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Integrated Landuse-Transportation Planning and Implementation for Developing Metropolises

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In most metropolises of developing countries, many kinds of urban problems are emerging and various discussions are being made on how they can be alleviated. Since landuse and transportation are structural elements of the metropolises, these problems can be attributed to them. One of the most important policies for urban development is to coordinate landuse structure and transportation system. This is particularly true in developing countries since changes in developing countries are so rapid and dramatic. The objective of the present study is to discuss the issues in the stages of both planning and implementation of the plan regarding landuse and transportation in developing metropolises. In the first part, issues regarding urban landuse and transportation are pigeonholed from two viewpoints, such as, interactions between "landuse and transportation" and "planning and implementation." In the latter part, by examining them from the technological, economic, social, institutional and financial aspects, problems are identified and some approaches to solve them are also proposed.

1. Introduction

In most metropolises of developing countries, many kinds of urban problems which might be represented by traffic congestion, excessive agglomeration of economic activities, inefficient urban activities, environmental pollution and worsening safety, are emerging and various discussions are being made on how they can be alleviated. These are described more in detail in the following chapter. Since landuse and transportation are structural elements of the metropolises, most of such social and economic problems are attributed to them. Landuse and transportation are causes and effects of the urban problems. Therefore, landuse as well as transportation are two of the most important elements in urban planning.

It is needless to say that the interaction between landuse and transportation should be taken into consideration in the planning process. The problem which exists in conventional planning concerned with landuse and transportation is that each of them is actually dealt with independently of the other. This is the case, in a greater or lesser degree, for not only developing countries but also for developed countries. Since urban changes in developing metropolises are so rapid and dramatic, it can be said that integrated planning of landuse and transportation is much more important and necessary than in developed metropolises.

In addition, institutions in charge of plan implementation are usually different from those which deal with planning in developing countries. The relation between planning and implementation is therefore also very important in this regard.

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The objectives of the present study are to investigate present situations of transportation and landuse, to identify issues in the stages of both planning and plan implementation regarding landuse and transportation, and to propose subjects to be tackled for realizing "integrated planning and implementation" of "integrated landuse and transportation" in developing countries, especially in Southeast Asia.

The investigation for this study is done with the help of United Nations Center for Regional Development through Workshop Meeting with invited representatives from several Asian countries. The author should mention that some parts of the content of this paper are based on the UNCRD report (UNCRD 1990) which contains information and discussions in the workshop meeting.

2. Urban Problems in Developing Metropolises

Though urban problems of developing metropolises have been pointed out in various ways in existing studies, they might be rearranged as follows (Miyamoto 1990A),

(1)Excessive agglomeration of economic activities in metropolises: In developing countries, about 50 to 70 % of Gross National Product is generated in the metropolises including their capital cities. Job opportunities and much higher level of income in metropolises have been attracting people from the local areas. Consequently, the metropolises have now much more population than they can actually accommodate. Since infrastructure improvements take a long time and much cost to complete, the level of infrastructure provision cannot catch up with the rapid increase in population. This is not only the problem of metropolises but also is a nation wide problem.

(2)Traffic congestion: This is also one of the most typical problems in developing countries. Main

causes of traffic congestion such as mixed traffic with high speed to very low speed vehicles, inefficient traffic control, and selfish and uncooperative driving behavior are typical characteristics in developing countries, to say nothing of the lack of transportation infrastructure.

(3)Confusion of landuses: In most developing countries, it is very hard to put city plans into practice even if they are legally authorized. A building may get a building permission without considering the coordination from the city planning point of view. Coexistence of different landuses in a small block generates many kinds of problems. One of the most serious problems is that the landuse plan does not coordinate with the transportation plan. Buildings are built by the private sector and, except for the parking spaces which deal with the traffic that the buildings generate and attract, it is seldom for the private sector to develop transportation facilities.

(4)Inefficiency of urban activities: Traffic congestion and confusion in landuses make urban activities in metropolises inefficient. Further economic development will be blocked if diseconomy of congestion exceeds economy of agglomeration in metropolises.

(5)Environmental problems: Environmental pollution is one of the current world wide issues. Environmental pollution problems are sometimes considered as global issues while in some instances are limited to the metropolises. Air pollution, noise and vibration, which are caused mainly by road traffic, are growing concerns for the people especially for those in Southeast Asia. Water pollution, unsanitary condition and garbage disposal are also emerging as important problems of the metropolises.

(6)Safety problems: Traffic safety in developing countries is also a very serious problem. The rate of casualty in developing countries is much higher than that in developed countries. In some developing metropolises, floods also threaten the daily life of the people. In addition, there are some metropolises which are in danger of destruction from earthquakes since their urban structures are too fragile against earthquakes. Crime in the city is a social problem that cannot also be ignored in city planning.

3. Pigeonholing of Issues pertaining to Landuse and Transportation

3.1 Setting of Pigeonholes

There are various issues related to landuse and transportation in developing metropolises. In this study, they are reviewed from the viewpoints of "landuse and transportation" and "planning and implementation" as shown in the Table 1.

The pigeonholes for the issue raising are set up based on the following idea. The interaction between landuse and transportation should be taken into consideration not only in the planning stage but also in the implementation stage. In addition, the linkage between planning and implementation should also be well-coordinated. Beside landuse and transportation, another viewpoint such as the relation between planning and implementation is needed to review the issues related to landuse and transportation in developing metropolises.

Table 1 Pigeonholes for Issues concerned with Landuse and Transportation

	Planning ⇄ Implementation		
Landuse	[L/P]	[L/P-I]	[L/I]
↓ ↑	[L-T/P]	[L-T/P-I]	[L-T/I]
Transport	[T/P]	[T/P-I]	[T/I]

However, there are some levels of time leads and lags in the interaction between the two viewpoints. For example, one will react with some time lag after an actual change in the other. While another will change as a result of being influenced by information of planned projects before its actual implementation. Construction of new facilities takes some time even after a decision to build them was already made. There is a so called announcement effect of big infrastructure projects prior to their construction. In other words, various interactions between landuse and transportation as well as planning and implementation all take place over vastly different time scales.

3.2 Identification of Issues

Key issues concerning landuse and transportation of developing metropolises have been listed up in Table 2 by following the pigeonholes in Table 1.

3.3 Issues related to Land Use Planning

In most developing metropolises, it is very difficult to set up the future scope of the city development since present changes are so rapid and dramatic, and are not stable. Moreover, there are very few effective policy measures to take. Hence, landuse plans prepared by the governments are mostly nothing but nominal future plans without being accompanied by any effective control/guidance measures. As for planning techniques, which are usually immature, scientific approaches such as quantitative models are scarcely used, and available data for

necessary analysis are mostly very limited and not so reliable.

Table 1 Key Issues Related to Landuse/ Transportation

[Landuse/Planning]
(1) Missing planning goals and objectives
(2) Outdated/unresponsive plans
(3) Missing quantitative analysis models
(4) Lack of effective policy measures
(5) Insufficient understanding of present situation
(6) Uncertainty of the future framework
(7) Immature planning technique
(8) Socio-political pressures from land owners

[Landuse/Implementation]
(1) Lack of effective landuse regulation/ guidance measures
(2) Lack of effective taxation system
(3) Unstable financial basis
(4) Fragmented land ownership
(5) Lack of power to control developments led by the private sectors
(6) Physical, historical and social constraints in urban development
(7) Lack of effective power to acquire lands for public works

[Transportation/Planning]
(1) No firm or conflicting urban transportation policy
(2) Lack of coordination between organizations
(3) Inappropriate analysis models
(4) Insufficient understanding of present situation
(5) Uncertainty of the future framework
(6) Immature planning technique
(7) Contradiction with economic policy - Traffic demand control vs. promotion of locally manufactured cars
(8) Limited options of transportation infrastructure developments
(9) Lack of the idea of transportation coordination

[Transportation/Implementation]
(1) Financial constraints for investments
(2) Lack of determination / political will to implement
(3) Enforcement difficulties
- overlapping functions of agencies
- inadequate manpower and logistical support
(4) Resistance from land owners/residents

[Landuse/Planning-Implementation]
(1) Lack of legal mandate to implement
(2) Lack of prompt monitoring and reviewing
(3) Lack of coordination between planning and implementation organizations

[Landuse-Transportation/Planning]
(1) Lack of / inappropriate planning models
(2) Lack of planning support system
(3) Lack of coordination among organizations

[Transportation/Planning-Implementation]
(1) Lack of legal mandate to implement
(2) Lack of prompt monitoring and reviewing
(3) Lack of coordination between planning and implementation organizations

[Landuse-Transportation/Implementation]
(1) Delay of Infrastructure Construction
(2) Inconsistent development of projects
(3) Lack of coordination between organizations

[Landuse-Transportation/ Planning- Implementation]
(1) Missing link between landuse change and transportation planning.
(2) Missing link between transportation change and landuse planning.

On the other extreme, socio-political constraints and concerns on the environment and the preservation of historical sites have hampered optimal allocation of landuse. Large-scale land owners who generally have strong political influence are intervening in the landuse planning, when it concerns their own lands. More specifically, the relocation of squatters is also a political issue in cities like Manila, Jakarta and Bangkok. In Kuala Lumpur and Jakarta, the "Wakaf" system, i.e. land donation by a person to the community for religious purpose, has restricted full development of donated lands.

3.4 Issues related to Implementation of Landuse Plan

The non-existence of effective regulation measures on landuse and development has rendered it impossible to implement a landuse plan. In the case of Manila, the sites and the total floor areas developed for residential use are not subject to control by the government. Hence, the impact of the development is difficult to assess and the corresponding transportation infrastructure cannot be planned for. This is also the case in Bangkok. In Kuala Lumpur, either people are unwilling to give up their land, or the land has been preserved for other purposes and therefore cannot be acquired by the government for planned development or for transportation infrastructure construction.

Fragmentation of land ownership has also made the land acquisition difficult, particularly in Jakarta and Hong Kong. In some instances, multiple titling and unknown ownership have delayed land acquisition for development projects particularly in Jakarta.

In the case of Manila, land developments are mostly led by the private sector with limited or no

government supervision. Whereas in Bangkok and Jakarta, there is no control on the actual use of the land because the landuse development plans prepared by the governments have no legislative power.

3.5 Issues related to Transportation Planning

In some developing metropolises, firm and consistent transportation policy is lacking: the policy for restricting the growth of private cars does not exist in Manila although the use of mass transit and pubic transportation is encouraged; and in Kuala Lumpur, people are encouraged to buy cars as the cars are made more affordable or are manufactured locally. There is no comprehensive transportation policy in most metropolises. As for planning techniques, conventional transportation planning models with slight modifications are usually used regardless of the characteristics of each developing metropolis. In addition, data survey uses conventional methods which require much man-power for collection and long time for processing.

Some of problems which make transportation planning difficult are exclusive to each metropolis: in the case of Seoul and Hong Kong, physical constraint on road expansion due to limited space available in the existing central area; and in Jakarta and Bangkok, owing to former land ownership, few distributor and collector roads exist to distribute traffic from trunk roads to the local areas.

Difficulty in land acquisition and low feasibility of large-scale transportation investments also reduce options of policy measures in the stage of planning.

3.6 Issues related to Implementation of Transportation Plan

There are a number of problems with the implementation of transportation infrastructure investments. Financial constraint is one major difficulty in providing roads and mass rapid transit systems, as in Manila and Bangkok. For the latter, the acquisition of land for transportation project construction is also difficult due to inadequate legislative and institutional arrangements.

Lack of determination of the concerned authorities to proceed with planned implementation in Bangkok has sometimes prevented the making of the right decision on time. Enforcement is another problem in many cities where it is characterized by the existence of a multitude of enforcement agencies and their overlapping functions. This fact is further compounded by inadequate manpower and logistical support. For example, bus lanes in Bangkok are being taken up by private vehicles and no remedial actions are being taken to solve this particular problem. Another difficult problem is the increasing political influence over government's decision, as is the case in Bangkok and in Hong Kong.

3.7 Issues related to Integration between Landuse Planning and Transportation Planning

Apparently, there is a lack of integrated planning in landuse and transportation developments in many Asian metropolises. This leads to uncoordinated and hence inefficient urban functioning and growth which cause serious traffic congestion as often seen in developing countries. This is due to the fact that there is no effective methodology nor is there any substantial mechanism to integrate/coordinate the landuse and transportation planning process.

The absence of a central unit or coordination organization among departments is the major factor for the lack of integrated landuse and transportation planning. The complicated structure of the current institutional set-up in most cities has made it difficult to define a clear line of responsibility among the relevant agencies for landuse and transportation planning. In most cases, ad hoc coordinating committees fail to reach agreements or even fail to adopt agreements and decisions. Coordination mechanisms are temporary in nature and the persons involved are changed frequently.

3.8 Issues related to Interaction between Planning and Implementation

Serious problems also arise from the lack of interaction between the planning process and the implementation process both for landuse and transportation developments. Problems will arise, for example, when all of the recommended projects cannot be implemented in accordance with the desired schedule. This, in turn, will affect the planning process and its outputs which may have to be reviewed and revised.

4. Examination of Issues and Identification of Problems to be solved

4.1 Aspects from which Issues are viewed

The issues listed up in the previous chapter are examined from other viewpoints to identify subjects which we should tackle for realizing the integrated planning and implementation for landuse and transportation in developing metropolises. The aspects from which the issues are viewed are as planning theory, policy alternatives, survey, analysis models, social custom, economic situation, institutional set-up, financing and education.

4.2 Planning Theory

It is essential to establish a long-range strategy for the balanced development, thus the clear definition and identification of short-, medium- and long-range objectives in planning process should be made in the course of planning. Flexible action plans to cater to possible changes of developments should be formulated based on long-range development plans. In addition, clear goals/directions for the future metropolises should be set up based not only on efficiency criteria but also on public equity, especially for landuse planning and implementation.

The ideal pattern of activity distribution in the metropolis is one of the area to be studied in connection to increasing motorization, urban sprawl and, to some metropolises, the introduction of mass rapid transit systems.

4.3 Policy Alternatives

There are many kinds of policies related to landuse and transportation in metropolises. They are roughly classified into three categories; regulation, taxation and investment. Usually, each of them is regarded as a measure specific to one of landuse and transportation. But usually it can also be a measure, sometimes a very strong one, for the rest. This is so because landuse and transportation are closely interrelated. In addition, an actual policy in integrated planning would be a combination of these policy elements. Variations of set of elemental policies as well as elemental policies should be developed by taking into consideration the interaction.

Deregulation or non-regulation may promote efficiency on the transportation sector, while strict regulations on landuse are indispensable to the future of the metropolises. In this regard, the designated use of land and permitted level of development should be clearly identified in the development plans especially for the central area.

4.4 Survey and Analysis of Present Situation

The first step of the planning process is to understand the present situation of the metropolis and to identify the issues to be tackled. For this purpose, it is necessary to analyse the present situation based on landuse and transportation data as well as other related data. But, in reality, the availability of the data is usually very low in most developing countries. Therefore, for better planning, we should start building the system by acquiring the necessary data for landuse and transportation planning. This means a periodical data survey system has to be set up first. This is very important not only for the present situation analysis but also for the model parameter estimation and calibration of the model performance.

Moreover, a new method should be developed for the survey in developing countries. Since the metropolises are dynamically changing, conventional method which takes much cost and long time for data acquisition and processing cannot be used in developing countries. Alternative methods such as Miyamoto(1988) might contribute to the supply of data for developing countries.

4.5 Analysis Models

It is needless to say that the interaction between landuse and transportation should be taken into consideration in the planning process (Miyamoto 1990B). Integrated landuse and transportation models which deal with both landuse and transportation as well as the interaction between them have been developed as described in Webster,et al.(1988). However, there have not been a many cases which employed such integrated models in the actual planning stage even in developed countries.

Landuse and transportation model should be built in accordance with the objectives of its application. The model should ideally represent the universe of landuse and transportation as briefly as possible, so far as it satisfies the requirements from the objectives. Bigger models are not at all better models. An example model for a developing metropolis is proposed by Ratchapolsitte, et al.(1986).

Monitoring of the overall planning and implementation process should be carried out, and regular updating of the landuse and transportation plans should be undertaken to account for future changes in development. To support the review and update work, landuse-transportation models as well as data survey system which are appropriate for developing metropolises should be newly prepared.

4.6 Social Custom

Infrastructure projects including landuse and transportation developments require, in the first place, land on which facilities are to be built. But land acquisition for public works is not always an easy task in the project implementation. Land/space availability determines the feasibility of the projects. Each country has its particular socio-economic system of land (Citynet 1990). In addition, some countries have their own way of land acquisition. The land system intimately depends on the social custom and religious backgrounds of a country. In developing countries, there are a variety of rights related to land; for land owners and leasers, and sometimes for squatters. It is very important to study the land system of each country since the comparison between them might give a country some suggestions for realizing the public work projects.

4.7 Economic Situation

The landuse/transportation planning and implementation should correspond with the economic growth of each country. But there is much uncertainty in economic forecast especially in developing countries. In addition, the level of economic development strongly influences landuse and transportation planning. In the stage of planning and implementation, it is necessary to take the uncertainty of future growth as well as the level of the current situation regarding economic development into consideration.

4.8 Institutional Set-Up

Institutional problems among organizations concerning landuse and transportation is one of the most difficult problems to be solved in realizing integrated landuse and transportation planning and implementation. Without good coordination between organizations, integrated planning and implementation cannot be conducted. The case of Bangkok concerning institutional problems is described in Udomsri and Miyamoto(1991).

With the various forms of institutional organizations, it is difficult to develop and/or recommend a single model that is applicable for all the metropolises concerned, considering the variety and disparity in the practice of democratic principles. Also there still exist wide variations in social, political and physical considerations. The example of one metropolis might give good suggestions to another metropolis.

4.9 Financing

A study on the methodology to identify the beneficiaries, in particular by the construction of MRT, should be made with a view to the impacts to urban development and environment. The project might be able to finance part of the cost by the value capture.

The mechanisms to get the cooperation of the private sector to cover shortage of public funds should be studied. For example, concession projects such as Build-Operation-Transfer should be investigated and new methods might be developed. In addition, for developing countries, ODA from other developed countries and funds from international lending institutions are also available. This means that there are more options in financing the public works for developing countries than for developed countries.

4.10 Education

Provision of courses for public administration is necessary to educate public officials who are in charge of either planning or implementation of landuse and transportation. Curriculum of public administration courses, which include infrastructure planning aiming at developing countries, should be originally developed.

5. Concluding Remarks

The metropolises of developing countries are the very areas which really require integrated landuse/transportation planning and implementation. To realize the integrated system, there are many problems to be solved as described in this paper. Since there are many specific characteristics in landuse and transportation systems of developing countries when compared with those of developed countries, the conventional approaches developed and applied in developed countries are seldom readily applicable to developing countries. In this paper, it was intended to propose subjects on which methodology as well as institutional set-up are originally developed for developing countries.

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