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Urban Road Transport in Asia's Developing Countries : Strategy for Safety and Efficiency

By

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Abstract.

Most of the world's population and economic growth is occurring in the Developing Countries (DCs) of the Asia Pacific Region. The DCs will be home to most of the world's urban growth. Motor vehicles are growing at two to three times the rate of population. Road safety and congestion are major concerns. As a consequence, DCs now face alarming urban road transport challenges, which are expected to continue for some years. The supply of transport services has not been matched the increased demand, due to insufficient infrastructure development. There is no comprehensive strategy in place to address the safety and efficiency of urban transport needs.

This paper begins by outlining the development of an integrated road safety strategy to address key concerns such as establishment of national road safety council, data system, road, enforcement, and monitoring. It then introduces urban road transport strategy which has been developed to deals with the overall picture, including problem assessment, objective formulation, and implementation. The strategies cover a wide range of issues, within a comprehensive framework, to create a competitive and sustainable approach to tackle problems, improve institutional capacity, optimise the use of resources, and link road system to community benefits and expectations. The role of government's leadership and donor's involvement has been addressed.

INTRODUCTION

In the developing countries (DCs) of the Asia Pacific Region (region), the tremendous growth in motor vehicle use, the enlarged capacity of heavy vehicles, population and economic growth, together with attraction of people into urban areas for work or leisure have led to a sharp increase in demand for more road space and services. The developed economy is predominantly urban and the urbanization growth is expected to continue for some years. Motor vehicle fleets are growing at two to three times the rate of population. The exceptionally high growth of motorized two- and three-wheelers and the use of non-motorized transport (NMT) are another aspects of transport demand.

Essential as the movements of people and goods are to the economic and social aspects of community life, they present people and their surrounding with the problems of congestion and road accidents, which impose a huge impact on the socioeconomic development. In many cities, there is an increasing pressure to find solutions for the escalating problem of efficiency and safety of urban road transport. The supply of transport services has not been matched the increased demand, due to insufficient infrastructure development.

Another serious obstacle is the institutional issue. Relationship between land use and transport agencies is fragile. Traffic enforcement and road management are within the hands of different departments. Coordination among agencies, lack of policy, shortage of budget, and insufficient information are major concerns. There is no comprehensive strategy in place to address road transport safety and efficiency and link performance to expectations.

This paper describes an integrated framework and indicates the feasibility of its application in the development of road safety and urban transport management strategies. The framework addresses the nature and magnitude of current transport problems in DCs, institutional capacity and efficiency improvement. Systematic implementation procedures that will be applicable under a variety of conditions have been introduced to overcome bottlenecks, improve growth and provide safe, efficient and convenient movement of persons and goods.

ASIA'S URBAN CONTEXT

Rapid socioeconomic developments generate high demand for adequate transport facilities and services. In 2000, the growth in the GDP of the world was estimated to be 4%. Following the impressive recovery of 1999, the economic performance of Asia strengthened further in 2000-2001. China, for example, registered robust GDP growth of 8% with virtually no inflation pressure (1).

According to the World Bank and Asian Development Bank (ADB) studies, in most developing countries the urban sector accounts for 50-70% of the gross national product. Cities in developing countries often devote 15 to 25% of their annual expenditure to their transport system. Between 8-25% of urban household income is typically spent on transport.

Today about 38% of developing Asia's population lives in cities – some 1.2 billion people. By 2020 the proportion of urban residents will rise by 50%, with the cities population reaching 2 billion (2). There will be at least 153 cities in Asia with population over one million. Eighteen of the 27 megacities – cities with over 10 million people – will be in Asia. .

Yet Asia's developing countries are only experiencing the beginning of this remarkable shift of people and economy activity from agrarian communities to urban industrial centers. Within these cities, road transport is the main mode of movement.

ASIA's ROAD TRANSPORT SYSTEM

The need for the main intercity road network together with the rapidly expanding urbanization in the region require capable road capacity, efficient transport planning, and sustainable approach. In many countries, road networks are still underdeveloped in both quality and extent, with low density, e.g 1,100 km of roads per million inhabitants in China, compared with about 1,800 km for India, and 25,300 km for the USA.

On the other hand, most countries are witnessing rapid increase in vehicle ownership. The vehicle population in Beijing grew about threefold between 1991-2000 from 540,000 to 1,570,000. Chi Minh City in Vietnam and Panang in Malaysia have about 300 motorcycles per 1000 persons (1).

Traffic congestion is much worse in the region's large urban areas than in the USA, and Europe. Traffic volumes per square mile in Europe are approximately 50% higher than USA. Traffic volumes are more than 80% higher in the much more dense Asian urban areas (3). As a result, traffic speeds are slower. In the USA, an average roadway speed in urban areas is nearly 32 miles per hour. The highly dense Asian urban areas have speeds less than 16 miles per hour.

Road accident deaths and injuries are increasing at faster pace in the region than other regions of the world. The region accounts for almost half of all estimated worldwide road accident deaths (around 0.5 million), with estimated economic loss of more than \$35 billion annually. This is more than double the amount of annual foreign development aid the developing countries receive, and equivalent to 2-3% of individual country's GDP (4). In 2001, there were about 755,000 road accidents, killing 106,000 and injuring 546,000 persons in China alone. This entails 1 death each 5 minutes. In India, fatalities among pedestrians is around 45%, while among motorized two- wheelers is around 30%. Studies even indicate that the number of deaths and injuries in the region is associated with under-reporting of 42% (5).

All this is accruing despite the fact that motorization is still at relatively early stage in most DCs. There are only about 1.3 vehicles for 100 persons in China, and 2.5 in India, compared with 60 in Australia, and 65.3 in Japan (6).

It is expected that cities would continue to experience a very high growth, and more pressure on the current fragile road networks for some years to come, in the absence of a comprehensive strategy to optimize urban transport operations and minimize its impacts.

INFRASTRUCTURE AND INSTUTIONAL BOTTELNECKS

DCs are in the midst of a fundamental transition in their populations and human resources that bear, on many key dimensions of their fast social and economic development. However, success in the DCs is far from even. Development of capable road transport system to move people and goods and facilitate urban functions will be a key challenge. At present, there is no well-known strategy, which effectively manage urban transport operations in most DC's cities. The worrying sign is that the current infrastructure development has not been matched by corresponding investment to develop efficient road transport networks.

Institutional bottleneck is another major concern. Government leadership is required to enhance efficiency. A multi-dimensional approach is necessary. Policies, traffic enforcement, data system, and legislation need to be strengthened. Performance monitoring, and accountability should be improved. Better qualified staff, and management system are needed. Involvement of the stakeholders, both public and private sectors, and civil society is also essential. Actions are also required to provide efficient road network capacity and develop accident prevention measures.

WHY IS TRATSPORT STRATEGY REQUIRED? Sustainability & Poverty

A sustainable transport system is one that is safe, efficient and environmentally friendly. In the DC's, sustainable transport system is required and this has been driven by the following issues:

1. Transport planning and strategic approach have not been given the priority they deserve, during the current infrastructure development, which resulted in bottlenecks, and impact on the socioeconomic development, and community welfare.

2. Road projects always achieved greater economic returns, but they can perform even better, if safety and accessibility are part of the objectives.

3. The emerging opportunities for private sector financing, the widespread of globalisation phenomenon, and membership of WTO, necessitate actions to be taken to adopt sustainable approach, avoid the potential constraints and capable transport system, for just-in time delivery.

4. Unavailability of efficient transport is making the journey to work costly and long for the poor. Transport development that improves access, therefore, can be a starting point in poverty alleviation.

INTEGRATED ROAD SAFETY AND URBAN TRANSPORT STRATEGIES

The scope of the proposed strategies of this paper will address the following specific factors, as an integral part of overall urban structure (i) assess the strategic options for the urban transport, congestion problems, travel demand, negative impacts, and cost, to develop sustainable road transport and land use plans; (ii) promote safety, better enforcement, reliable mechanism for data collection, and capacity building and human resource development; and (iii) promote cooperation and best practice, and foster allocation of appropriate funds, and stakeholder participation.

Proposed Road Safety Strategy

Efficient strategy should be based on the integration of the 3 'Es' of (i) Education; (ii) Engineering; and (iii) Enforcement (7). The following comprehensive road safety strategy, therefore, has been developed to address ten key requirements.

Government Leadership

Objective: Formulation of National Road Safety Council (NRSC), with representation of relevant agencies and reporting to the central government, to establish improved cooperation and collaboration mechanisms, and provide guidance to road safety activities that are aimed at the reduction of traffic accidents. NRSCs should also be formed at municipal level. Define common objective is necessary, while self-interest of individual agencies should be swept aside-in the interest of saving lives. See Figure 1 and 2.

Data System

Objective: to develop an effective accident and enforcement data collection and analysis system, sponsored by all relevant agencies, and develop an effective protocol for data dissemination and monitoring. A common definition of accident, fatality and injury is also required. This is necessary to establish a uniform system and standards, to continuously monitor effectiveness. See table 1.

Road System

Objective: to introduce more safety conscious planning and design of roads and traffic operations; and to establish procedures and institutional capability to improve hazardous locations via low cost engineering improvements.

Legislation

Objective: to develop improved traffic legislation to remove ambiguity, confusion and conflict, which promote road safety, and facilitate effective enforcement. It is necessary to increase the offence detection rates.

Enforcement and Policing

Objective: to develop more effective enforcement through increased use of technology and tactics to deter unsafe driving behaviour, strengthen traffic police skills, and involvement in planning and design of roads and traffic management schemes.

Education

Objective : to increase the capability of agencies and their staff to plan, design, implement and evaluate targeted, data-led publicity campaigns and road safety education through the school curriculum and community involvement.

Driver License

Objective : to conduct a critical review of driver training and testing systems, to improve driver skills, together with appropriate control to minimize abuse in licensing practices.

Vehicle

Objective: to strengthen vehicle testing and inspection systems, to deter the use of defective and unsafe vehicles on public roads, and to establish link with the industry.

Traffic Monitoring

Objective : to establish uniform traffic monitoring system, sponsored by all road safety agencies, enhance emergency services/rescue assistance available to traffic crash victims, and to provided all relevant data such us vehicle registration, driver license, and crash records.

Traffic Management

Objective : to establish a systematic traffic management scheme to facilitate the movement of private and public transport, NMT, trucks, bicycles, two- and three- wheelers, parking, special events, as well as link with activity and service centers.

Proposed Urban Transport Strategy

Urban transport is enormously complex. It operates in a context associated with integration of large number of disciplines. The proposed strategy, therefore, offers the possibility to identify and assess various urban disciplines within their mutual effects as a whole, which then give a basis to work out proper action. The following steps describe briefly the process of the strategy. See Figure 3.

Stage I

Problem Identification : The task here is to answer several questions such as (i) what is the current and anticipated level of urban transport problem?; (ii) is it necessary to develop new strategy?; (iii) are there social/economic/environmental/equity/political issues, which might limit the strategy introduction?; (v) what current and anticipated technology may be available to support strategy development?; (vi) what are the available options?; (vii) what is the practical plan to handle the interaction between transport demand, supply, drawbacks, and introduce the best service?

Objective Formulation : The objective should include the following (i) minimize congestion and permit traffic to move more freely; (ii) satisfy potential travel needs, and urban growth; (iii) promote safety and economic development; (iv) provide an appropriate access to employment, and other activities; (v) facilitate the operation of freight, taxis, public transport, and NMT at minimum costs; (vi) integrate with land use, and population distribution; (viii) flexibility to accommodate the potential changes. At the end of this stage it is necessary to examine the potential government involvement and willingness to provide leadership. This is necessary to secure the required resources. Without government leadership, it is impossible to develop a successful strategy in the DCs.

Stage II

Development Elements : This stage deals with the evaluation of all elements of urban and road networks including data, cost, economic activity, road plans, traffic, land use, population, political system, community culture, employment, social issues, transport modes, TDM measures; congestion, accidents, policing, parking, pedestrians, urban growth, and characteristics of the area.

This stage is necessary to furnish the background information, which is lacking on the characteristics of urban transport, and establish appropriate working conditions, which could be achieved over a wide range of urban area. Development of appropriate method for measuring and predicting are included in this stage, to assess the merit and disadvantage.

Stage III

Possible Strategies : Evaluation of the finding of the previous stages will lead to the development of various possible strategies. This stage will define the adopted strategy. Details design is required, together with the details of the administration and implementation means. Lesson learned, and project timing and team should also be addressed.

IMPLEMENTATION ARRANGEMENTS

The proposed strategy components are not within the control of one government agency. Government involvement therefore is necessary to ensure the success of the strategy. Involvement of the donors, to enhance coordination is also crucial, since implementations remain difficult without

donor's aid, e.g. loan. This is also necessary to facilitate implementation due to lack of communications within most of the individual country agencies. Donor's grant is also required to provide support for capacity building and staff development, policy reform, legislation issues, and administration improvement.

There are several successful stories in the world (8). In Singapore, the Area Licensing Scheme is successfully operational for some years. The state of Victoria in Australia has managed to establish a road safety council, comprising transport and police ministers, which reduced road accident deaths by 50% during the 1990's. The Japanese transport administration system is another good example. The DC's can learn from past experience and tailor plans to meet their needs.

The proposed strategies can be implemented at national or provincial level, and can be oriented to meet country specific conditions. Road Safety strategy could be implemented individually, or as part of the proposed overall urban transport strategy.

CONCLUSIONS

In the absence of a comprehensive approach to address urban transport and road safety problems, a multidisciplinary strategy is required.

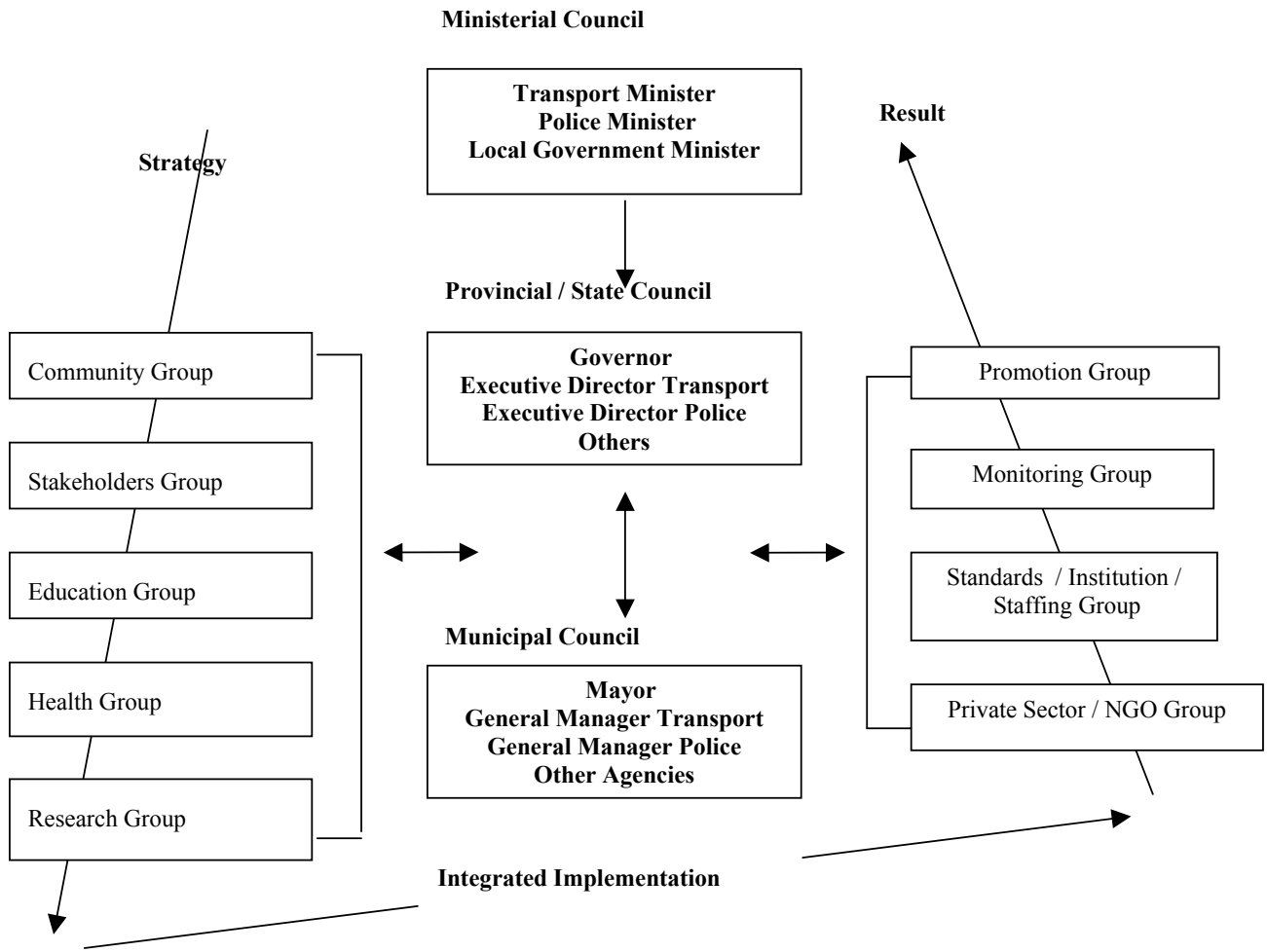
An integrated road safety strategy has been presented to address ten main components such as establishment of national road safety council, data system, road, traffic enforcement, legislation, and education. Urban road transport strategy then developed to deal with overall picture, including problem assessment, objective formulation, identification of relevant elements, evaluation criteria, and strategy implementation. The strategies cover a wide range of issues within a comprehensive framework to create a sustainable approach to tackle urban transport problems, improve institutional capacity, optimise the use of resources, and can be implemented at national or provincial level, and tailored to meet individual country needs.

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Source : Author

FIGURE 1 Proposed Structure of Road Safety Council

Components	Elements
1. Government Leadership (& Donor's Support)	<ul style="list-style-type: none"> - Establish NRSC at Ministerial level - Allocate budget / support - Strategy / standards / targets - Coordination and monitoring - Focus on integration efforts - Institutional strengthening / clear role - Research / promotion
2. Data System	<ul style="list-style-type: none"> - Data collection system - Data analysis and dissemination - Monitoring system - Institutional strengthening
3. Road System	<ul style="list-style-type: none"> - Design / operation / road safety audit - Accident prevention measures - Blackspot - Skill development
4. Legislation	<ul style="list-style-type: none"> - Road traffic act - Rules and regulations
5. Enforcement	<ul style="list-style-type: none"> - Equipment & skill development - Strategy / offence system - Performance indicators
6. Education	<ul style="list-style-type: none"> - Road user education - School's road safety education - Training
7. Driver License	<ul style="list-style-type: none"> - System review - Driver testing - Driver training - Strategy for action.
8. Vehicle	<ul style="list-style-type: none"> - Link with industry - Testing and inspection regime - Strategy for action.
9. Traffic Monitoring System	<ul style="list-style-type: none"> - Integrated information system - Emergency response / ITS / GIS
10. Traffic Management	<ul style="list-style-type: none"> - Systematic system - Heavy vehicles / 2- 3- wheelers - Pedestrian / NMT

Objective : Socioeconomic Growth through Saving Lives, Reducing Injuries & Strengthening Institutional Capacity

Source : Author

FIGURE 2 Proposed Road Safety Strategy

TABLE 1 Proposed Minimum Road Accidents and Enforcement Data**Accidents**

Location	Date, time, and address
People	Road user classification, involved people, kind of severity : fatal, injury level, age, sex, address, driver license type and condition, blood alcohol level, seat belt status, airbag, bicycle, 2- and 3- wheelers requirements, NMT, pedestrian, and bicyclists
Vehicle	Registration, type of transport, model, color
Road	Intersection type, link, width, lanes, surface, traffic engineering devices
Environment	Land use type, weather condition, time of day, light
Causes	Speed, alcohol, mechanical fault, other vehicle, pedestrian, tricycle, bicycle, 2- and 3- wheeler
Diagram	Provide a diagram to show accident features

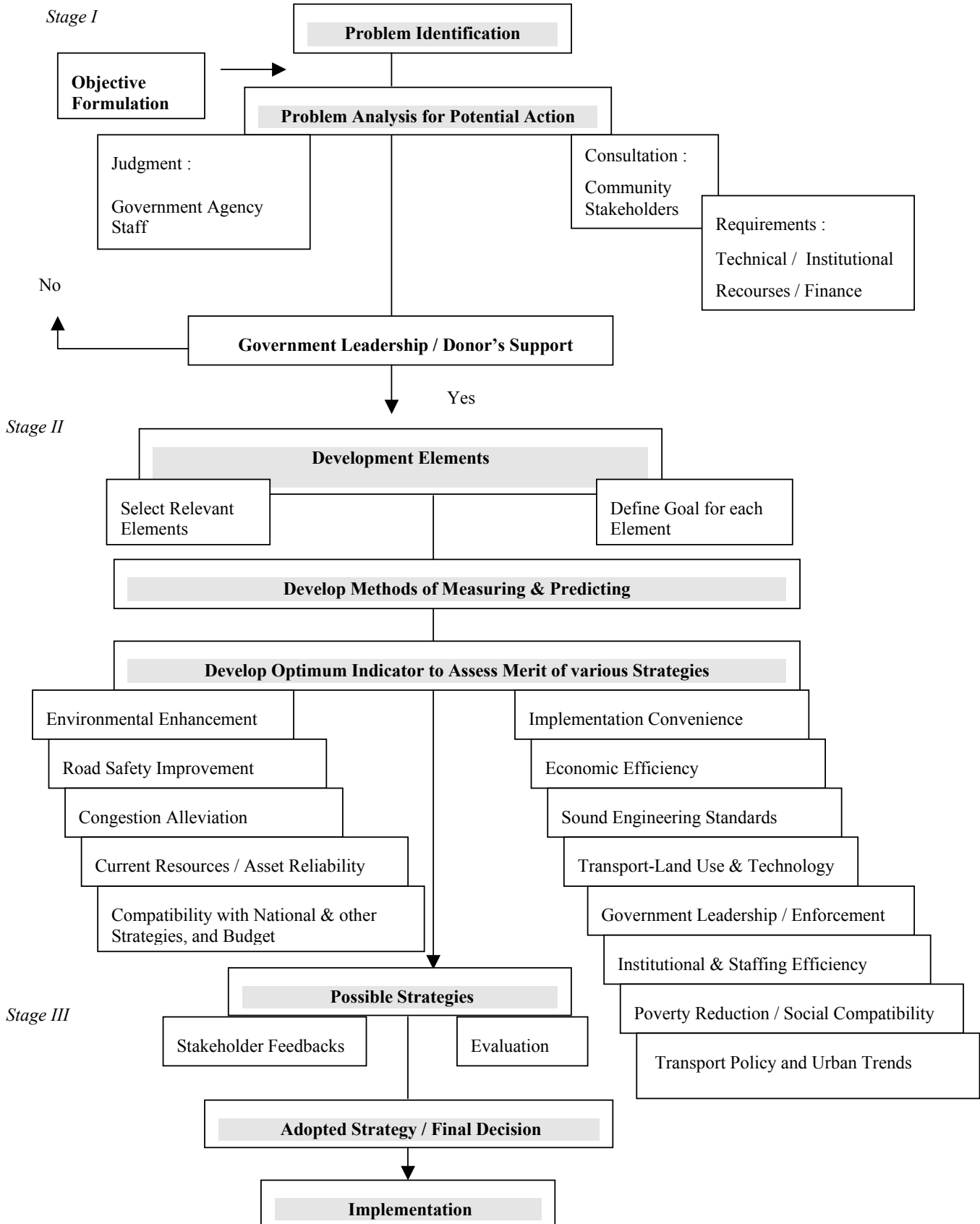
Enforcement

People	Drink driving condition and blood alcohol level, exceed speed limit, careless driving, seat belt, mobile phone, Drugs, safety requirements
Vehicle	License, registration, number plate, unroadworthy, light
Road	Disobey sign, signal and traffic rules
Policing	Speed and alcohol devices use, number ant type of offence issues, activity area, time on patrol, type of activity, office work, relevant police station

Links

Link Accidents and Enforcement Data is vital to assess strategy implementation and effectiveness against program operations, to optimize the use of recourses
Example : While traffic police is concentrating on speeding offences of zone 1 of the expressway, zone 3 shows high tricycle fatalities. District commander then should modify his program to meet needs

Sources: Author



Source : Author

FIGURE 3 Proposed Integrated Urban Transport Strategy