

THE IMPLEMENTATION OF TRAFFIC IMPACT ASSESSMENT IN SOUTHEAST ASIAN CITIES: CASE STUDIES OF THAILAND AND THE PHILIPPINES

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Abstract: For years, urban development in Southeast Asian cities like Bangkok in Thailand and Metro Manila in the Philippines has resulted in serious traffic problems. To cope with this situation, the formal Traffic impact assessment (TIA) was recently started. This paper aims to explain the current TIA applications in these two cities and compare their strengths and weaknesses. Moreover, obstacles are discussed together with possible remedies. We have classified the obstacles into four issues, namely institutionalization and legislation, unavailability of standard process, lack of knowledge, and budget limitation. Pragmatic examples are elucidated to provide clear perceptions. The study proposes two strategic points, concerned players and implementation stages. Five players, including governments, developers, consultants, academic persons, and community, should be encouraged to fulfill significant roles in three stages: promotion for the necessity, formulation, and evaluation processes. Ultimately, it is expected to be a case study to learn how to effectively set up TIA.

Key Words: traffic impact assessment, land development control, Southeast Asian cities, and policy implementation.

1. INTRODUCTION

Various undesirable consequences of urbanization in many cities have made planners realize that attempts to only encourage city growth by improving facility performances impose greater social costs than benefits. Therefore, they try to efficiently manage the usage of existing transportation systems and to minimize the construction of new networks. Many planning tools have been developed and applied to accomplish this task, one of which is Traffic Impact Assessment (TIA) for land development control. This is not only for local practices, but it has become a trend in many countries, including South East Asian (SEA) cities like Bangkok in Thailand and Metro Manila in the Philippines. In developed cities, the TIA is now performed routinely, but in the developing cities it has just been utilized from the last decade [Hokao and Mohamed, 1999, and Regidor and Teodoro, 2003].

Although there is a realization that the integration of land use and transportation planning is

important in developing metropolises, up to date this is still far from reality, because of rapid and dramatic changes in city structures and institutional problems [Miyamoto, 1992]. Many land development projects have been approved for construction over the city areas. Those developments include office, condominium, exhibition hall, shopping center, and hypermarket projects. Many of these were located in Central Business District Areas, thus they have generated more traffic congestion along the urban networks. A main cause of congestion is the lack of effective measures to control such land developments. These congested conditions have prompted planners to necessarily implement TIA in their cities. The effort to apply TIA in balancing land use developments and sufficient road network capacities has been increasingly promoted as a promising tool, particularly in Bangkok and Metro Manila. However, there are some obstacles for implementing TIA policies in these cities. This paper aims to explain current TIA applications, and compare some strengths and weaknesses. Moreover, the obstacles are discussed together with possible improvements. Ultimately, the lessons learned and solutions developed are expected to be a basis for planners to learn how to effectively set up TIA for growth management in the future.

First, the current implementations of TIA in Thailand and the Philippines are reviewed. The important role of TIA in the weakly planned cities is also discussed. Then, problems are also discussed and comparison of strengths and weaknesses of the TIA in the two countries is done. Next, the study proposes the strategic points to successfully implement TIA in the society. Finally, lessons are drawn and presented in the study's conclusions.

2. TRAFFIC IMPACT ASSESSMENT IN THAILAND AND THE PHILIPPINES

TIA implementations in Thailand and the Philippines are reviewed so that a better understanding on the current practices and obstacles can be drawn out. The TIA was introduced in Thailand earlier than in the Philippines although the TIA process in Thailand is yet to stabilize. In addition, the experiences from implementing TIA in Thailand can serve as lessons for the Philippines or other developing countries, particularly for SEA region. In the following sections, the TIA process in Thailand is described, and followed by that in the Philippines.

2.1 Traffic Impact Assessment in Thailand

In the light of urban growth, the Thai government has realized the need to control and plan urban development and land utilization. Therefore, there have been a number of Acts legalized to control land development projects. They include the Town and Country Planning Act of 1975, Building Control Act of 1992, Land Development Act of 1992, and Enhancement and Conservation of National Environmental Quality Act of 1992. The first aims to develop a comprehensive city plan and project plan at the macroscopic level. The second deals with the building regulations and the procedures for obtaining a building permit, so mainly it is concerned with structural engineering, construction and safety issues. The act that focuses more on the project site characteristics is the third one. It provides some specifications on the size and area of development land, including how to provide access and exit roads, footpaths, the distances from roads to buildings, and traffic signs and markings etc. However, most traffic and transportation features in this act mainly come from the viewpoints of architecture or city planning rather than the traffic engineering. TIA was firstly introduced in Thailand under the last act focusing on the environmental problems. The traffic impact has been included as one of environmental impacts, so developers of the project occupying more

than 300 parking units or larger than 2,000 square meters of gross floor areas are required to conduct the environmental impact study. For development projects in Bangkok, developers must submit the study reports to the Building Control Division (BCD) of Bangkok Metropolitan Administration (BMA). In addition, they have to submit the report of traffic impact study separately. Then, BCD will submit the report to the Traffic Engineering Division (TED), under the Traffic and Transportation Department of BMA, for the technical investigation. The traffic impact mitigations recommended by TED are passed back to the developers, and they may have the meeting or discussion on mitigation measures. Finally, the developer must follow the final agreement in order to get the project approval. This TIA process in Bangkok is shown in Figure 1.

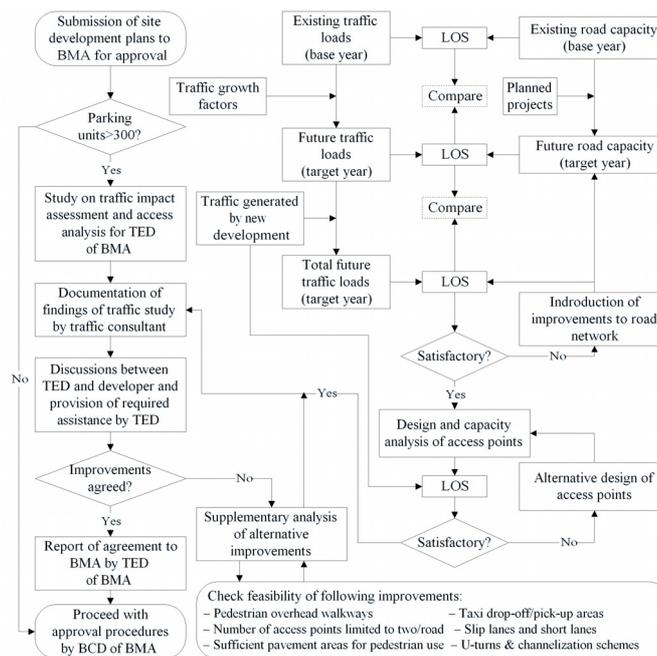


Figure 1. Process of Traffic Impact Mitigations for New Developments in Bangkok.
Source: Hokao and Mohamed, 1999.

Actually, as the representative of developer, a traffic consultant conducts the traffic impact study. TED considers and evaluates the alternatives of traffic impact alleviations or improvements proposed by the consultant team. TED will select the most suitable alternative or may propose their own alternatives under the negotiation. However, the process is not standardized, most results of decision-making are dependent on the negotiation. This can make the situation become worse. Most selected improvements are simple without the detailed analyses and evaluations, such as limiting access points to two along major roads, managing areas of taxi drop-off and pick-up, providing slip lanes and short lanes for in-and-out traffic, etc. The measures may be adjusted by the size of access roads, levels, slopes, turning points, parking, U-turn areas and any other elements that may facilitate traffic flow, stability, security, aesthetics, discipline or urban planning.

Generally, the traffic impacts are fully studied in Bangkok for public transportation projects, developments in historical places and traffic-sensitive areas or close to critical intersections, and big buildings that can significantly generate traffic [Hokao and Mohamed, 1999]. Recently, many development projects especially supermarkets, have been established in regional center cities like Chiang Mai and Song Khla. Their impacts can be controlled through the law on environmental impact study (EIS).

2.2 Traffic Impact Assessment in the Philippines

In the Philippines, many cities like Metro Manila are facing the traffic impacts generated from urban developments, especially for shopping centers or commercial areas. Similar to Thailand, there exists legislation requiring the conduct of an environmental impact assessment for different kinds of development, either for environmentally critical projects or for projects located in environmentally critical areas. An early version of this law is the Presidential Decree 1586 (in 1979) establishing an Environmental Impact Statement System including other environment-related measures and for other purposes. This law has undergone many transformations until 1996 (Department Administrative Order; DAO 96-37), which has strengthened the implementation of the Environmental Impact Statement system. However, a comprehensive and meaningful TIA is not yet explicitly included in the current EIS system. A review of several EIA reports on projects that would have significant impacts on traffic has shown that only a brief description of the traffic conditions in the vicinity of the site for development is included [Regidor & Teodoro, 2003]. With the absence of a clear legal requirement for the conduct of TIA, the study of traffic impacts of a development has usually been superficial, if any.

The need to determine and prepare countermeasures for the traffic impacts of an urban development cannot be overemphasized. Palmiano et al. (1999) pointed out that because in Metro Manila the locations of new commercial developments significantly follow the expansions of urban transportation system, it is necessary to more carefully plan and control the developments. Otherwise, traffic bottlenecks or critical areas will continue to emerge, even if new facilities are provided.

As shown in Figure 2, the mechanisms of TIA implementation in the Philippines can be classified into three strategies: 1. through the EIA framework; 2. through national legislation; and 3. through local government unit ordinance, as identified by the study of the University of the Philippines National Center for Transportation Studies Foundation Inc. or the UPNCTSFI [Regidor & Teodoro, 2003]. The first strategy includes the mechanisms of implementing TIA under EIA and HLURB subdivision and condominium guidelines. It focuses on evaluating and mitigating the adverse impacts generated by development projects. While the EIA guideline mainly assesses the projects that critically affect to the environment, the HLURB subdivision and condominium guidelines focus on residential projects. Second, through national legislation or passing of an administrative or department order, TIA may be enacted as a requirement of national agencies likes the Department of Interior and Local Government (DILG). The third strategy is to control all developments through a Local Government Unit (LGU) Ordinance since by law, LGUs may pass their own ordinances as they see fit. It can be seen that the proposed mechanisms can be cover all application levels in the Philippines. The first two strategies can deal with the national level. The traffic impact study of any project beyond the municipality or local government's responsibilities can be facilitated by these national mechanisms. At provincial or local level, project developers may be required by the LGU through a local ordinance to perform a TIA study prior to the granting of the relevant permit.

Figure 3 shows a framework identified by the UPNCTSFI study team for TIA institutionalization. Three main cases, including site development in a critical area, urban renewal or industrial site development, and rezoning, are required a TIA study. These cases are almost comprehensive to consider all kinds and sizes of developments. Regidor and Teodoro (2003) suggest that it is realistic and practical to implement TIA based on this

framework, because all development types can be taken into account, and it is applicable with the existing EIA system. At present, some developers conduct a full-blown TIA only if there is pressure from some affected and usually influential stakeholders (e.g. affected residents). In other words, the conduct of TIA in the Philippines has not yet been clearly institutionalized. The proposed strategies for TIA implementation have yet to see actualization.

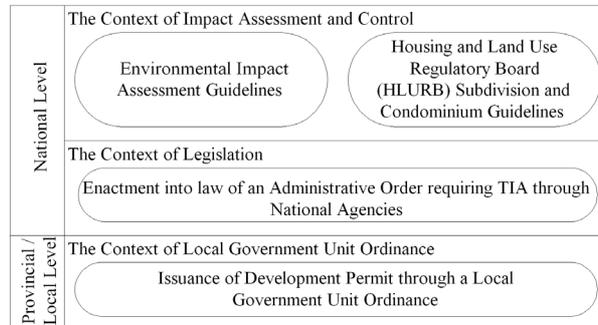


Figure 2. The Mechanisms for Implementing TIA in the Philippines
Source: Combined from Regidor and Teodoro (2003)

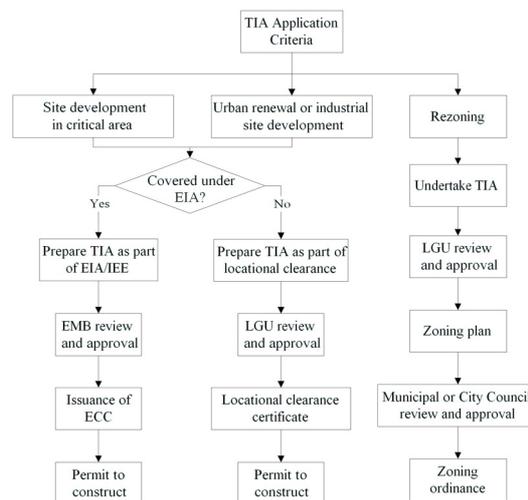


Figure 3. The Framework of TIA Institutionalization in the Philippines.
Source: Regidor and Teodoro (2003)

2.3 Traffic Impact Assessment under Weak Urban Land Use Plan

It has been known that the urban land use plans and regulations of Thailand and the Philippines are rather weak in developing and enforcing a zoning system. The plan has little or no control over the intensity of development nor does it suggest the meaningful ranges or density in each type of land use. This implies that any development, regardless of its size and location, will be officially approved so long as it does not violate the basic regulations of land use type defined by existing City Planning Laws. There is usually no consideration of serious adverse development impacts, such as environmental or traffic congestion problems. For instance, in Figure 4 the steps in providing a land use plan for Bangkok is shown. It can be seen that there is no analytical method to assess the effects of land-use changes on the transportation systems, especially in terms of trip generation. The regulated TIA guidelines can fulfill this gap of urban planning process. A TIA study of development project quantifies the impacts of proposed land usage, and prepares some mitigation measures.

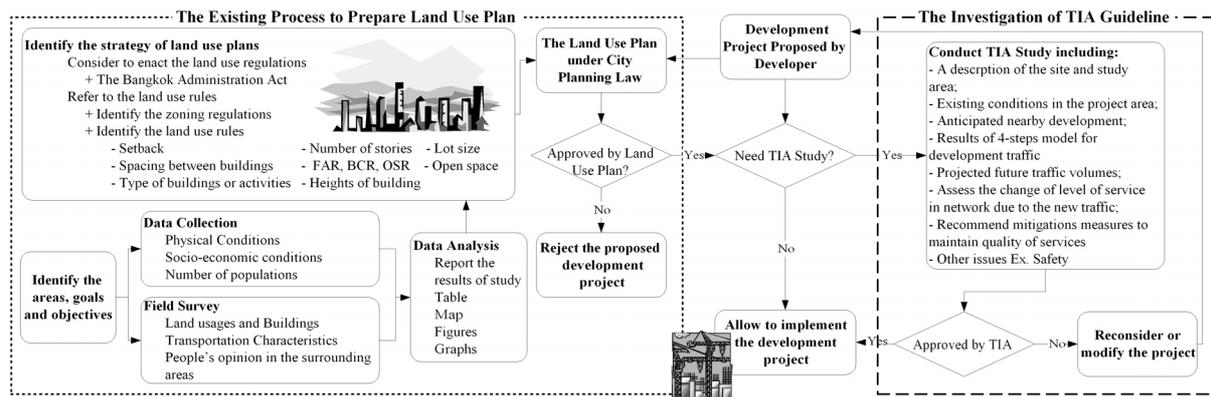


Figure 4. The Coordination of Land Use Plan in Bangkok and Proposed TIA Investigation.

Occasionally, while development project is approved based on the land use plan of City Planning Law, its TIA study may show unacceptable traffic impacts in that zone or area. For example, in Bangkok new hypermarkets were approved to be located near to the critical intersections, and they caused to severe traffic congestions. Although, based on the zoning regulations those developments are appropriate, it is also essential to consider their negative consequences on vicinity activity areas and local networks in detail. This does not mean that TIA guideline will not permit to construct the project, but it will require the developer to provide the impact mitigation measure(s) or caution the planner to reconsider the approval or to modify that development. For hypermarkets, to get the approvals they may be requested to limit number of entrances and exits or to prepare an efficient parking layout for relieving the effects of crowded traffics in the site on the surrounding networks. This TIA role functions as the investigator of existing land use plan in weakly planned cities, especially in SEA cities.

TIA guidelines should be independent from the law of existing land use plan and the involved agencies to be a good investigator in land development control, as shown in Figure 4. For example, the municipality or city council, Department of Public Works and Town and Country Planning, Ministry of the Interior, provides the land use plan, but a TIA study is requested by the requirement of EIS act, Environmental Impact Evaluation Division, Office of Policy and Planning, Technology and Environment of Thailand, The Ministry of Science. This helps to eliminate the effects of external factors, including the influence of the developer, social factors, and political factors on preparing TIA study. The cooperation between urban land use plan and TIA guideline is an important issue that planners in Thailand and the Philippines must concern and provide efficiently. Otherwise, a lot of conflicts in decision making under the land use plan and TIA guideline may arise. Eventually TIA will not be able to effectively control urban land development.

Next, the obstacles for effectively implementing TIA in Thailand and the Philippines are described. The problems might be found in both countries or in one of them. Moreover, some pragmatic examples are demonstrated to serve as good case studies for planners in other cities.

3. THE OBSTACLES FOR IMPLEMENTING TRAFFIC IMPACT ASSESSMENT

In developed countries, TIA is performed routinely, but it has been recently utilized in developing SEA countries like Thailand and the Philippines. Therefore, there still are some (or many) obstacles for implementing an effective TIA process in such countries. This study has

been conducted based on the interview surveys of government officers in the organizations related with traffic engineering and land use planning. The study reviewed some TIA reports conducted for the development projects, and the discussions among academic persons and specialists definitely were carried out as well. It was found out that the obstacles could be classified into four issues: institutionalization and legislation, unavailability of standard process, lack of knowledge, and budget limitation.

3.1 Institutionalization and Legislation

For Thailand, especially in Bangkok, the TIA institutionalization framework under the EIS act is obvious (see Figure 2). All projects occupying more than 300 parking units or larger than 2,000 square meters of gross floor area must be studied about the traffic impact as one of environmental concerns, whether or not the projects critically affect the environment. This is straightforward to consider a development project should be considered for traffic impacts or not. In some cases, the project size is smaller than the regulation, but it is located in a critical area, so this situation becomes questionable whether the developer needs to perform TIA or not. Practically, government planners negotiate with developer and ask them to prepare the study. However, some developers avoid the EIA study by dividing a project into two or three projects in the same site area and using different owners, to minimize their expenses and for easy project approval. It is also noticed that the Environmental Impact Evaluation Division of the Ministry of Science plays the main role to investigate the traffic impacts of all development projects for the whole country. Exceptionally in Bangkok, TED can share the responsibilities to evaluate the impacts of new developments. In local cities, there is no any division that has enough potential to evaluate the EIS and TIA studies, so they have to pass the reports to the central office of Environmental Impact Evaluation Division for the project approvals. This process overloads the central office, and reduces their evaluation quality.

In the Philippines as mentioned earlier, there are several avenues for institutionalizing TIA (see Figure 3): inclusion in the existing EIS framework, local government ordinance, and national legislation or administrative order. In particular, not only EIA guidelines are utilized to control proposed land usages, but also other related legislations try to influence on specific development project, for example HLURB subdivision and condominium guidelines to control residential development projects. At present, there is no requirement to conduct TIA study for residential development projects in Bangkok, because the existing regulations do not include such projects. Most projects are mainly considered under the EIA context. This also leads to misunderstanding in preparing for traffic impacts, because the subdivision regulations principally focus on adequately carrying the estimated wastewater, potable water, and drainage to and from the development. When it comes to the road and footpath sections, the laws merely specify the width of roadway and footpath required for the total number of units to be built, rather than applying systematic traffic trip generation analysis [OCMLT, 1995]. As seen from the surveys in Bangkok, some TIA studies just reported that during the construction stage they would train the truck drivers to politely and cleanly transport the construction materials without any actual TIA study. Planners should keep in mind that TIA definition, details of studies, and authority of TIA regulations, must be clearly stated in the laws. Otherwise, it is difficult to control land developments by using TIA. It was noticed that the institutional frameworks of the Philippines can cover all possible development projects and they try to distribute the responsibility and decision-making powers to provincial or local agencies through LGU ordinance. This is a good system to implement an effective TIA process. However, to implement such systems, the government needs to sufficiently provide technical knowledge for local staffs. Although, the institutionalization framework in the

Philippines seems to be more efficient than in Thailand, a clear and mandated institutionalization has yet to materialize and the usual practice of TIA has generally been superficial. Therefore, Filipino planners should seriously pay attention to this initial stage.

3.2 Unavailability of Established and Applicable Standards

Previously, both Thailand and the Philippines have no the standard process of TIA to be used as the reference. In the U.S., they have developed their own standards to conduct formal TIA, and some famous standards are ITE's trip generation handbook and Highway Capacity Manual. In South Korea, not only the standard process was identified, but also some parameters of the simulation program in estimating traffic impacts were defined clearly. This information is very useful in verifying TIA study. Under JICA support, some planners in the Philippines have realized the necessity of standard TIA process, and they have conducted a study to develop the standards based on their established EIS system [Regior and Teodoro, 2003]. In Thailand, there is no discussion on this issue yet, though the international consultants have strongly recommended in the master plan for transport planning and policy projects since 1995. Without the standard, the consultants are not able to prepare an appropriate TIA study, and the involved agencies also cannot correctly check a study and evaluate impact mitigation alternatives. One of the key factors to develop an effective TIA standard is the availability of road functional classification. The standard methods to estimate traffic impacts on each road type should be different, because they are different in geometric and traffic characteristics. However, many SEA cities have unclear road hierarchy, this is difficult to develop a suitable standard. Planners in Thailand and the Philippines need to classify their road networks, so that developments in each site can be appropriately assessed according to "where users are likely to perceive a change in the quality of service".

Various TIA standards that have been established and used in developed countries may not directly be applicable in SEA cities. This is because of differences in travel characteristics, socio-economic conditions, and cultures. For example, in the U.S. the estimation of shopping trip generation is mainly developed for passenger cars, but in Metro Manila the shopping center trips by the public transportation mode share more than 60%. Due to privacy concern and high car ownership, passenger car plays as the major mode for American people, but in developing cities the low incomes force most commuters to be public transport captives. Additionally, some unique modes in SEA cities like Song Taews in Bangkok and Jeepney in Metro Manila ought to be considered in the analysis. These emphasize that the Philippines' efforts to develop their own TIA standards are a good example that other SEA cities should follow. Next, as a result of unavailability of TIA standards, the problems at the exit and entrance of a development area are demonstrated. Also, the unique characteristics in SEA cities are considered in the development of local TIA standards. They include undefined trip generation rate, lack of efficient plans for pedestrian and public transportation, respectively.

Poor Accessibility Management

As there are no explicit regulations for arranging traffic flow in and out from the project area and lack of enforcement, some developers just prepared direct access into major carriageways in and out for their development areas. This usually creates critical conflict spots into traffic streams and generates severe congestion. As shown in Figure 5, a vehicle leaving from a shopping center is interrupting the main traffic stream. For Figure 6, a car waiting to enter a hypermarket is blocking the main traffic. It can be seen that trips going in and out from a development project significantly effect to the adjacent traffic, not only in volume, but in term

of accessibility quality also. Lack of detailed design standard to alleviate the undesired impact creates severe congestion. Therefore, planners must consider the accessibility management as a key issue in TIA standards.

Trip Generation Estimation

Some of the most important TIA concerns are how many trips will come to the developed area (or estimating trip generation). Generally, there is no standard method for estimating number of trip generation in SEA cities. Most of studies applied trip generation rates from other countries, especially for the handbook of trip generation rate developed by ITE, or they conducted many studies and estimated some practicable rates based on their experiences. For instance, it was recommended to estimate trip generation for shopping center project in Metro Manila based on Gross Leasable Area (GLA) [Palmiano et al., 1999], while many shopping center project in Bangkok utilized Total Floor Area (TFA). Some condominium projects in Bangkok estimated number of trip generation to be equal to number of parking lots. The application of trip generation rate from other countries might irrationally represent the generated new trips. In the U.S., trip generation rates are based on passenger car trips, and if directly applied to SEA cities, the new traffic may be overestimated. These inconsistent estimation methods make the investigation of traffic impact studies more difficult, because the evaluator of TIA study does not know which estimated traffic volumes are reliable. The trip generation step is the preliminary step for further steps of TIA, thus the standard method should be established to be suitable for each country. An alternative to support the government in setting up a standard estimation of trip generation is to request all developers to submit the estimation of trip generation for their approved projects, or at least the report of generated trips by each mode coming to the development site after opening. The government may provide some report forms or worksheets for developers. This is easy to develop a complete database in establishing the standard estimation of trip generation for various land use types.

Overlooked Accessibility of Pedestrians

In the big cities like Metro Manila and Bangkok, the safety and convenience of pedestrians should be considered as the major issues for managing accessibility of any developments. 44 % total trips a day in Bangkok travel by public transportation systems, particular for bus. For Metro Manila, about 70 % of shopping trip generation is by public modes [Palmiano et al., 1999]. A lot of passengers have to get on and get off from the system at the stations or bus stops. Poor accessibility impedes the pedestrian flows, and causes the accumulation of passengers exceeding the capacity of terminal facility. Under this situation, pedestrians might intrude into the carriageway, and obstruct the traffic streams together with congestion and potential accidents. As shown in Figure 7, some shopping centers always utilize the walkways nearby bus stops for bazaar or any activities. Figure 8 demonstrates poor accessibility and dangerous road crossing for pedestrians in front of a shopping center. These examples show that the effects on pedestrians cannot be disregarded from the TIA process in SEA cities.

Unattractive Public Transportation System

Public transportation is a main mode for direct access to a development project, as shown in Figure 9. However, the TIA practices in developing cities mainly focus on passenger car trips, especially in term of parking areas, accessibility provision at entrance and exit. This might be because of the influences of TIA process in the U.S. Planners should realize that the travel characteristics in developing cities are much different from the developed ones. There are

some criticisms to consider only traffic impacts caused by private car, as it might induce more auto trips. Some argued that the trip generation from the ITE manual is the overestimation [Shoup, 2001]. In Figure 10, limited spaces and defective environments of a bus stop will reduce the service quality of public bus and are unattractive for users. Planners should find out how to encourage people to come to destinations through public transport systems. This can help relieve the negative traffic impacts caused by the developments.

It can be seen that determining TIA standards is an important factor to establish the TIA process. The government cannot ignore the need to develop the appropriate standards. Generally, TIA study under the EIA framework lacking the detailed standards only determines the direct impacts at the ingress and egress of developed area. They do not usually consider the impacts on the adjacent networks. Furthermore, the unavailability of regulations for traffic impact mitigation, external factors, including the influence of the developer, social factors, and political factors, can affect the assessment process directly or indirectly. Eventually, the TIA makes no provision for refusing approval, despite the findings.

3.3 Lack of Knowledge

Without the experts or technicians having sufficient knowledge on TIA in the government and consultants, the implementation of TIA process is never successful. The institutionalization of existing development impact assessment in Thailand is mainly concentrated in the central government offices, since there is a lack of potential staffs in local offices. At the same time, the experts in private sector are very limited, only a few famous companies have traffic engineers experienced in TIA. This situation is similar for Thailand and the Philippines. The intention to distribute the responsibility to handle TIA to control land developments to local agencies are useful in increase of the efficiency of TIA implementation. However, the government of the Philippines must train their people to have enough knowledge in transportation planning, traffic engineering, and using computer packages. As experienced in Bangkok, some consultants understand that TIA under the EIS act is the traffic impact during project construction only. They just reported how would they control the transportation of construction material. Lack of potential staff is also a problem in the TED of BMA. As seen from a high-rise project located along a small two-lane road, the TED officers approved the report, although the capacity of the small road was obviously overestimated (2,000 car unit/lane/hour). Unavoidably, to accomplish the target in efficiently implementing TIA, human resources in the conduct of TIA in the related organizations must be developed.

3.4 Budget Limitation

As explained before that to establish the TIA process in developing cities needs a lot of resources for developing the TIA standard process, details of required analysis components and methods, road classification, training staff, and for meeting among planners and developers. These steps require a huge budget from the government side. Therefore, it becomes a serious problem for them, and some planners give up to implement TIA. There is no doubt that the governments in both countries have to face the financial problem to implement TIA process, as the social costs generated by sprawl developments are never charged to developers. Although, the policy of impact fee for urban development projects was proposed to the government for long time, it has been neglected until the present. This is because most politicians are afraid for their public popularity. Certainly, the expenses of TIA study are not only imposed to government, but also to developers in hiring consultant team and mitigating negative impacts. The developers should be made to understand that while they

are gaining profits, their projects are imposing social costs to the community, therefore they should share in the responsibility of relieving additional costs.



Figure 5. Traffic Conflicts at Poor Exit.



Figure 6. Obstructed Traffic at Poor Entrance.



Figure 7. Decrease of Walkway Spaces due to Bazaar in Development Area.



Figure 8. Low Accessibility and Poor Safety for Pedestrian.



Figure 9. Using Public Transport System.



Figure 10. Poor Bus Stop Conditions

For years, planners in developing cities have invested a lot of money to alleviate the congestion by constructing new facilities, but it seemed to be unproductive. For example, during 1992-1996 Thai government spent about 1 Billion Bahts to construct expressways and main roads, but congestion cost was still very huge, as estimated in 1995 to be about 91,461 Billion Bahts. If the planner tried to implement TIA process with the same amount of money, it is believed that the cost can be significantly reduced. As estimated by the United Nations, a 10% reduction in peak-hour trips in Bangkok would provide benefits of about US\$ 400

million or 16 Billion Bahts annually. Comparing this benefit and the implementing cost of TIA, planners should not refuse to consider the TIA as a highly promising congestion solution.

Definitely, the obstacles of implementing TIA process in many countries are not limited to the issues mentioned in this paper. In terms of policy, it is not very clear who should pay for cost of conducting TIA study, whether it is the developer only or the developer and government. After all, a TIA study is also beneficial for updating traffic planning data of related agencies. In case of charging impact fee to developer for a budget in alleviating undesired traffic impacts, it is still ambiguous how the fee can be estimated. Consider the standard process, some technical issues are still under the researches in each country, for instance how large of the study area influenced by new project should be defined, what is the threshold of development project size that should be required for the TIA study, and how to estimate the generation of pass-by trips. These are just some problems of TIA applications to be elucidated in the further studies. However, this article focuses on the obstacles in the beginning stage of TIA implementation in SEA cities. The lessons from other countries will be studied in the next steps.

4. STRATEGIC POINTS TO IMPLEMENT TRAFFIC IMPACT ASSESSMENT

This chapter emphasizes how to improve the implementation process of TIA in SEA cities. What the study focuses is not the problems of technicality and practicality in each implementation stage, but we are going to discuss on the strategic points that can help to accomplish the TIA implementation. This paper classifies the strategic points into two points, including the concerned parties in TIA policy and stages of TIA implementation. First, the main parties that may influence to or be influenced from TIA are discussed. Second, the role of each party in helping to successfully implement TIA is explained. It is recognized that the most critical difficulty at the current situation is lack of motivation and cooperation among important stakeholders in the society. This article expects to inspire government, academic persons, and consultants to fully consider and seriously implement TIA in their cities.

4.1 The Concerned Parties

Normally, when TIA implementation is discussed, it focuses on the enforcement of government. It might be unfair for the government, if the society does not share the responsibility with them. As seen from the previous case studies of ineffective land use planning in SEA cities, only the government's efforts were difficult to accomplish land use control measures, because many stakeholders might oppose such measures. This is similar for implementing TIA policy. Under the existing EIS regulations, the government could not force developers to efficiently assess and alleviate the traffic impacts from their development projects. As a result, adverse impacts of sprawl city developments have been imposed to urban transportation facilities with huge social costs. To successfully implement the TIA process, we need the cooperation among various stakeholders or parties. The study considers five parties that should play some significant roles in implementing TIA. They consist of government, developers, consultants, academic persons, and the community or civil society.

Government, basically is the one who takes the responsibility of city planning. They have to hold TIA as the tool to control land development. There is no doubt to respect them as a main party. The conduct of a TIA has impacts on the developers, since they are directly affected from the policy in increase of budget, time, and human resources. However, they also gain

benefits from the accessibility improved to attract more customers. On behalf of developers, consultants are hired to perform a TIA study. The study team must collect on-site data, analyze impacts of new traffic, and propose mitigation measures. These tasks require the technical knowledge, so the consultants play an important role in preparing TIA study. When a development project located in a city, the community living nearby the project will be directly or indirectly affected in term of advantages or disadvantages. The community should have a chance to participate in the implementation and application of TIA. As shown in a case study of Makati, a major CBD in Metro Manila, the community requested developer to complete the TIA study for a new school project close to their residential area. The final party is academic persons. In developing cities, most professional traffic engineers work in the universities. These experts should distribute their technical knowledge to other parties involved in preparing TIA study. Additionally, they can motivate people and developers to realize the necessity and advantages of TIA. For the next section, the role of each party is discussed in each implementation stage.

4.2 The Stages of Implementation

This section aims to discuss each main stage in implementing TIA. Based on the reviews of TIA practices in Thailand and the Philippines, the study proposes to separate the implementation process into three main stages. These stages have influences on TIA applications, as illustrated in Figure 11: promotion of the necessity of TIA, formulation of TIA process, and evaluation of TIA process.

Promotion of the necessity of TIA

Although, most planners are very familiar with the techniques and tools in TIA process, such as classical four-step model, network capacity analysis, traffic managements, etc., only few really understand what the role of TIA is in land development control, or why it is essential to be established. The TIA does not intend to prohibit the developments, but it tries to minimize the effects of located project on the transport network and thereby assist both public and private planners to make major land use and other development decisions. At the beginning, it should make all parties in the society to realize the necessity and advantages of TIA. In Figure 11 (a), academic persons who really have skills on TIA should motivate the government to understand and encourage them to start utilizing TIA measures. Simultaneously, academic persons also can discuss with consultants on how preparing TIA study is important. The study team should have the professional skills, otherwise the TIA report prepared seems to be meaningless. Academic persons may not be necessary to deal with the community and developers directly. Government should promote TIA to both parties by themselves. However, academic persons can support through sharing the knowledge in public workshop or meeting. Developers should realize that a new development has impacts on the community at large, so they ought to share the responsibility for mitigating such impacts. For the community, they should be encouraged to participate in the project affecting to their living standards.

Formulation of TIA process

Human resources are essential in the TIA process, planners in related agencies and consultant firms must be trained to correctly conduct and evaluate a study. Also the detailed TIA standards should be completed and used as the reference of the society. These activities can be conducted under the support of an academic person as shown in Figure 11 (b). They can develop the vital standards by cooperating with government planners and experts in consultant

firms. After that, the academic can train the staffs of government and consultants on how to employ the developed standards in appropriately estimating and mitigating traffic impacts. This kind of cooperation can be seen from the case of TIA standards development in the Philippines. During the application of TIA in the real world, it can create the consultations among the government, developers, and consultants about predicted impacts and alternatives to relieve such impacts. Definitely, the community should have opportunities to make clear what they want in allowing the development inside of their areas.

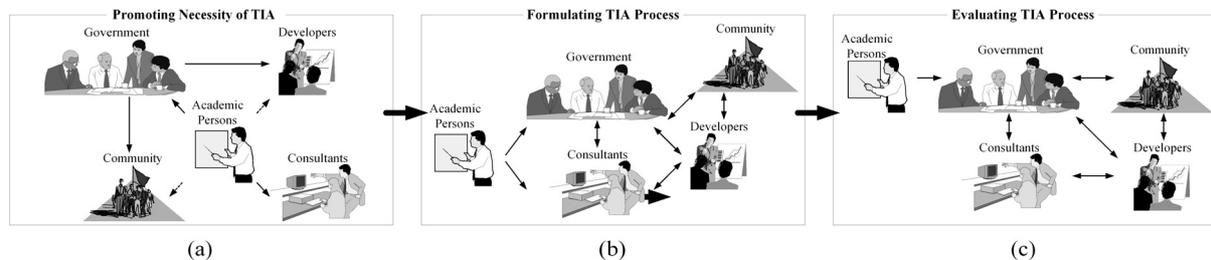


Figure 11. Proposed Stages for Implementing TIA: (a) Promotion for the Necessity of TIA, (b) Formulation of TIA Process (c) Evaluation of TIA Process.

Evaluation of TIA process

The evaluation process is a key part for successful TIA application. Previously, due to informal evaluation process, many incomplete impact studies were approved. Eventually, such development generated a lot of problems on traffic congestion and environmental damage. Two good evaluation systems proposed for implementing TIA in the Philippines are the TIA review committee and accreditation system. First, to evaluate a report of traffic impact study, it should set up a committee to check for completeness and adequacy. Initially, academic persons should be members of committee together with potential representatives from related agencies as demonstrated in Figure 11 (c). This can educate the government staffs to be professional in evaluating TIA studies. If a number of staffs is trained until they can handle the evaluation efficiently, the government can employ only their staff. Based on the recommendation of UPNCTSF study team, these evaluators should have permanent positions, because of the following reasons;

- Permanent evaluators will allow for intensive training, concentrating on a core group for developing adequate knowledge of the TIA system.
- Permanent evaluators can accumulate the necessary experience over time. Changes in evaluator team often result in having a member or members who have not sufficient experiences.
- Permanent evaluators can provide the consistency to the review process. This will create the evident appraisal of TIA reports.

Second, it is a system to guarantee that those who perform a TIA study are only qualified persons or firms in terms of knowledge and experience, such as academic background and more than three years of experience in TIA. The qualified groups get a certificate or accreditation. Absolutely, if they carry out a low-quality TIA study, the accreditation can be withdrawn.

In evaluating a TIA report, government will discuss with developers or consultants, the representatives of developers, in order to find the most suitable mitigation alternatives. Additional, the community should be notified as to how the adverse impacts will be alleviated.

If they have any other requirements, so they can propose to the government and developers for the consideration. This study strongly recommends that the evaluation process should not be merely finished at the roundtable meeting. The evaluators should track or monitor the implementation of mitigation measures of approved projects. At the same time, they must provide opportunities for the community to assess the changes. If developers do not follow the final agreement, there should be some punishment such as penalty charges. There is a case in Bangkok when the developer had agreed to provide an overpass in front of their shopping center (see Figure 12) as a condition to the granting of the development permit. But after two years of completing the project, they never constructed the overpass. Nowadays, that place is very dangerous for pedestrians, especially during evening peak hours, as shown in Figure 13.

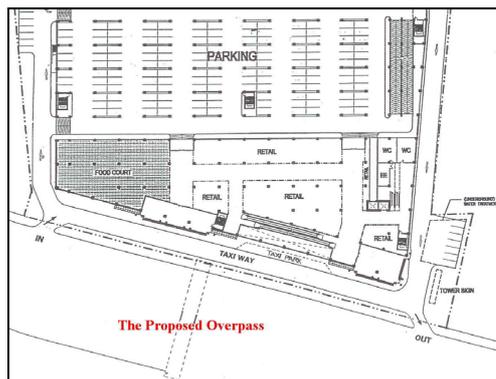


Figure 12. The recommended overpass.



Figure 13. Poor impact mitigation.

A city council or a specific committee composed of TIA evaluators will play an important role in enhancing the quality of TIA study. It should be composed of senior technicians from various related fields, including traffic and transportation engineering, land use and urban planning, legalizing land development regulations. They should come from academic, government, and private organizations, and also have experiences on assessing and mitigating traffic impacts, so that the committee is highly qualified and independent from political issues. Moreover, in long-term vision this committee can play the significant role in developing and standardizing all related components of the formal TIA process, such as setting up the necessary parameters of traffic simulation, identifying of impact mitigation requirements etc.

5. CONCLUSION

To date planning control in South East Asian (SEA) Cities like Bangkok and Metro Manila have been weak in guiding development. The road development program is still not linked to any particular land use scheme. Under this situation, a powerful technique to control and mitigate the adverse development impacts on the transportation system is to establish a systematic form of Traffic Impact Assessment (TIA). The implementation of TIA in Thailand and the Philippines has been reviewed to provide the understanding on the TIA characteristics in both countries. Although Thailand has started to apply the TIA under the environmental impact study earlier than the Philippines, the planned institutionalization of TIA in the Philippines seems to be more systematic and efficient, once realized. With a number regulations and guidelines, the TIA requirement has the potential to cover all levels and kinds of urban developments in the Philippines. However, in the Philippines a clear and mandated institutionalization has yet to materialize and the usual practice of TIA has generally been superficial. Therefore, vigilance is necessary for the eventual institutionalization of the TIA

process in the Philippines. This study also recommends that in weakly planned SEA cities the TIA should be under a different law or guideline independent from the land use plan, so that it can efficiently function as an investigator of land development control.

For the obstacles of TIA process, four main issues consisting of institutionalization and legislation, unavailability of standard process, lack of knowledge, and budget limitation, should be considered. The need to develop the required human resources to perform a serious and meaningful TIA exists in both countries. The unavailability of standard process and limited budget are also problems in both countries. However, the intention of the Philippines to develop their own TIA standard is a good lead. Because in SEA cities the trip characteristics are much different from developed cities, the utilization of foreign standards may fail to provide an appropriate result. Particularly, there is some uniqueness in travel behavior of people, such as high proportion of public transport riders, management of accessibility and safety for pedestrians.

The study recognized that one of the most critical difficulties in implementing TIA in SEA cities is the lack of motivation and cooperation among important stakeholders in the society. Therefore, we have proposed two strategic points, including concerned parties and implementation stages. Five parties, including the government, developers, consultants, academic persons, and community, should be encouraged to actively play their significant roles in three implementation stages: promotion for the necessity of TIA, formulation of TIA process, and its evaluation. Experts in the academe may inevitably take the responsibility to motivate the other groups to realize the TIA necessity, and to support in formulating and evaluating the TIA process. The cooperation of all parties is also essential. Definitely, we still need to study more about the technical and practical problems for successfully implementing TIA. This paper is intended to draw basic lessons for planners especially for developing cities, to learn how to effectively set up TIA for growth management in the future.

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