Internal discords, mainly arising out of questions relating to what is the most preferred issue, produce the following problems (Hwang, 2001):

- Conflicts between automobiles and humans: illegal sidewalk parking; concerns over the protection of commercial rights; off-street parking permit issues; and, concerns over residential area safety.

- Conflicts between automobiles and public transit: investment priority among road, bus and subway; bus-exclusive lanes and automobile delays; congestion fee collection on private auto and bus exemptions from such fees; and, low rate transit fares and high rate taxation on private vehicles.
- Conflicts between public transit services: decreases in bus patronage owing to the extension of subway networks; overlapping routes between buses and subways; and, overlapping routes among buses, community buses and shopping shuttles.
- Conflicts between person and freight trips: entry limitation on freight for stopping space and long-term parking but not for automobiles.
- Discord between supply side and management side in the viewpoint of approaching traffic problems. The former emphasizes increased construction of roads, overpasses, subways, and new facilities while the latter extols the efficient management of established facilities and methods to restrain the traffic demand of privately owned modes. Unfortunately, this has resulted in a lack of consideration to the fact that the supply of transportation facilities in fast growing cities such as Seoul tends to generate new traffic demand.

Examples of external discord include the existence of conflict among administrative authorities (Kim and Gallent, 1998). As transportation-related authorities have no integrated system in terms of construction, management and operation, it is difficult to look at problems comprehensively. The problems are, for instance: too much separation of transportation administrative functions among local authorities; strong central intervention on local traffic operation; and, local plans controlled by the financial subsidy of central government. The problems are exemplified by the different functions of the different bodies. For example: the national police is responsible for signal lamps, signposts and city highway operation; the Seoul Metropolitan Government has no integrated system of transportation administration; the traffic management centers are responsible for traffic management and public transit services; the construction department is responsible for road construction and operation; the subway construction headquarter is responsible for subway construction; two subway corporations are responsible for subway operation; Gu or Borough offices are responsible for off-road works; and, the Ministry of Construction and Transportation (MOCT), the Kyonggi Province and the Incheon Metropolitan Government are responsible for metropolitan transportation facility construction and management. Furthermore, through the revision of roads and traffic law, the police often interfere in the administrative business of local governments in such areas as traffic control, safety, and parking supervision. Also, the MOCT is showing a tendency toward the centralization of power which runs counter to local autonomy through the law on Transportation Systems Improvement and the special law on integrated transportation, under the pretext of managing reckless investment of local governments. In addition, public transit is operated based on an administrative sphere with no thought of passengers' living sphere, which weakens its competitive position.

There exists difficulty in inducing synergy effects between transportation policy and other sectors such as land use and city planning, environment, logistics, and Information Technology (IT). For instance, the law on capital region growth management approves housing construction but regulates the construction of major companies or any factory

facilities of high-tech industries, which results in an imbalance between jobs and housing and encourages long-distance commute trips. Conflict among interested parties borne from the absence of a coherent transportation administration makes it difficult to carry out rational and necessary plans closely related to the environment, human life and congestion mitigation. With regard to price regulation, experts are strongly opposed to this as are local governments which are unwilling to take up the issue.

### **3. PROPOSALS FOR A NEW TRANSPORTATION PARADIGM**

The environment surrounding the transportation policy in Korea is changing rapidly. The accumulated experiences have triggered a lot of reflection by decision makers, which along with the advent of the information age and the maturity of civil society requires interested parties to make a considerable change in many sides such as object, method and decision processes of policy.

#### **3.1 Goals of Policy**

Recently, the issue that mobility, the most widely accepted paradigm of transportation in the past century, is sustainable in the 21st century has given rise to much controversy. Mobility commonly associated with development, growth and efficiency; was a pivotal paradigm in the development of cities when the supply of efficient transportation facilities was a reality and a logical necessity to overcome spatial impedance (Camagni, Gibelli, and Rigamonti, 2002). Safety, convenience and cost effectiveness were essential indices in practicing the paradigm, and for this, civil engineering, transportation engineering and economics made the greatest academic contributions.

However, mobility, once the most fashionable paradigm in the 20th century, is now confronting a crucial crisis with sudden changes in external conditions such as land depletion, financial burdens imposed by excessive construction, the limitations of technical forecast, increasing deficit, and raised public awareness (Meyer and Miller, 2001). Furthermore, along with the rapid spread of human ecology theory (Kaiser, Godschalk and Chapin, 1995) which views nature in a human-oriented manner, the perception of the destruction of nature has been renovated. It has conflicted with the original ecology, which supports the preservation of nature, prompting a crisis in the paradigm since late 20th century.

It is expected that the paradigm of mobility will shift to accessibility which emphasizes, as a management-oriented idea, more importance on the environment and citizens compared with supply-oriented measures (Handy, 1993). In other word, accessibility builds on the condition that any kind of transportation services should be provided to reach a destination whatever travelers use. From this point of view, trips have multiple aims so various political measures should be considered through policy mix to meet the demand.

### **3.2 Measures of Transportation Policy**

Traditionally, the major concerns in terms of transportation planning were congestion, development and efficiency. In this vein, principal policy measures focused on the supply of transportation facilities, for example new construction, extension and integration, and the application of road and transportation engineering to raise efficiency in traffic flow management, and system improvement. These concerns were expected to change with the advent of a new paradigm on sustainable development within cities. Here the new concerns include: global warming, ecology, social equity, the quality of life, and energy consumption (Newman and Kenworthy, 1999). These shifts are expected to bring great changes in policy measures implemented.

In the future, important political measures are likely to include access management, land use planning and growth management, transportation demand management (TDM), intelligent transportation system (ITS), incidence management, traffic calming and city design, and education (Meyer and Miller, 2001). To recapitulate the change, the former represents the provision of facilities and transportation engineering policy, while the latter does the management of the present facilities and trip makers. The advent of various administrative policies is expected to adjust the interests of conflicted parties.

### **3.3 Transportation Policy Decision-Making Process**

The paradigm of Mobility puts a high premium on objective rationality, represented in terms of technical, instrumental and economical achievements. Such rationality draws a distinction between the general public and the expert group, which makes it difficult for each to understand the other. Therefore, generally it was predominantly thought that objective rationality should come first before the subjective understanding of the public. Against this backdrop, transportation plans were executed in an authoritative manner somewhat analogous to an order from one's superior. In addition, considerable political variables intervened in the policy making process so that many plans ended up with a lack of objectivity.

There are many practical obstacles to proceed with a plan which affects the establishment of facilities and impacts upon travelers only by virtue that the implementation of the plan is objectively rational. This is because many interests get entangled with the plan in various ways. Previous political measures wrapped with technical rationality carried out a political will with ease, but as new measures are based on building consensus among parties concerned, it is difficult to reach an agreement on a plan based solely on technical rationality. Therefore, communicative rationality based on the theory of Habermas (1984, 1987) and Friedmann (1985) is expected to play an important role as a new paradigm in relaxing tensions in the process of policy formation and raising the feasibility of a plan. This attaches weight to the role of an expert with professionalism and the ability to persuade and communicate. It will become increasingly necessary for transportation planners to take an active part in inducing disclosure between a government and other interested parties through the use of their

communication skills and expertise (Ward, 1984; Willson, 2001). It will be necessary to organize related meetings and to make efforts to reach an amicable agreement based on rationality through active participation, mutual understanding and efforts to narrow gaps in opinion.

#### 4. DIRECTIONS OF TRANSPORTATION POLICY

Three transportation environments associated with transportation policy making are suggested to establish a new transportation paradigm. These include:

- A fair and equitable transportation environment for the socially disadvantaged. To create such a transportation environment, transportation resources should be distributed evenly, not regionally biased, to make a contribution to promoting balanced regional development, and transportation system should be established focusing on human, public transport and the environment instead of automobile. In particular, public transit should provide a wide range of services to raise accessibility. On the other hand, auto drivers should shoulder expenses according to the beneficiary and/or polluter pay principles.
- Sustainable transportation environment with low cost and high efficiency. This requires the implementation of inexpensive management plans rather than expensive facility construction plans. Environment-friendly transportation systems designed to decrease car demand and minimize social costs should also be goals.
- Organically integrated and balanced transportation environment. This suggests harmony with the environment and culture requiring smooth logistical systems and an overall improvement in transportation-related sectors.

More specifically the transportation environments suggest as directions in transportation policy the following.

- A change in paradigm from car orientation to people and environment orientation,
- The provision of competitive services of public transportation in comparison to cars,
- The application of the beneficiary or polluters pay principles to car drivers in a strict manner combined with the investment of revenues in upgrading the quality of transit services and supporting financially an integrated institution,
- Placing a higher priority on road investment and improvement to establish freight movement networks for the free flow of goods and improve the efficiency of door-to-door services by using distribution companies and street parking for freight loading and unloading,
- Invest efficiently by balancing the provision of transportation utility and administration,
- Implement a comprehensive urban management policy that connections land use or city planning with environmental planning,
- Delegate the executive functions of the central government to the local authorities, and
- Improve exterior conditions to raise feasibility and advance transportation culture by promoting the participation of citizens, advancing professional planners within the established system through various programs, and providing transportation-related education program at universities.



## 5. TRANSPORTATION POLICY ALTERNATIVES IN DETAIL

### 5.1 Establishment of Human and Environment-Oriented Transportation System

New transportation measures are required to shift from a car-oriented paradigm to a human and environment-oriented paradigm. To achieve this it is necessary to restrain automobile use and make the streets more pleasant to walk along. Furthermore, crosswalks at crossroads need to be repaired and increased in number, and the application of district transportation improvement projects should be extended. In Seoul, for example, a safe and adequate pedestrian passage was allowed in front of Kwangwhamun Gate in the civic center, and Myongdong in the central business district. The streets in front of Kunguk University, located in the eastern part of Seoul, have also been transformed into pedestrian-friendly streets, and Donhwamun Street near the civic center is under construction.

After evaluating the usefulness of existing facilities such as roads and overhead structures they should be, when needed, dismantled or transformed into space for walking. When the Seoul Metropolitan Government (SMG) closed Namsan 2nd Tunnel, which connects with the city center, for repairs over three years, a traffic survey revealed little traffic delay on neighboring streets (SMG, 1999).

Recently, the Seoul government started to remove a 5.8km length of Cheonggye elevated highway, a major connector between the city center and outskirts, and to renew the adjacent areas into pedestrian-friendly ecological districts. The cost is estimated at approximately US\$300 million for removal, maintenance and improvement by 2005 (SDI, 2001).

The introduction of a residential area parking permit program is expected to aid the prevention of fatalities from fire by securing space for fire engines and is expected to protect pedestrians by controlling non-resident parking in residential districts. A garage requirement law would be best to reduce illegal parking in residential area. However, it should be applied to cars with an engine displacement of more than 2000cc on a step-by-step basis in order to minimize friction with the automobile industry.

A floor area ratio incentive for the closure of entry and exit driveways to buildings is desirable to avoid conflicts between pedestrians and cars approaching directly from the main street. With this kind of program, the 41st Street in New York experienced success in ensuring pedestrian flows and controlling the excessive use of cars. In addition, it is necessary to induce drivers to use a circular urban highway and to enhance mobility with a toll collection scheme. As a result, arterial roads are free from excessive cars and re-designed to facilitate easy access for pedestrians and human activities.

Exclusive bus shoulder lanes which expose pedestrians to air pollution, noise and tremor need to be moved to the center of the roadway. In addition, a bus exhaust pipe should

be designed to move pollutants upward to protect pedestrians from emissions. Diesel oil prices should be increased to a level comparable to gasoline so as to restrain the over consumption of currently inexpensive diesel oil. In addition, facilities and services for green transportation such as bike, light rail and the less mobile need to be provided and expanded to a large scale.

## **5.2 Improving Competitiveness of Public Transit against Cars**

To sharpen the competitive edge of public transportation services, it is necessary to encourage more public transit-oriented development on the already highly dense streets, such as Teheran Street and Kangnam Street in the subcenter of southern Seoul. High density development is generally characterized by numerous pedestrian trips coupled with high vehicular demand. Those streets mentioned are gridlocked with automobiles, as well as bus exclusive shoulder lanes which do not adequately fulfill their intended function. The pedestrians require more space for walking than currently available. Therefore, to improve transportation services in these streets, it is desirable to add more bus services even if there is an already existing subway service underground. In addition, so as to secure smooth running of buses, shoulder bus exclusive lanes should be moved to the center of the roadway. By narrowing roads and expanding space for walkers and other pedestrians the streets will become public transit-oriented (for example, see Cervero and Radisch, 1996; Ryan and Throgmorton, 2003).

It is also necessary to restrain long distance automobile trips. This can be achieved by: encouraging intercity travelers to use public transportation such as rapid trains and intercity bus rapid transit; operating bus preferential lanes on highways to the city center all day long; introducing integrated transit passes; fare reduction for transfers and new transportation modes; the improvement of subway transfer systems; the diversification of the taxi services; and, providing tax benefits to employers who are frequently using public transit modes.

## **5.3 Application of Beneficiary Pay and Polluter Pay Principles**

The beneficiary and polluter pay principles should be strictly applied to automobile drivers, the revenues from which should be spent on upgrading the level of transit services and supporting an integrated transportation service. In particular, congestion tolls should be enlarged to traffic-stricken areas and the revenue be reinvested in improving transit services. The Namsan tunnel congestion charging scheme has been implemented for the last six years and was found very successful at improving traffic speed on the toll charged corridors (Hwang, 2001). In addition, it is recommended that a graded traffic impact fee be imposed on employers according to the level of reduction in automobile travel, to adjust local mileage tax rates upwards, and to introduce residential parking permits to remove free off-street parking in residential districts.

The government should take an active part in managing traffic demand at the source by designating department stores or large-scale business districts as special transportation

management zones, which partake in various programs. A maximum parking requirement on parking lots for business and/or commercial use should also be implemented to limit the supply of parking space, thus controlling excessive car use (see Shoup, 1999). At present, a toll exists on a beltway in the Capital region however all inner city expressways in Seoul are toll free. Hence, the traffic passing through congested central areas aggravates crowding. In order to solve the problem, it is recommended to introduce tolls on the city expressways to smooth traffic flow and to minimize vehicular trips inbound to the city center.

#### **5.4 Preferential Treatment for Freight Movements**

A necessary requirement is to place overweight or oversize restrictions on freight vehicles on a limited basis, and to give higher priority to road investment and improvement works in order to establish freight networks promoting the free flow of goods. Also recommended is the improvement in the efficiency of door-to-door service by using distribution companies and street parking for freight loading and unloading. To achieve this it is necessary to push forward with the introduction of freight exclusive roads or lanes, implement a street parking system for freight loading and unloading to reduce costs in distribution, and revise parking laws in order to stipulate mandatory facilities such as parking space.

Small-scale distribution companies running business with motorcycles cause many problems on streets such as traffic accidents, delivery accidents, driving without insurance, and illegal road occupation. However, there are no grounds to supervise them under the law. The laws governing freight vehicle operation are not applicable to such businesses because the law does not recognize this type of mode. Therefore, there exists a pressing need to legalize and improve the business environment for such firms. In addition, it is necessary to construct a package distribution center inside each city with nonstop operations, and establish an information network to reduce costs in logistics.

#### **5.5 Improvement of Efficiency in Transportation Facility Investment**

It is recommended that the cost-effectiveness of transportation facility investments be achieved. Prior to an investment decision, the central government should set preconditions that a certain level of travel demand is managed by transportation demand management (TDM) and transportation system management (TSM). Therefore, over-size transportation facilities can be restrained. Current transportation planning is based on dealing with increasing traffic demand based solely on system supply. The supply side measures have been given a high priority by government because these measures are relatively expensive whereas low-cost management plans such as TSM and TDM attract little attention from the public and government alike. In the United States, the congestion management plan (CMP) is designed to deal with 20 per cent of increases in traffic, whereas in France, 4 per cent to 8 per cent of traffic is dealt with through management plans.

In terms of roads investment, reinforcing the connection with existing highway networks is necessary to be ahead of new construction of city expressways and subway lines, so as to provide rapid and extended services. In consideration of a possible Korean unification, future facility investment should be undertaken outside of the Capital region so as to avoid the centralization of traffic in the region.

Various management techniques such as access management, land use management, city design, intelligent transportation systems (ITS) and accident management are required. For effective application, transportation experts need to be fostered and hired by local authorities. At present, transportation-related officials at the level of local authority lack expertise and political interests hinder efficient budget spending.

Lastly, facility investment tends to result in productivity declines if it is focused solely on meeting traffic demand. Therefore, in the case of overpopulated areas, designated by laws on the Capital area growth management, it is more desirable to seek financial resources by attracting private capital investment than to depend on the direct investment of the central government. In such cases, the money saved by the central government should be invested in nurturing other cities to redress the current uneven and unbalanced development pattern.

## **5.6 Integrated Urban Management Policy**

The implementation of a comprehensive urban management policy that considers land use, or city planning, and environment planning simultaneously is also required (Janic and Reggiani, 2001; Kim 2001). To do so, it is necessary to revise the Capital Region Growth Management Law, and permit large companies and other factory facilities to move inside the metropolitan areas. This will accomplish the concept of 'compact city' in the Capital region and address traffic problems caused by the job-housing imbalance and enhance national competitiveness.

It is also necessary to solve additional traffic problems resulting from overpopulation by developing other local cities and organizing a new environmentally friendly land management system to convert by merging the MOCT with the Ministry of Environment (MOE) and other related government authorities.

The Seoul city department of environmental management and bureau of transportation management are under different vice-mayoral jurisdictions, making it difficult to mediate between them. Therefore, it is required to have a deputy mayor of environment who comprehensively manages environment, city planning and transportation under his or her jurisdiction. Along with this, a master planning team under the deputy mayor's jurisdiction is recommended.

## **5.7 Transportation Administrative System Suitable for Local Autonomy**

It is necessary to cede the executive functions of the central government to the local

authorities, that is, the local authorities should decide, and central government manage and control, overall system efficiency. The police should relegate local traffic operation functions to local governments. At present the national police have the right to revise the road traffic laws, and are involved in such minor issues as the erection of signposts, the marking of crosswalks and the operation of traffic signals and city expressways.

The MOCT should also hand its decision-making functions on road construction and the supply of intercity bus services over to local authorities. It is necessary for MOCT to close down the Metropolitan Transportation Planning Team in charge of area-wide transportation, and establish a local association body to undertake the task.

A metropolitan public transportation management association needs to be set up to manage an integrated service (see Costa, 1996). Each authority is to be operated autonomously, but subsidies from the central or local government should be provided through the association to promote public interests in route adjustment, fare, level of service, and connecting services.

### **5.8 Promotion of Advanced Transportation Culture**

It is necessary to improve the transportation culture by promoting the participation of citizens in decision-making processes, and by fostering expert planners within the established system through various programs, and provide transportation-related education programs at schools. It is also necessary to establish an institutional structure to encourage citizens to take part in the decision-making process and to open all transportation and transportation related information to the public. It is also necessary to nurture planners as administrative experts who have technical expertise and communication skills in narrowing the opinion gap among parties concerned (for example, see Bickerstaff, Tolley and Walker, 2002).

After due consultation with the Ministry of Education and Human Resources, it is necessary to give a transportation-related class more than 20 hours yearly to all primary and secondary school students as a compulsory subject, to insert the contents of transportation culture in their curriculums, and even to induce colleges and universities to have transportation-related subject electives in general courses. In addition, it is necessary to provide intensified education programs for local public servants working in transportation services on a regular basis to insure high levels of professionalism, and to involve education programs when reissuing a driver's license.

## **6. CONCLUSION**

Current transportation problems in Korean metropolitan areas can be summarized in three ways: competing alternatives without priority, discords between transportation policy and land use planning and environmental policy, and inefficient administrative systems.

Planners for the 21st century should abandon automobile-oriented approaches to transportation, pursue pedestrian and public transportation-oriented policies, seek job and housing balance, promote an environmentally friendly policy, and handle administration considering the living sphere. A transportation environment which seeks and implements such policies will achieve low-cost and high efficiency, be integrated and well-balanced, equipped with an effective system to reflect public consensus, and equitable to consider the socially disadvantaged.

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