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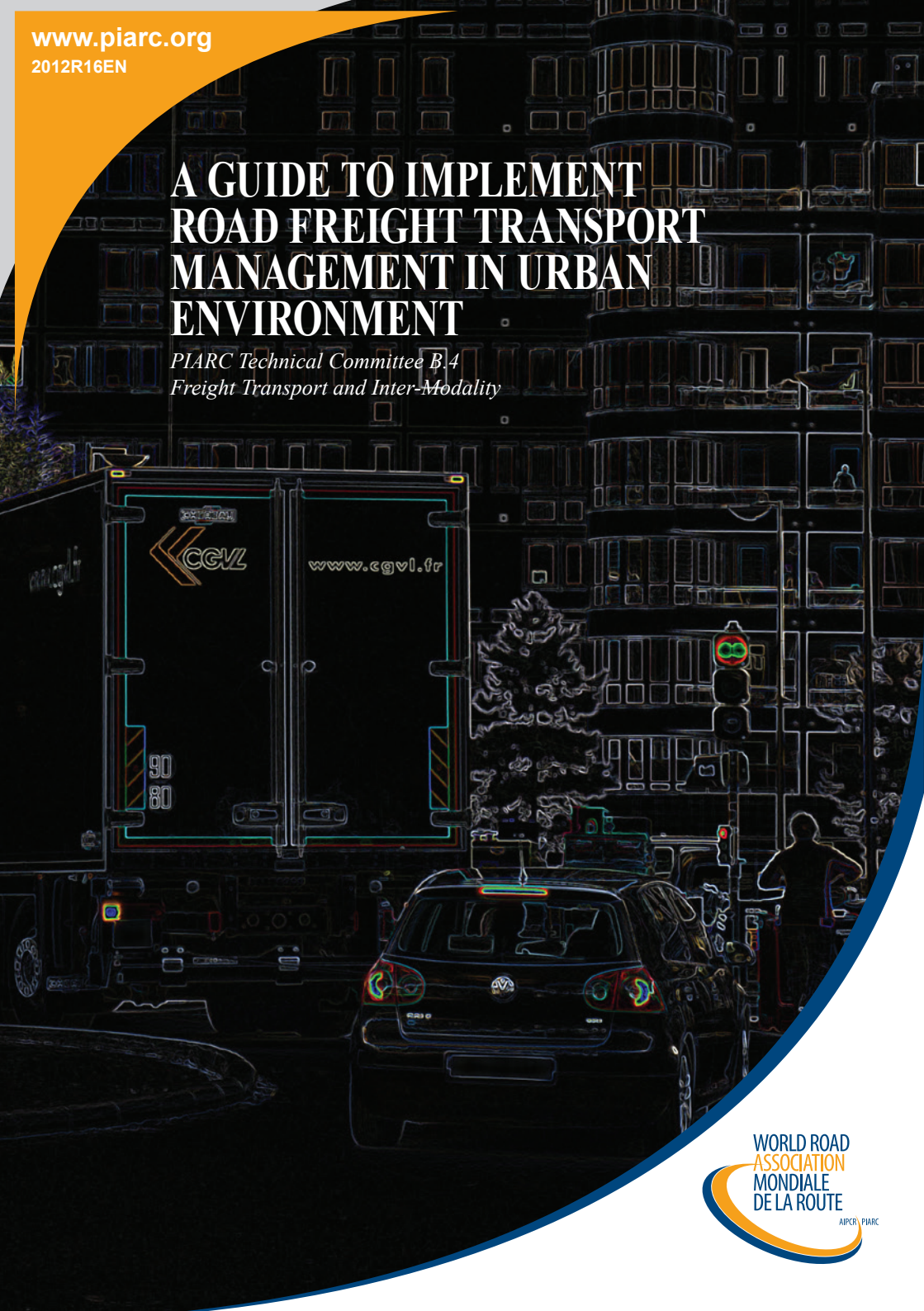
A GUIDE TO IMPLEMENT ROAD FREIGHT TRANSPORT MANAGEMENT IN URBAN ENVIRONMENT

PIARC Technical Committee B.4
Freight Transport and Inter-Modality



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ABSTRACT

This guide was prepared as an introduction to road freight transport management (RFTM) in an urban environment and to provide practical information.

After a presentation of the objectives of R FTM, the report describes the different stages leading from the establishment of a partnership between the different stakeholders to the selection of measures. It deals also with the implementation of a pilot program and its evaluation.

A set of case studies is presented from which lessons are learned. The report identifies the key factors of success, possible barriers and it makes recommendations on how to overcome the problems.

This guide is extracted from the report *"Public sector governance of urban freight transport"* (2012R15EN).

1. INTRODUCTION

Target audience
This guide is provided mainly for government officers who are facing freight-related problems, or who are in charge of logistics in a city or urban environment.

Intention of this guide
This guide was prepared to provide practical information on urban freight management. Considering road transport is the dominant mode in the usual urban environment, our discussion focuses *on road freight transport management* (RFTM) in this guide. It focuses on the things to consider and the actions to take at each stage in the whole process of the management. This guide is extracted from the work of Technical Committee Freight Transport and Inter-modality, published in the report 2012R15EN *"Public sector governance of urban freight transport"*.

Structure
This guide consists of two parts; the first part, *chapter 1 – "Introduction"*, gives an outline of *"Road Freight Transport Management (RFTM)"*, including its definition, necessity, scope and objectives.

Chapter 2 – "Procedure", page 9, gives the procedure of the freight management in a step-by-step way. *Chapter 3, page 38,* presents the lessons learnt from case studies. *Chapter 4, page 46,* presents recommendations for a successful management.

1.1. WHAT IS ROAD FREIGHT TRANSPORT MANAGEMENT?

"Road Freight Transport Management (RFTM)" is a system of tools that is intended to improve the safety and economic efficiency of freight vehicles, as well as reducing their associated environmental burdens and improving local quality of life. The measures include infrastructural and non-structural measures such as developing roads and allocating freight movement to a desirable time and route.

1.2. WHY IS ROAD FREIGHT TRANSPORT MANAGEMENT NECESSARY?

Freight movement, largely born by road transport, can cause several societal issues, such as traffic congestion, deterioration of roadside environment, and traffic accidents *(figure 1, following page)*. RFTM becomes necessary, especially in urban settings, where almost no other modes for freight movement are available.

1. Traffic congestion
Congestion adversely affects just-in-time deliveries.

2. Environment nuisance
Environmental burdens such as air quality and noise problems caused by freight vehicles

3. Traffic safety
When goods vehicles are involved in an accident, it tends to be severe.
Source: The white paper on police 2008, National Police Agency, Japan

4. Worsening the populations' quality of life
Pedestrians on local streets are threatened by shortcutting freight vehicles.

FIGURE 1 - TYPICAL LOCAL ISSUES TRIGGERED BY FREIGHT TRANSPORT

Intervention by the government is generally thought to be the second choice considering that economic activities like logistics should be given a free hand to the private sector. However, each business's acquisitive attitude does not necessarily lead to social optimum. This is when governments' involvement in RFTM can provide solutions to a problem.

When the public sector takes the initiative in RFTM, it is important to clarify the entire picture of a package of measures in order to obtain consent from freight businesses, who are likely to bear some form of burden, such as the cost associated with detouring away from congested areas.

1.3. OBJECTIVES AND SCOPE

1.3.1. Objectives

Road freight transport management aims for three main objectives, namely a society that is economically efficient, environmentally-friendly and liveable *(table 1)*.

TABLE 1 - OBJECTIVES OF RFTM

	Objective		Effects
Realize 3 objectives at the same time	1. Economically efficient society	Less travel time	Travel further Travel more frequently
		More reliable	Sophisticated production and distribution
		Larger vehicles	Mass transport
	2. Environmentally friendly society	Less CO_2 emission	Global climate
		Less NO_x emission Less noise	Local air quality
	3. Livable society	Safe and comfortable society	Increased traffic safety
		Better place to live	Larger selection of products Comfortable road space Fresh products Affordable price for products

1.3.2. Scope

Road freight transport management (RFTM) covers mainly the travel of freight vehicles, starting from the loading of cargo at facility A to the unloading of cargo at facility B as illustrated in *figure 2, following page*.

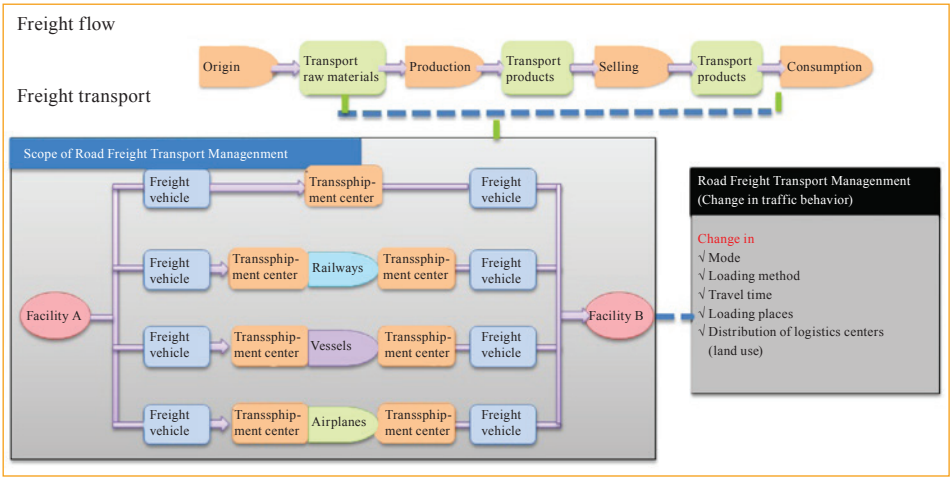

FIGURE 2 - SCOPE OF RFTM

1.3.3. Different points of view with different position

If the public sector has a different point of view than the private sector in that it focuses on regional or national welfare that is sustainable whereas a private sector business focuses on their own economic activities in practice, the public sector needs to build a consensus with the private sector including logistics businesses to share both perspectives *(figure 3)*.

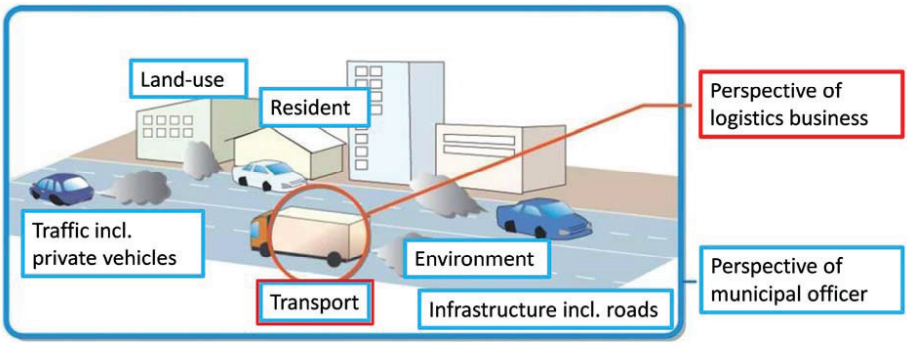

FIGURE 3 - DIFFERENT POINTS OF VIEW WITH DIFFERENT POSITION

2. PROCEDURE OF RFTM

This chapter provides practical instruction regarding what action should be taken at what stage of the RFTM system.

Before anything else, the administration would be better off with an appropriate organisational configuration, so that the administration can have a logistical perspective and focus. *Table 2* give some examples of cities with a logistical department.

TABLE 2 - ORGANISATIONAL CONFIGURATION

City	Relevant department	Number of staff	Main service
New-York	Office of Freight Mobility, New-York city Department of Transportation	–	Project management regarding freight mobility.
Paris	Road transport passenger/ freight mobility office	1	Planning of freight transport policies Talks with businesses and freight companies. Planning "Paris traffic policy (freight transport)".
London	Transport for London (TfL) Land transport unit Freight unit	15	Planning London freight plan. Support for each FQP of each district in the city. Managing: Freight Operator Recognition Scheme (FORS)
Reference: interviews with each department			

2.1. WORK FLOW

A typical work flow for road freight transport management is provided in *figure 4, following page*. It is important that a municipality makes the final decisions after public consultation, thus taking on final responsibility. A Freight Quality Partnership (FQP) or Public Involvement (PI) can be used as helpful methods to discuss and gain support for urban freight transport policy measures before a municipality's final decision.

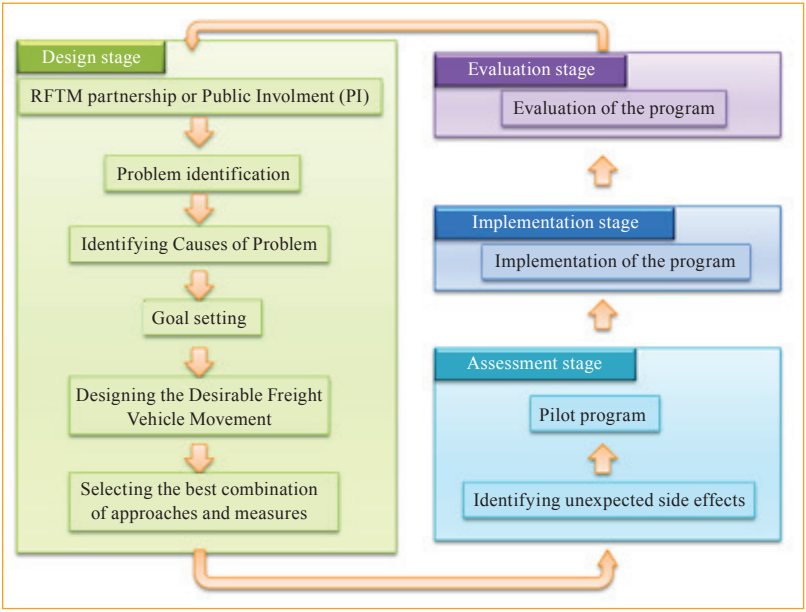

FIGURE 4 - WORK FLOW

"Plan-Do-Check-Act" PDCA cycles are often used for management systems in many fields, for example modern quality control, or environmental management. A management system applying the cycle is expected to implement measures in spirals of increasing knowledge of the system including benefits and issues that will converge on the goal, each time being closer to the goal than the previous turn.

As *figure 5, following page,* shows, ideal freight management fits neatly within the PDCA cycle in which freight measures will be improved and made more efficient as each cycle ends. *Figure 6, page 13,* gives an example of content. Naturally there should be a variety of cases for the application to the cycle. One can modify this as may be necessary. An example is provided in this guide.

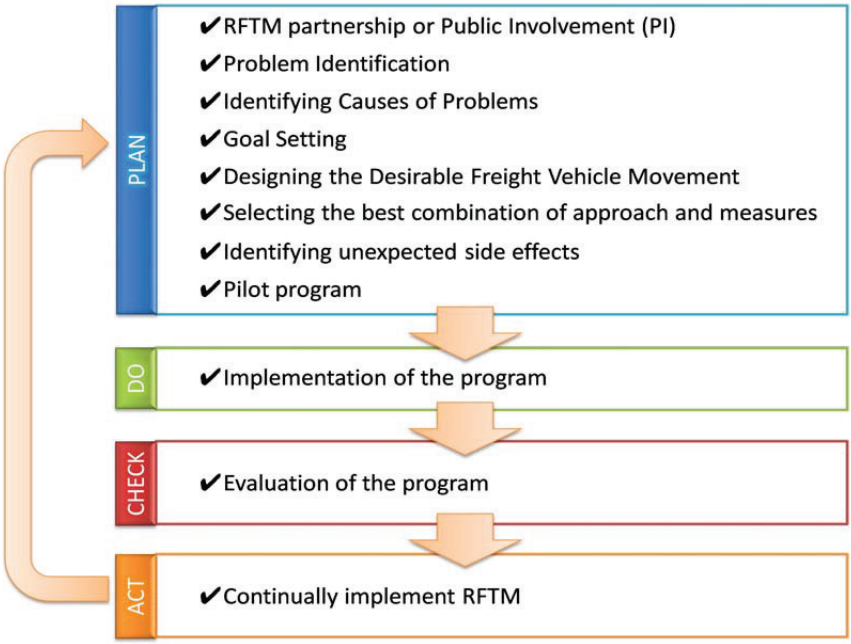

FIGURE 5 - PDCA CYCLE FOR THE CASE OF ROAD FREIGHT TRANSPORT MANAGEMENT

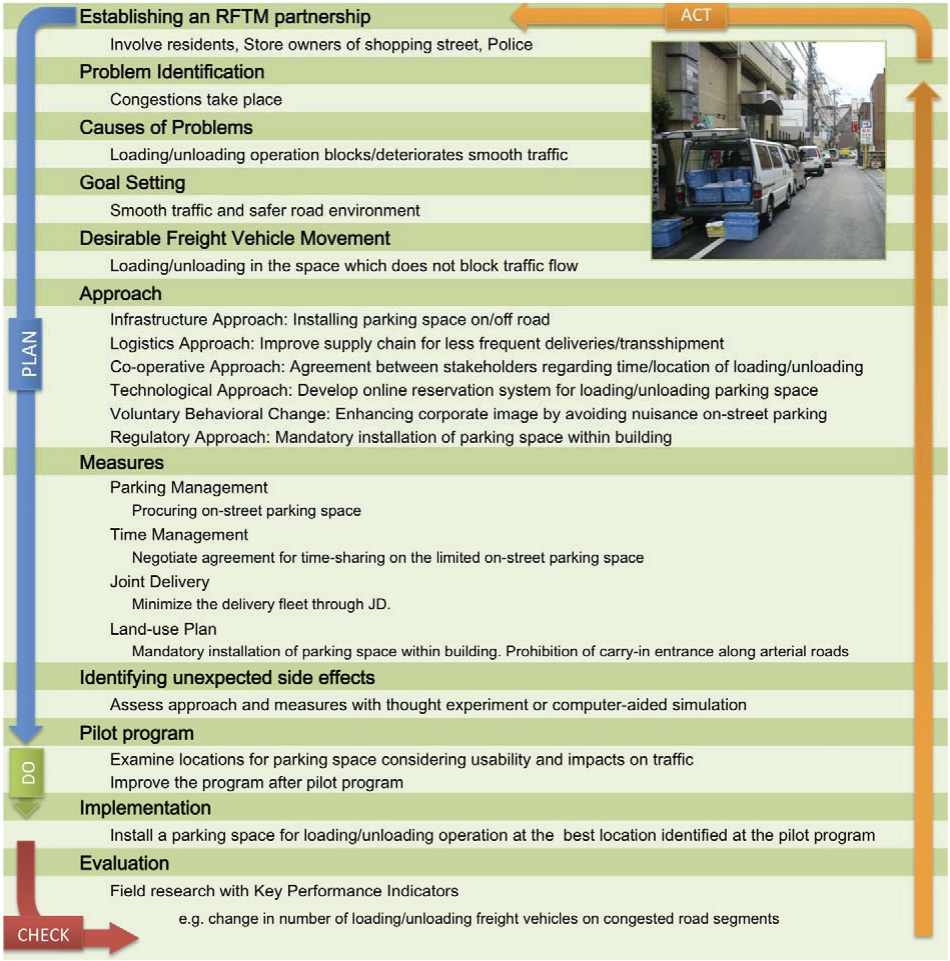

FIGURE 6 - EXAMPLE OF RFTM PROCEDURE

2.2. DESIGN OF PROGRAM

2.2.1. RFTM partnership (or FQP) / Public Involvement (PI)

Building a partnership takes effort and time, but it is worthwhile putting effort and time into it, because partnerships provide valuable information and opinions that you may not gain otherwise. Also, once consensus is achieved in the partnership, unforeseen events can be dealt with easily.

There are several techniques for involving stakeholders. This report covers two of them; one is to establish an RFTM partnership (or FQP: Freight Quality Partnership) and the other is to utilise public involvement (PI). Either one can be used depending on the economical and political situation.

A. RFTM partnership

Structure of RFTM partnership

RFTM Partnerships, including freight businesses, owners of stores in affected streets, residents, officers (municipal, central or police) and academic experts, are an effective tool in order to promote smoother traffic management *(figure 7)*. In instances where RFTM partnerships are not well known to a community, officers need to explain how they work, and ask for assistance from interested groups.

FIGURE 7 - EXAMPLE OF RFTM PARTNERSHIP (EAST OSAKA FQP, JAPAN)

The actors concerned

The actors concerned, or stakeholders, include residents, visitors, estate managers and developers, retailers, shippers and carriers. Each may have different interests and issues to be aware of *(table 3, following page)*.

TABLE 3 - INTERESTS AND VARIOUS STAKEHOLDERS	
Stakeholder	**Examples of interests**
Shippers (retailers, manufacturers, wholesalers)	Good working environment attractive to skilled workers, accessibility for shoppers, timely availability of goods at low charge, profitability
Residents	Road safety, less noise and air pollution, timely availability of goods at low charge, accessibility to local stores
Freight carriers	Accessibility, sound working environment, sufficient infrastructure for delivery activity, cost efficiency, road safety
Administrators	Maximized public benefit, less complaints from other stakeholders

Table 4 and 5 present the members of the partnerships established by the cities of Osaka (Japan) and Derby (United Kingdom).

TABLE 4 - MEMBERS OF EAST OSAKA FQP	
Freight business	Osaka Trucking Association and freight businesses in the city
Cargo owner	Businesses in district, Osaka Prefectural Urban Development Corporation and The East Osaka Chamber of Commerce and Industry
Local resident	Resident's associations and residents
Public bodies	Osaka prefecture and East Osaka City Ministry of Land, Infrastructure, Transport and Tourism Osaka prefecture police
Academic expert	Kyoto university
Reference: East Osaka FQP document	

TABLE 5 - MEMBERS OF DERBY FQP	
Freight business	FTA (Freight Transport Association) RHA (Road Haulage Association) Tarmac and Boots
Cargo owner	South Derbyshire Chamber of Commerce
Local resident	–
Public bodies	Local governments (regional county and city), Association of National Parc Authorities, Police, Transport 2000 and Highways Agency
Academic expert	–
Reference: Derby FQP document	

Level of participation

Each actor involved in the partnership can have a different level of participation depending on what problems are being considered. For example, safety problems may draw more attention from residents and police than from cargo owners. Each actor will determine its level of participation in accordance with its interest. If however, a deeper level of participation is required, a coordinator of the partnership (usually a government officer) can ask them to do so. For example, when traffic accidents involving freight vehicles are the main problem and freight business' do not show much interest in the topic, a coordinator can attract their attention by emphasising the benefits that freight business' will receive from, for example, a better corporate image through a safety enhancement program.

Levels of participation can be (1) Information (e.g. leaflet, newsletter or website), (2) Consultation (e.g. information session for general public), (3) Concerting (e.g. voting and choosing between several alternatives for the project) and (4) Co-production (i.e. a bottom-up strategy with information flowing from actors to authorities at a design workshop for example).

Communication tools

There are numerous tools that can be used to keep in touch with the actors involved in the partnership. Written documents (leaflets, journals, press articles, summary technical sheets), events (meetings and exhibitions), or virtual channels (newsletters and websites) can make useful communication tools.

B. Public Involvement (PI)

Establishing an RFTM partnership or FQP is not the only method used at this stage. Public Involvement (PI) is also a good tool and has been widely used *(figure 8)*.

The importance of PI is often cited in administrative literature; it increases public input in the planning stage, which helps an administrative office increase its chance of success. If the administrative office ignores the stakeholders and the public at large, it will rarely enjoy the benefits of their support and approval. By building good relationships with stakeholders, the planned measure will be better understood and more likely supported because they feel they are a part of the program through being involved from the planning stage of the PDCA cycle.

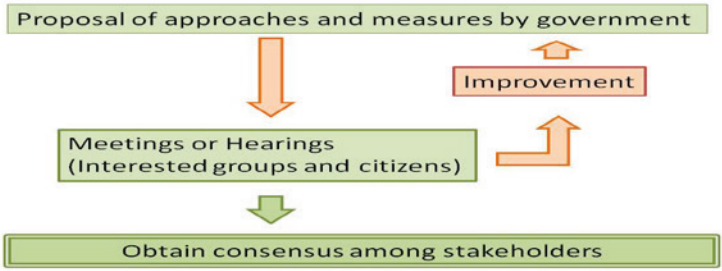

FIGURE 8 - TYPICAL PI PROCESS

Public meetings or hearings are often held as a means of PI. However, it is recommended to focus on interested groups and citizens so that one-to-one discussion can be achieved rather than just addressing a meeting, with little opportunity for feedback. Also videotaping the meeting and releasing it online can provide citizens with an opportunity to understand the situation at their leisure.

For administrative organisation, at least one full-time officer who is experienced or trained in public involvement should be allocated to this work, considering that PI can be time-consuming and takes a lot of work.

2.2.2. Identifying Problems and their Causes

Problem(s) might sometimes be obvious; the city official may be facing complaints; or there might be hidden problems which can be revealed through regular talks with people of various positions. Typical problems are:

- congestion;
- environmental nuisance;
- safety problem;
- energy consumption;
- visual pollution;
- damage to infrastructure;
- unsuitable infrastructures.

For more development on the description, the causes and points to consider, please refer to chapter 1 of the report 2012R15EN already mentioned.

2.2.3. Goal setting

The next step after identifying problems is to set goals. Goals should be simple and clear so that everybody can easily understand them. After a cycle of freight measures

have been implemented, the goals should be checked to ascertain if they have been achieved. In this sense, success or failure of the package is easily and fairly determined if the effect is measureable.

2.2.4. Designing desirable freight vehicle movement

Freight vehicle movement should be economically-efficient and environmentally-friendly.

1 - For freight vehicle movement around urban areas

Urban areas usually have a greater population density and are environmentally-sensitive, and normally include a number of destinations for freight vehicles. In order to reduce the environmental burden in the urban areas, it is necessary to minimise freight vehicle movements as much as possible. Thus, the following movement is desirable when freight vehicles drive within urban areas *(figure 9)*.

a. Freight vehicles without any destinations within the urban area drive around the urban area using ring roads or bypasses.
b. If the road network is such that freight vehicles have to drive through the urban areas, require them to use principal arterial roads that are more desirable from an environmental and safety perspective.
c. Require freight vehicles coming into the urban area to use ring roads and bypasses so that the travel distance within the urban area will be minimal.

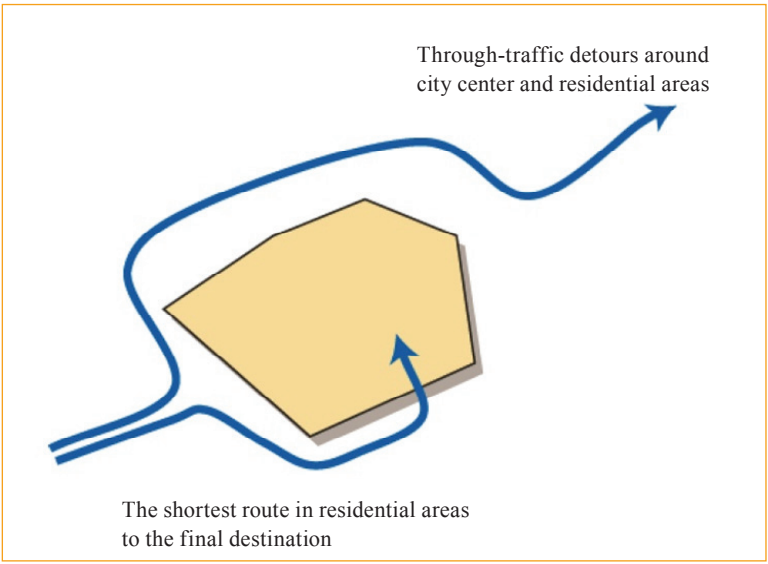

FIGURE 9 - ROUTE SELECTION AVOIDING/MINIMIZING FREIGHT VEHICLE MOVEMENT IN AN URBAN AREA

2 - For freight vehicle movement within urban areas (using arterial roads)

Freight vehicle movement is required to select its route into urban areas so that the environmental burden is minimised especially in cities where there are no ring roads. In this regard, freight vehicle movement into urban areas or surrounding areas is under the following conditions.

- Using arterial roads

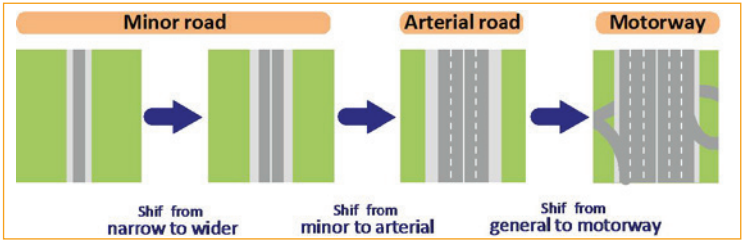

FIGURE 10 - USE ARTERIAL ROADS WITH LESS ENVIRONMENTAL BURDEN AND GREATER SAFETY

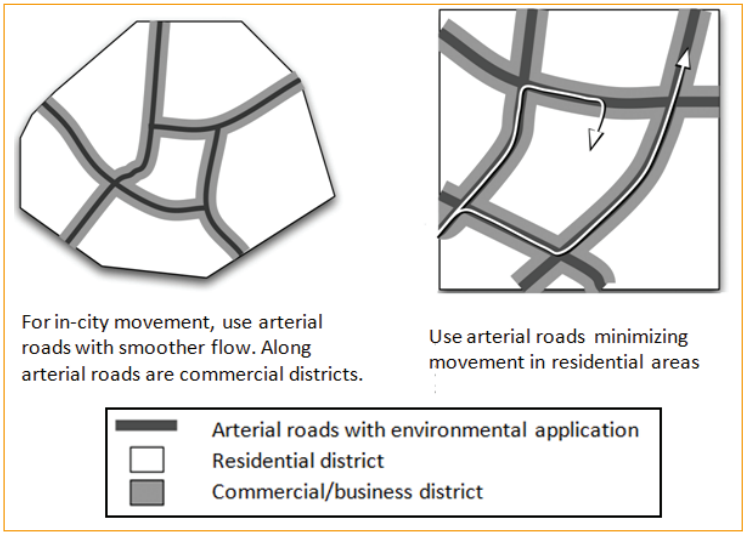

FIGURE 11 - FREIGHT MOVEMENT ENTERING URBAN AREAS

Freight vehicles use surrounding arterial roads if they have no destinations in residential area.

Freight vehicles use arterial roads near residential areas and select routes that minimises the travel distance within residential areas.

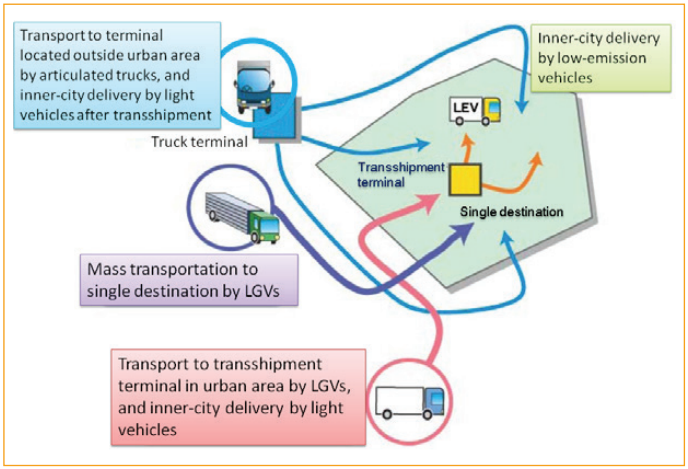

FIGURE 12 - FREIGHT MOVEMENT ENTERING URBAN AREAS

- Selecting desirable vehicles for in-city movement

Use larger freight vehicles near the fringe of the urban areas and change to smaller LEVs (Low Emission Vehicles) for the last-mile delivery after transshipment at a transshipment terminal.

- Selecting desirable time of day

a. Select off-peak times for freight vehicle movements when there is not too much traffic on the road or nearby pedestrian traffic. For example, loading/unloading operation finishes before 10am or starts after 8pm.
b. Avoid freight flow into residential districts at night unless it is absolutely necessary.

3 - For freight movement between urban areas

Use motorways and principal arterial roads for transport between urban areas. In this case, transport in bulk using large freight vehicles while using other modes such as railways and marine.

a. Adopt mass transport using large freight vehicles on motorways and principal arterial roads among cities, production areas, ports/air ports/railway stations.
b. In case of smaller amounts of goods, use small vehicles to get goods to truck terminals for transshipment to larger freight vehicles followed by transport between urban areas.
c. Use railways and marine transport if it is effective from the aspect of energy saving, reducing environmental impacts and transport costs can be saved.

2.2.5. Selecting approach

In order to realise desirable freight vehicle movement, there are a number of approaches and measures to select from.

"Approach" in this context means a type of incentive or idea for the problem-solving. Typical approaches are provided in the following table.

An approach should only be selected from the many available options after careful consideration. This prevents a government officer from taking a simplistic solution. For example, congestion caused by freight carriers' disorganised on-street unloading operations, an optimal approach can be selected from Regulatory, Infrastructure or Voluntary Behavioural Change.

Accordingly, the best measure could be parking/time/vehicle management selected from a Regulatory approach, or the designation of unloading space and developing off-road loading spaces from an infrastructure approach or joint delivery from a Voluntary Behavioural Change approach.

As the selection of both approach and measure is reviewed through discussion between affected parties, a thoughtful and practical combination of approach and measure can achieved.

TABLE 6 - EXAMPLES OF APPROACH	
(1) Infrastructure	Development of bypasses or ring roads Development of urban distribution centers Create off street loading facilities Installing on street loading spaces
(2) Regulatory	Introduce fuel taxes Introduce roas user charge Develop dedicated freight routes Impose vehicle restrictions Impose loading time restrictions Introduce congestion charging Have differentiated parking charges Create freight concessions Provide subsidies to scrap less productive vehicles Land use zoning of freight and logistics activities Land use zoning of freight dependant retail activities Set emission standards
(3) Logistical	Use of small delivery vehicles Improved terminal operations Improve driver competencies

TABLE 6 - EXAMPLES OF APPROACH (follow)	
(4) Co-operative	Form freight partnerships Load sharing systems (increase load factors) Joint deliverying
(5) Technology	Use of electric delivery vehicles Use of GPS and FTMS Implement a vehicle parking reservation system Introduce real time traffic information
(6) Behavioral	Implement anti-idling messages Improve social acceptance of urban freight activities Use of recommended truck routes

Approaches can be categorised in the following manner.

Infrastructure approach

This category is based on development of structures such as roads (including maintenance), parking space or logistics facilities. While historically, infrastructure planning, investment and management has been the domain of the public sector, the growth in Public-private partnerships and the more recent systems approach, which expands infrastructure to cover other facilities, has altered this balance.

Regulatory approach

The regulatory approach includes grouping policy, land use planning, licensing, regulations and associated instruments. Going hand in hand with this mandate, and as covered in the previous chapter, the level of enforcement and observance can differ widely dependent on the circumstances, practices and state of regulatory development. Therefore the ability to enforce, and create an awareness of solutions developed under a regulatory approach is also an important characteristic. However, the success or otherwise of a regulatory approach in many instances will come down to one other characteristic of this approach which is the ability to achieve an acceptable level of compliance through a blend of supporting *"hard"* (e.g. penalties) and *"soft"* (e.g. information) measures.

Logistical approach

Logistics is a dynamic, multi disciplinary set of integrated business activities that are critical to the flow of freight and information, through an entire product supply chain from raw materials, through to final disposal. This approach is characterised by the involvement of only (or mainly) the private entities in the form of actors such as freight and logistics businesses. They seek to implement changes in order to derive economic benefits or advantages such as reducing delivery costs or higher loading ratio of freight vehicles.

Co-operative approach
This approach focuses on harmonising measures between private and public sector actors to achieve mutually efficient and sustainable outcomes.

A characteristic of this approach is that measures focus on enhanced or new, operationally efficient business models such as can be seen with urban consolidation centres. One other important priority of measures would be for information gathering, planning, evaluation and co-ordination of urban freight transport to involve the public and private sectors in a pro active and co-operative role much as occurs with public transport and the broader field of mobility management.

Technology approach
There appears to be little doubt that Information and Communication Technology (ICT) can play a vital role in addressing problems within urban freight transport.

Already freight logistics and supply chain practitioners have embraced the use of ICT in various forms to gain efficiency in their operations. The range of ICT measures available to contribute to addressing the problem for logisticians is vast and has predominantly been influenced by the private sector as they seek to exploit opportunities through the development of product and solutions in order to gain a financial return. Some of the more widely known measures under this category which support the logistical approach include:

- Freight Transport Management Systems,
- Vehicle Routing/GPS Systems, and,
- Load sharing systems.

Behavioral Change approach
The foundation of this approach is to encourage voluntary behaviour change through measures such as promotional activities to raise awareness through the provision of information. The objective of solutions in this category are not necessarily to provide alternatives to say existing operational practices but to try in an active manner to raise awareness of solutions and encourage the use of alternatives which can embed long term and sustainable changes to the behaviour of the actors.

This approach is often seen as the soft component used to underpin the success of those measures within the other categories and which take a harder approach such as the case where a new regulation is created to overcome an issue. In practice this could mean a promotional campaign introduced to promote the regulatory change.

Other
Any approach not covered by the above.

2.2.6. Selecting measures

"Measure" in this context means a specific action to be taken to address freight-related problems.

1 - Infrastructure development

Road network

a. Road network around the urban areas.
Ring roads or bypasses should be developed on the fringe of urban areas. These roads will divert freight vehicles entering the urban areas. Also, they will provide alternative entry points that help minimize travel distances in the urban areas.

b. Road network in the urban areas.
Clarify the structure and role of each category of roads including motorways, principal arterial roads, arterial roads, minor arterial roads, district roads and others. Freight vehicles should drive on higher class roads for as much distance as possible and avoid narrow roads such as district roads. For the arterial roads, sufficient environmental applications including green buffer zones, wide sidewalks, sound barriers and noise reducing pavement should be installed.

c. Road networks accommodating large freight vehicles
Major logistics facilities, large-scaled factories and ports/airports/railway stations that deal with a large amount of freight should be connected to each other by arterial roads or motorways.

Transshipment and loading/unloading centers

a. Transshipment from large freight vehicles to small ones
Major logistics facilities should be built along the major ring roads or arterial roads on the fringe of urban areas.

b. Transshipment between modes
Transshipment facilities among modes including airplane, marine, railway and road should be provided.

c. Joint delivery center
Delivery to one destination by a number of carriers will cause traffic congestion and negatively impact on the environment. Joint delivery could provide efficient delivery using fewer vehicle fleets. This requires development of a joint delivery center that is used for collecting goods, sorting by destination and transshipping.

d. Loading/unloading facilities
At originating points and destinations, loading/unloading facilities are needed that enable efficient operation. The following points should be taken into account when developing the facilities.

If a large amount of freight is usually generated from the building, the loading/unloading facility should be installed within the building.

If small amount of freight is usually generated from the building, a common loading/unloading facility should be provided which can be shared by several buildings. An on-street loading bay in front of the building could also be an option.

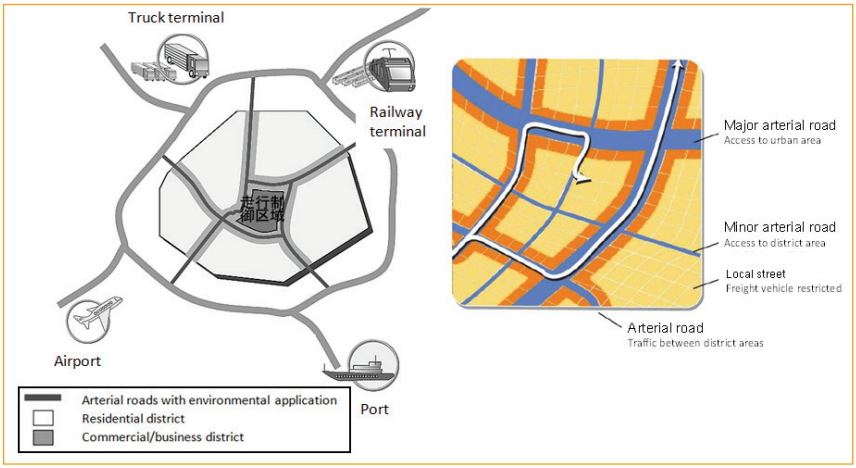

FIGURE 13 - CONCEPT OF ROAD NETWORK AND LOGISTICAL POINTS

2 - Traffic management of Freight Vehicles

Infrastructural development alone cannot realise desirable freight vehicle movement. In addition to infrastructural development, traffic management such as freight vehicle control is necessary. There are two types of traffic management for freight vehicles; through-traffic and flow traffic.

Through-traffic management

a. Prohibit all through-traffic freight vehicle movement through the urban area.

b. Prohibit all freight vehicle movement through the urban area except for designated routes.

Flow traffic management

Prohibit all freight vehicle movement flowing in/out the urban area except for designated routes.

Parking management

Parking management for freight vehicles is necessary in addition to in/out flow management. Specifically, parking management aims at a reduction in parking, congestion and environmental burden. It requires the wise use of roads depending on time of day and locations.

The following measures can be provided for parking control of freight vehicles in urban areas.

- Parking prohibition of freight vehicles or imposing a set of conditions on their parking.
- Parking prohibition of freight vehicles for limited hours to reduce their in-flow.
- Designation of parking space exclusively for freight vehicles to address issues of parking shortage induced by passenger vehicles. At the same time, parking prohibition of freight vehicles at all non-designated space will prevent on-street parking that hinders smooth traffic flow.
- Set different hours that can be used for parking passenger or freight vehicles.

Harmony with urban structure

a. Harmony between the urban structure and freight transport
In urban areas, there are facilities sensitive to noise and the quality of life such as residences, schools and hospitals and other facilities such as commercial buildings, offices, factories and storage facilities which are sensitive to operational efficiency. Land use plans should be carefully designed so that heavy freight vehicles do not disturb noise-sensitive areas.

Therefore, urban structure should be planned or guided in such a way that these problems can be avoided. In continually changing urban areas, factories and storage facilities that were previously located on the fringe of urban areas are now included within the expanding residential areas. Realignment plans and measures that attract large-scaled commercial facilities to the fringe of urban areas that take this phenomenon into account are important. The following factors are the points when considering urban structure and the distribution of logistics facilities.

Production facilities such as factories and storage facilities should be located on the fringe of urban areas and connected to each other by ring roads. By doing so, freight vehicles will be able to access production facilities from other cities without entering residential areas and the connection will be more direct.

Tertiary industry facilities such as offices should be brought together at the heart of the city and should be connected with the outer-city by principal arterial roads.

- As an urban area extends, there is the possibility that factories and storage facilities that were previously located in the fringe of the urban area will be surrounded by the expanding residential area. If this happens or is expected to happen, urban areas should be realigned by taking actions such as moving factories and storage facilities to outer urban areas.
- Large-scaled wholesale stores located in the outer city should be attracted to areas along arterial roads. In this way products are transported directly to the store using arterial roads.

b. Harmony with roadside land use

Freight vehicle movement, especially using large vehicles, has a great environmental impact on roadside areas. In order to mitigate the impact, the following measures that foster harmony between the road and roadside land-use are will be necessary.

- Control residential land use along the road. It should be used for high-and-medium rise commercial and office buildings and reduce the number of residences, and at the same time protect the environment of the backland.
- Attract non-residential facilities such as parks on roadside land at the fringe of urban areas. If residential dwellings are established, install environmental buffers and sound barriers to reduce the environmental impact to residents.
- Mitigate the environmental burden at roadsides by installing noise reducing pavement and underground road crossings for arterial roads in urban areas.

The *table 7, following page,* summarises typical measures often found in cities throughout the world.

TABLE 7 - MEASURES TO ACHIEVE THE DESIRABLE FREIGHT VEHICLES MOVEMENT

Measure				Example
Traffic management	Traffic flow management	Through-traffic optimization	Infrastructure development	- Ring roads, bypasses
			Traffic management	- Restriction through-traffic in city/district - Designating major arterial roads for through-truck route
		In/out-flow optimization	Infrastructure development	- Clear functional classification for inner-city road network (motorways, major/ minor arterials and collectors) - Transshipment terminals outside city
			Traffic management	- Designating arterial roads for truck route - Restriction of trucks from entering city center and residential area
	Parking management		Infrastructure development	- Facility for delivery
			Traffic management	- Designating truck-only parking space
	Time management			- Limited time window for trucks entering city center and residential area - Timesharing parking space between trucks and cars - Nighttime and early morning delivery
	Vehicle management			- Using small vehicles - Using low-emission vehicles
Better transport method	Joint delivery		Infrastructure development	- Joint delivery Center - Transshipment terminals outside city (Terminal for transshipment from larger vehicle to smaller vehicle)
			Traffic management	- Joint delivery agreement
	Intermodal transport		Infrastructure development	- Intermodal terminals (transshipment equipment in intermodal terminals)
Harmony with urban structure	Land-use plan		Infrastructure development	- Placing environmental buffer along arterial roads
			Land-use management	- Restricting residential building along arterial roads
Other	improve vehicle movement			- ITS, ICT
	Organizational activities			- Freight Quality Partnership

2.2.7. Seeking an Optimal Combination of Approaches and Measures

The Approach and measure(s) used should be selected from a variety of options with careful consideration.

The relationship between approaches and measures is given in *table 8*.

TABLE 8 - MEASURES TO ACHIEVE THE DESIRABLE FREIGHT VEHICLES MOVEMENT

Measures			Approach					
			Infrastructure	Regulatory	Logistical	Operative	Technology	Behavioral
Traffic management	Traffic flow optimization	Through-traffic optimization	X	X		X		X
		In/out-flow optimization	X	X		X		X
	Parking management		X	X	X	X		X
	Time management			X	X	X		X
	Vehicle management		X	X	X	X	X	X
Best transport method	Joint delivery		X		X	X		X
	Intermodal transport		X		X		X	
Harmony with urban structure	Use land			X				
Other	Smooth vehicle movement		X		X		X	
	Organizational activities				X	X		X

2.3. ASSESSMENT OF THE PROGRAM

The designed approach and measures may have negative side effects as well as expected benefits. Both sides of the effects caused by the selected approach and measures should be carefully examined in advance of implementation so that the advantages will be maximised while the disadvantages will be minimised. There are several techniques to anticipate the advantages and disadvantages depending on the financial constraints of the project:

- stakeholders' workshop to brainstorm possible effects,
- computer-aided simulation,
- pilot program,
- scenario examination.

Computer-aided simulation, pilot program and scenario examination are discussed in the following sections.

2.3.1. Computer-aided simulation

For a district (smaller area)

1 - Method of evaluation

A study district has been selected to evaluate the effects of RFTM with respect to economy, environment and quality of life according to the workflow presented in *figure 14*. The target district is surrounded by major arterial roads. Computer-aided evaluation was conducted in this manner.

1. Select a road network target for analysis.
2. Make an Origin-Destination (OD) table estimating with the actual survey data (traffic volume and plate number surveys) to analyse the traffic flow in the residential area.
3. An estimation of the effect of RFTM measures (a. truck route designation, b. in-flow traffic restriction and c. joint delivery) was made using computer simulation.

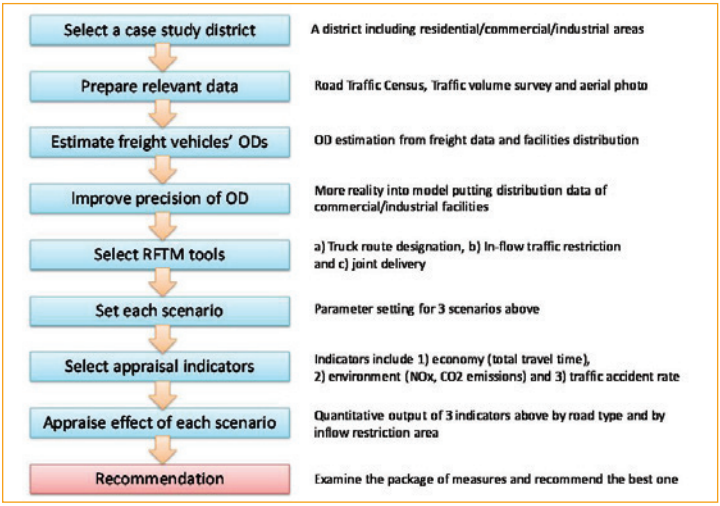

FIGURE 14 - SIMULATION WORK FLOW

2 - Result

Figure 15, following page, show the resulting traffic shift. Computer-aided simulation indicates that the combination of truck route designation and joint delivery is the most effective. As seen in the figure, most local streets in the district experience less traffic (blue lines) which shifts to surrounding arterial roads (red lines).

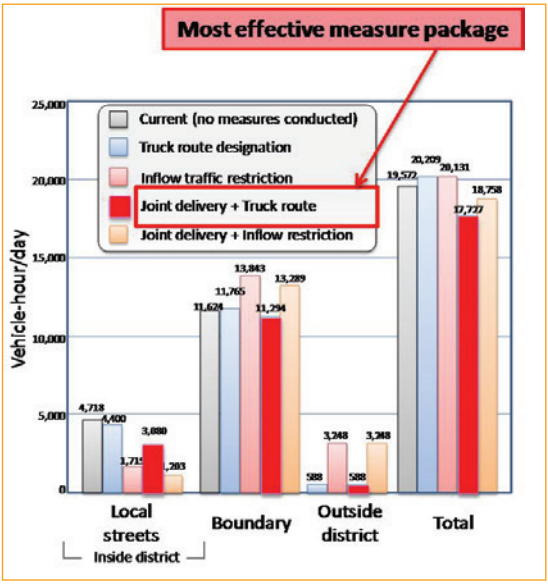

FIGURE 15 - TRAFFIC SHIFT FROM LOCAL STREETS INSIDE TO SURROUNDING ROADS

Simulation indicates that the combination of truck route designation and joint delivery has the following effects:

- reduced total travel time of freight vehicles *(figure 16)*,
- reduced freight traffic volume as well as reduced NO_x and CO_2 emissions along roads,
- reduced traffic accidents.

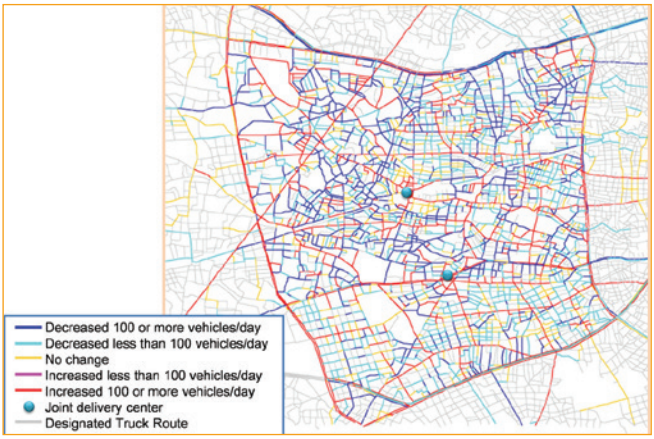

FIGURE 16 - ESTIMATED CHANGE IN TOTAL TRAVEL TIME
(After truck route designation and joint delivery are implemented)

For a metropolitan area (larger area)

1 - Method of evaluation

The Tokyo Metropolitan Area was selected to evaluate the effects of RFTM from the same aspects of the simulation conducted in the previous section. Three scenarios have been examined namely, a) truck route designation, b) through-traffic restriction and c) terminal development *(table 9)*.

TABLE 9 - RFTM SCENARIOS

	a) truck route designation	b) through-traffic restriction	c) terminal development
Image of measure	- In principe no Freight Transport is allowed except on the truck road - Take the shortest route destination after deviating from the truck route	- No freight through-traffic is allowed in the subject area - Free or dignificant discount for surrounding ring expressway	- Develop large scale terminals near ring road exit - Use larger vehicles for inter-city transport - Joint delivery
Expected effects	- Reduced Freight Transport on local streets - Reduced environmental burdens (CO_2, air quality, noise and accident)	- Reduced Freight Transport in the subject area - Reduced environmental burdens (CO_2, air quality, noise and accident)	- Reduced number of freight vehicles in connetion with use of larger vehicles - Reduced number of freight vehicles by joint delivery - Reduced environmental burdens (CO_2, air quality, noise and accident)
Evaluation	- Estimate with traffic allocation - Separate evaluation for truck route from other roads - Individual evaluation for internal/external/ through-traffic	- Estimate with traffic allocation - Separate evaluation for inside-area, on-ring-road and outside-area - Individual evaluation for internal/external/ through-traffic	- Estimate with traffic allocation - Separate evaluation for ring roads, expressways and general roads
Point of view	- Target area - Target route - Target day time - Through truck route/Local truck route	- Target area - Target day time - Ring road toll	- Terminal distribution - Number of terminal - Transshipment model

2 - Result

Truck route designation and through-traffic restriction are included in the simulation model; freight vehicles that do not have destinations inside the target area are to make a detour using the inner ring road (Metropolitan Motorway Central Circular Route) and freight vehicles that have destinations inside the area are to take the

shortest travel distance after exiting the nearest motorway exit. To attract freight vehicle traffic, the inner ring road toll is reduced by 50%.

The resulting traffic shift is shown in the map of *figure 17*. Freight Transport is significantly reduced inside the target area, out-flowing to the ring roads. However, it is possible that induced traffic of passenger vehicles flows into the uncongested roads inside the area.

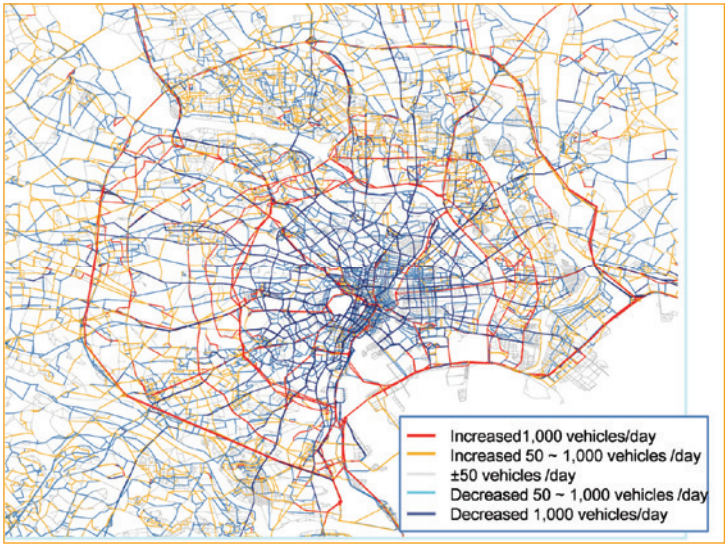

FIGURE 17 - TRAFFIC SHIFT INDUCED BY TRUCK ROUTE DESIGNATION AND THROUGH-TRAFFIC RESTRICTION WITH INNER RING ROAD TOLL DISCOUNT

2.3.2. Pilot program

A pilot program is a tool to let local residents consider new measures to resolve local problems, to give them a chance to actually experience the new measure, and finally, to help them decide whether the tested measure should be fully installed. Conduct a pilot program with full consideration and identify the side effects to be addressed once the pilot period is over.

Evaluation of a pilot program is also useful. Make a prediction of the quantitative and qualitative effects with appropriate indicators. Typical indicators for example include congestion length and travel time between specific road sections.

In the case of a loading/unloading space, an on-street parking space can be temporarily installed as a pilot program. One should learn what people think of it and how it affects on the near-by traffic to examine the adequacy of the parking

space as well as its location. If the results of the pilot program shows unpopularity or adverse effects on traffic and/or safety, an alternative plan should be prepared.

A pilot program in Shibuya city, Japan

The busiest shopping streets in Shibuya, Japan were experiencing severe traffic congestion due to narrow roads together with a large number of vehicles and pedestrians. The project team came up with a pilot program to try out some potential measures to solve the problems.

The 2-month long pilot program included the following measures:

- roadside loading/unloading space,
- tighter law enforcement against illegal parking,
- free parking lot for visitors,
- shuttle bus service for visitors.

The above mentioned measures received favorable response from participants. After the pilot program, the City established an association including residents and other relevant groups and bodies to talk about the upcoming full-scale program. With limited finances, they decided to offer roadside parking space for loading/unloading operations and revise a law requiring newly constructed larger buildings to have a built-in loading/unloading space.
See the appendix of B4 report *"Public secor governance of urban freight transport"*, PIARC refence: 2012R15EN for more details.

2.3.3. Scenario examination

There are other tools to identify the effects such as scenario examination.

The first step of scenario examination is to write down possible future situations resulting from implementation of a measure(s). This method covers a wide range of future situations that can not be accurately predicted.

The scenario planning method is different from other tools in that it makes more than one assumption, including unfavorable and favorable situations with countermeasures corresponding to each situation. The method appears useful especially when planning a longer-term strategy.

This section provides an example of scenarios and possible situations faced by each stakeholder after implementation of a measure. Note that there is a variety of applications of scenario planning and this is not the only way. One could use this method for scenario examination before implementing a measure.

Suppose our imaginary city is suffering from noise and air pollution due to chronic traffic congestion in the center of the city, and the city administration decides to start joint delivery system setting up a new consolidation center and to introduce access control against environmentally unfriendly vehicles.

Now, we are going to identify what will happen after introducing the new measures *(table 10)*. In the *"Best"* scenario, a win-win situation will be created whereby every stakeholder is satisfied. On the contrary, in the *"Worst"* scenario, unexpected effects are brought about. Face-to-face talks with each stakeholder may prove useful in identifying these effects.

TABLE 10 - SCENARIOS OF IMAGINARY MEASURE PACKAGE

	Shippers (retailers, manufacturers)	Residents	Carriers	Administrators
Best	- Excellent accessibility for employees and shoppers - High reliability of on-time delivery - Increased sales for retailers	- Safe to walk around. - Quiet environment especially at night - Excellent air quality - High reliability of on-time delivery - Excellent accessibility to local stores	- Excellent accessibility to final destination - Comfortable to drive in the smooth traffic - Easy to carry out loading/unloading operations thanks to sufficient infrastructure - More cost efficient through enhanced time reliability	- Full acceptance by public - Less complaints - Increase in residents ans businesses in town
Worst	- Newly introduced joint delivery system is too complicated and costly - Extremely strict access control scheme does not please their customers	- A great number of un-qualified vehicles illegally enter the city center, causing noise/air pollution as before (insufficient enforcement) - Good delivery become pricy due to joint delivery (less competition among carriers)	- Fear of losing their jobs because of the joint delivery system - Inaccessibility problem still remains (lack of loading/unloading places)	- Not accepted by public - Even more complaints

Based on the scenarios created here, one can produce action plan so that each possible side effect can be addressed.

2.4. IMPLEMENTATION OF THE PROGRAM

Based on the results of the pilot program, determine if a full-scale operation should be commenced. In the decision process, it is important to check that the program is feasible and practical.

If the program requires a subsidy, determine how much and how long it needs it for before conducting a full-scale program.

2.5. EVALUATION

2.5.1. Objectives of evaluation process

After the implementation of the program, the results should be evaluated. This is a part of a wider project management process. Evaluation and feedback is equally important to guarantee the success of the measures undertaken and improve on any adverse secondary effects as a result of the measure(s). It is also important to demonstrate how and where value is achieved. Hence the main objectives of any evaluation process are as follows:

- check that actions are implemented as planned;
- analyse the effects of the actions undertaken;
- determine whether objectives are met; and
- react and develop solutions where objectives have not been met or problems have been raised.

2.5.2. KPIs for evaluation

One way in which measures are assessed is via the use of *'key performance indicators'* or *'KPIs'*, that reflect the objectives of the actions being implemented, whilst considering their wider implications for freight transport and the environment in which they operate. *Table 11, following page,* provides a selection of objectives and key performance indicators that could be used to evaluate measures deployed across an urban centre or wider region, and are categorized into 4 strategic level aims.

TABLE 11 - DEMONSTRATES A NUMBER OF KPIS FOR EACH CATEGORY			
Objectives	**Indicators**	**Information sources**	**Measurement methods**
Emissions Reductions	- Noise - Local air quality emissions (CO_2, NO_x, CO) - Traffic volumes on key corridors - Complaints from residents - Complaints from industry - Proportion of HGVs involved in accidents	Acoustics field study Field study Local Authority Police/Local Authority Police Accident Statistics	Measurements, modelling Measurements Traffic Counts Desktop Research
Economic development	-Commercial Floor space - Number of visitors/amount of revenue generated per hour/day - Rotation of shops	Local Authorities, land register Offices, real estate promoters, town centre managers	Statistics Questionnaires, studies
Improving Accessibility	- Number of vehicle-km - Number of vehicle -tons-km - Number of vehicle movements - Travel time - Number of obstacles en route – bridges, traffic calming etc - Congestion of delivery areas (vehicle turnover)	Carriers Drivers Field Study Mapping Road managers, police	Questionnaires Traffic Counts
Improving Vehicle Load Factors	- Average load factor of vehicles - Fuel consumption per unit of delivery	Operators	Study

Wider social benefits may be accrued as a result of the four criteria above. It is also important to evaluate these as a result of any intervention, as they often manifest in terms of secondary effects which can impact on the overall success of the project.

Based on the evaluation made at the *"Check"* stage, continue to implement the RFTM tool. If the evaluation suggests the ongoing tool needs to be modified, do so. Discuss the modification if it is a major one.

Keep close relationship with interested groups. Reactions from them are good indictors as to how well the measure is working. Do not forget to raise their awareness of any freight issues by continually discussing things with them. Writing down whatever you notice during this stage might help when it comes to the *"Plan"* stage in the next iteration of the cycle.

3. LEARNING FROM REAL SOLUTIONS

This section presents the lessons learnt from a few case studies.

a. Freight Best Practice, UK Department for Transport

Freight Best Practice (FBP) is a program set up by the UK Department for Transport to promote operational efficiency within the freight industry. It is primarily aimed at reducing the CO_2 emissions from freight transport as well as reducing costs and increasing the competitiveness of operators.

The program is evaluated primarily in two ways. A survey of operators is carried out on an annual basis, to provide qualitative, anecdotal evidence of awareness, use and perception of the program in terms of its applicability to the industry and effectiveness in reducing costs and CO_2.

Evaluation in a quantitative fashion is carried out on a bi-annual basis, by an independent organisation that looks at the awareness levels and usage of FBP to calculate market penetration in percentage terms and resultant savings in CO_2 and industry costs, thus getting a *'value for money'* assessment for the client. The level of publications distributed and to whom, is also evaluated internally, on a monthly basis as well as resultant savings in CO_2. These have demonstrated that the freight industry in England save around 150,000 tonnes of CO_2 per year and make financial saving of over £80m. Additionally a benefits model has been produced and calibrated by successive quantitative benefits evidence to help predict the benefits of varying courses of action for FBP. Comprehensive levels of evaluation such as this enable FBP to be a dynamic program reacting to trends and identify gaps in the market. This makes the program more focussed and able to direct itself to where the greatest benefit will be created i.e. *'small operators'* or *'the retail industry'* This makes it one of the most accurately evaluated examples of public sector freight management.

b. Installation of a joint delivery centre (Yokohama, Japan)

A joint delivery system was set out by the Motomachi Shopping Street, the first in Japan. After a preliminary study, a project team was formed to improve the roadside environment (such as air quality and noise), to ensure a positive pedestrian environment, and to improve traffic safety. The system has been successful meeting the objectives.

Coherent policy to address the known issues and careful preparations were the key factors for the success. Even though there were variety of opinions sometimes opposing each other, having over 300 shops in the Shopping Street, careful negotiation was undertaken to reach an acceptable compromise to majority of parties that still meets the initial objectives. Preliminary studies (traffic volume survey and

questionnaire surveys) clearly identified issues. Fortunately, the project team was able to find a place for the joint deliver centre in vicinity to the Shopping Street at a low cost. To avoid vested interest, an independent local business was asked to manage the joint delivery operation. It was perceived that a significant improvement was achieved in the shopping street creating an impression of *"easy-to-drive-by"* to *"safe and environmentally-aware"*. The risk of alienating car drivers through parking restrictions was judged acceptable as the Motomachi Shopping Street had already built a strong brand.

Success factors:

- initial research was undertaken to understand freight movement and the associated problems and issues from a variety of interested groups;
- consensus building was established under careful negotiation;
- a near-by joint delivery centre was fortunately available at low cost;
- a third party outside of direct interests was delegated to operate the joint delivery operation;
- the shopping streets holds brand awareness among customers.

c. Promoting loading/unloading spaces on the street (Shibuya, Japan)

Shibuya City decided to improve traffic in the shopping area taking the opportunity afforded by Tokyo City to implement the *"Smooth Tokyo 21"* policy. The set-up conference included the shopping street federation, logistics companies, responsible authorities and the Police. It identified issues to be tackled, namely constant traffic congestion and danger to pedestrians. The project was considered generally successful, although the off-street parking spaces were lost due to insufficient funds.

Factors that led the project success include well-built consensus among the interested groups. To raise tenants' awareness of terminal logistics, each tenant was given an opportunity of door-to-door visit for better understanding. In this case, a draft plan had already been made to be shown to tenants or residents.

Success factors:

- consensus building among the interested groups including shopping street and freight companies;
- a draft plan to positively influence shop tenants and residents;
- symposium;
- meeting to explain to the locals;
- a variety of promotional materials;
- banner on the crossover bridge;
- website, Radio and Traffic information board;
- presence of Tokyo City's initiative.

Cause of failure:
Financial shortage to keep permanent parking spaces

No quantitative evaluation was been provided.

d. Public-private cooperative organization activity (East Osaka, Japan)

A Freight Quality Partnership was formed by the local stakeholders to tackle various problems including on-street parking by freight vehicles due to lack of alternative parking space.

Throughout the project, communication and consultation has been an important key. They set two types of opportunities to talk; *"conference"* and *"workshop"*. In their term *"conference"* is to talk officially with large number of participants, whereas *"workshop"* is to discuss frankly with smaller number of participants. By holding many workshops, members became close and had good communication, resulting in consensus building.

Success factors:
- conducting a preliminary research for the actual condition of:
  - land-use;
  - roads;
  - questionnaire with residents and the industry in the area;
  - interview with on-street parkers;
  - traffic volume and traffic flow;
  - number of on-street parking;
- setting clear goals:
  - eliminating trucks parking on street;
  - reducing private vehicles parking on street;
  - truck route management;
  - better local environment;
  - providing both conference and workshop leading good opportunities for communication and consultation;
- classifying action plans into two categories:
  - short-range: ready (or close to ready) to implement;
  - long-range: to be implemented within 10 years after enough consideration and research;

The project, looked to undertake a cross party assessment of the requirements of freight within the area and set common goals as a result on both a long term and short term basis. Little has yet been done regarding the evaluation of its success, but it uses an approach that has proved effective in a number of other countries, particularly the UK. Further evaluation needs to ascertain what direct actions have

occurred as a result of the committee's setup and how these actions have impacted on the problem of congestion. A mixture of qualitative and quantitative data needs to be collected such as anecdotal evidence from residents and business as well as traffic counts and turnover of vehicles in parking spaces.

e. Electric Reservation System for Freight Vehicle Parking (Toyota, Japan)

Toyota City decided to address illegal parking for loading/unloading by freight operators. The City successfully provided ITS-based parking space off street. The parking spaces were remotely monitored with a web-camera. The drivers would make a reservation with a cell phone and they could enter the parking space using a electronic payment card. It was popular among freight drivers because it was easy to understand and use. After the pilot program, the full-scale operation is underway led by the private sector. Whether or not the system performs well economically determines success or failure of this measure and that evaluation has not yet been provided.

Success factors:

- a relatively long period of pilot program enabling to include seasonal effects,
- wise use of IT,
- an easy-to-understand and easy-to-use system,
- preliminary research on on-street parking so that the effect of pilot program can be evaluated.

Possible cause of failure:

- setting unreasonably high parking free for the full-scale operation;
- failure to grasp the parking space actually demanded.

f. Garonor, Aulnay-sous-Bois logistics center (Paris, France)

Like other major cities in the world, reducing freight vehicles from the center of the city has been a priority for Paris. A combination of infrastructure investments (ring road and logistics terminal development) and freight regulation were implemented. As a result of the introduction of these complementary measures, large freight vehicles began to travel on the ring roads outside the city center, while smaller freight vehicles continued to have city center access. Freight operators unload the goods from large vehicles and load them on to smaller vehicles in the logistics terminals located along the ring road outside the City. Regulation alone, without infrastructure investment, could have ended up in failure. Providing places for freight operation along the ring road seems to be a success factor.

Success factors:
- strategic land use distinguishing freight flow from city center;
- combination of infrastructure investments and freight regulation.

Possible failures (It could have failed under the following conditions):
- inconvenient (or isolated) location of the logistics center;
- unreasonably high usage fee for the freight operators;
- incomplete ring roads.

There is no quantitative evaluation provided.

g. Street parking regulation of freight vehicles (Paris, France)

Regulation of use of on street loading/unloading space limited to 30 minutes was introduced to City of Paris in the light of *"Charter of Good Practices of Transport and Delivery of Goods"* was concluded between City of Paris and 47 interested groups in 2006. It reflected concerns of environment and economic deficiencies related to freight vehicles on-street parking.

In 2002 when exclusive lanes for bus and bicycles were introduced, freight businesses expressed strong objections claiming that new rule did not take into account road space for freight operation, (e.g. loading/unloading). Ultimately this led to development of the Charter.

Although an evaluation of the 30 minutes parking limit regulation has not been carried out, the fact the 30 minutes regulation obtained interested groups' consent should be viewed as success considering there was a strong objection from freight industry.

A success factor is persistent effort in building consensus; it took 3 long years to reach an agreement. The fact the regulation does not have a legal binding force, however, can be a potential barrier to a strict control.

Success factor:
- persistent effort in building consensus;
- successful agreement of *"Charter of Good Practices of Transport and Delivery of Goods"*.

Potential barrier:
- the regulation does not have a legal binding force;
- low public awareness of the new rule in that use of roadside space in the bus lane and congested area is limited to freight drivers.

h. Freight Operator Recognition Scheme (London, UK)

Transport for London educates and encourages freight operators to follow best practice, rather than focusing merely on keeping within the law. FORS is a key project within the London Freight Plan and provides a quality and performance benchmark for the industry. It will benefit London as a whole by encouraging freight companies to prioritize safety and reduce their impact on the environment. It recognizes and rewards excellence of freight company's operation with bronze, silver and gold (at this moment, standard for gold has not been determined).

It seems successful with continuous efforts in maintaining communication with freight industry through newsletters (as frequent as 3 times a year) and user-friendly website. Also, advantage when tendering for business and driver training seem to be incentive for freight companies to join the scheme.

Although it does not have legal binding force, FORS specification shows advanced approach in ensuring legal compliant of subcontracted drivers; it requires the FORS member company to check the validity of the drivers' licenses of the subcontracted drivers and to make sure that they are not in breach of any drivers' hours or working time regulations. And it also requires the member company to ensure that tachographs are returned to them from its subcontractor.

A member at *"silver"* level uploads the required data onto the FORS website on a regular basis. By comparing with similar operations, a member can see where it stands in relation to its competitors while the company identity is kept confidential, which is another benefit of becoming a FORS member to freight company.

Success factors:

- excellent communication
- some benefits to freight companies; free drivers training, benchmarking, workshops and others.
- encouraging tone rather than regulating/punishing
- the scheme is free and wide open to any company operating vans and lorries in London
- making good use of their website and frequently-published newsletter *"FORSight"* as an information tool.

Initial evaluations show a benefit to cost ration of over 2.5:1.

i. Freight Partnership and related measures (Tyne and Wear, UK)

After a field survey conducted resulting in the report *"Nature of freight"*, the Tyne and Wear Freight Partnership was launched at a consultation event held in Newcastle

in April 2005. The Partnership seeks to understand the problems and issues relating to freight movement and provides a mechanism through which they can be addressed. It brings together transport operators, industry representatives, local authorities, the Highways Agency and key local stakeholder groups to facilitate delivery of an action plan targeted at improving the efficiency, safety and sustainability of freight movement.

Since the Partnership was launched, a variety of major outcomes have been achieved such as strategic freight maps, destination maps, signage improvement and an easy-to-understand website. Importantly, there was a consensus that the Partnership should work to a clearly defined action plan including *'Do Now'* and *'Do Soon'* types, focusing on the delivery of tangible outputs.

The achievements of the Partnership have been recognized by winning two national awards; Freight Partnership of the Year (2008) and Transport Policy and Planning Award (2008).

Maintaining communication and consultation has been a success factor. The website launched in December 2006 had 32,500 hits by 5,600 individual users by June 2007, indicating it has been well-used.

Success factors:

- consensus that the Partnership focuses on the delivery of tangible outputs;
- good communication and consultation, including serviceable website and promotional DVD. The website proves well-used having over 300,000 hits since December 2006. Also, the meeting minutes are open at their website ensuring fairness and transparency in decision making of the Partnership;
- sufficient financial resources with funding from CIVITAS, an EC initiative aimed at helping cities achieve a more sustainable, clean and energy-efficient urban transport system by implementing a range of technology and policy-based measures.

No formal evaluation has been carried out to date, however the popularity of the destinations maps indicates that a good level of usage and therefore benefit may exist.

j. Eliminating on-street parking program (Sendai, Japan)

Whether or not a pilot program is successful affects the following full-scale measure to a large extent. If the pilot program is well organized and its results are promising, then the full-scale measure can be smoothly initiated. A good example is Sendai City's effort in eliminating on-street parking program.

The city had recognized the on-street parking as a major issue and previous studies found as much as 40% of parked vehicles were freight vehicles on an average weekday. A consultative conference was formed to deal mainly with freight vehicles

on-street parking issue and it carefully prepared for the upcoming pilot program. The program turned out successfully with understanding and cooperation from the majority of interested parties, which ultimately led to some measures incorporated into a regular operation.

Success factors:

- a thoroughgoing preparation before the pilot program, in which truck drivers were aware with the locations of the new loading spaces. As a result, the truck drivers did not have to wander around seeking the loading space, which prevented unnecessary traffic;
- consistency of attitude of the responsible officer. In this case, the police department in charge had been the same over time (it is not unusual that department or officer in charge changes in several years in Japan and deferent department or officer can have different point of view even in the same organization). The police consistently showed cooperative attitude to the effort, which was obviously a great help.

k. Eliminating on-street parking program (Musashino, Japan)

A success factor for freight management is often a solid consensus. We can see a good example of a this in Musashino City's efforts. As in common with other urban cities, Musashino City has been facing on-street parking issue in its commercial center. In order to provide the shoppers a comfortable and safe pedestrian space on street parking was considered undesirable.

The city set up a conference involving local shopping streets, freight businesses, parking business, and local police. The freight businesses expressed concerns about costs since the road traffic laws were tightened and that it would be difficult to bear more costs. Other members in the conference tend to take it for granted that the additional freight costs (e.g. parking costs) should be borne by freight businesses.

When it comes to cost sharing, it is important to identify beneficiaries. The conference in this case reached the agreement that every interested party would benefit if the town attracts more customers. The conference functioned well and successfully initiated an experimental pilot program. Shop owners who initially did not participate changed their views after positive news from the pilot program from their customers.

Success factors:

- shared original intention to start the effort;
- appropriate attitude by officials; not too strong and not too weak.

Possible failure:

- details of the pilot program were not well communicated to freight drivers, which led to low level of involvement in the joint delivery program;

- meeting the requirements of road administrator (city) and traffic administrator (police) was not easy in this case. The program included conversion a road section into pedestrian-friendly sidewalk, with which the administrators expressed concerns. Trees planted in the middle of the sidewalk prevented emergency vehicles from passing.

l. Eliminating on-street parking program (Hiroshima, Japan)

All too often shops that order goods feel no sense of responsibility to manage the delivery of the goods they order even though they can play an important role in optimising freight activities.

In Hiroshima's case, some of shop owners in the city participated in a watch-dog campaign, in which participants asked the freight drivers who parked on street to park in the designated spot. Also, they felt the drivers becoming more cooperative with the program through the communication in the campaign. A joint delivery program was conducted as a part of this effort, as well. Joint delivery is often costly and has to be financially sustained and it is hard to justify the benefits to the freight industry and make them willing to pay. At this moment, evaluation of the pilot program is not complete. Whether or not they will continue the joint delivery system is yet to be decided.

Success factors:
cargo-owners' change in attitude to the freight activities through the watch-dog campaign.

4. TOWARD SUCCESSFUL MANAGEMENT

With a careful look at the case studies collected and summarized in the previous chapter, an analysis was conducted focusing on success factors, barriers and problem solutions.

4.1. SUCCESS FACTORS

a. Understanding the situation

Understanding the situation of the target area is important. Before the officials talks to other interested groups, it is strongly recommended to study the current status (and historical one if available) of the traffic and land use, the main players of the area and their interests, politics and awareness of logistics issues.

Typical main players are the shopping street and residents. However, other players should be included depending on the case and local customs.

TABLE 12 - RELEVANT PLAYERS		
Administration	**Business**	**Locals**
National Prefectural/State Municipal Police	Bus business Freight business Chamber of Commerce	Shopping street Resident

b. Building a cross-departmental organization

In some countries, organizational structure of administration is too rigid for a Road Freight Transport management that often requires extra effort for flexibility. For example, traffic management is usually allocated to the Police while road and other infrastructure management fall under the jurisdiction of national/prefectural/municipal government in some countries. Unless there is a position specifically responsible for logistics, much effort in facilitating cooperation among the relevant officers may be necessary. Regular meeting with national/prefectural/municipal officers and police officer for information exchange can make an excellent preparation.

c. Choosing the right persons to talk at the right time

One cannot be careful enough to choose the first person to talk with. There are points learned from the case studies:

- the head of the shopping street in the area can be a candidate. He or she can take initiative;
- shop owners of the shopping street in the area;
- head of traffic department of the Police in the area.

Best way can vary with characteristics of the area. One should give much thought to this.

d. Partnership/Consensus-building

Partnership-building or consensus-building is almost always the key to success. When a project starts running, one problem after another comes up because urban freight management involves various interested people with different preferences by its very nature. For example, as seen in the case of the shopping streets in Kichijoji or Shibuya in Japan, retailers and freight drivers need a place for loading/unloading whereas pedestrians and general drivers want clear road space with few parked freight vehicles on street in the setting of limited road space. There is a conflict of interest over use of road space.
This drives us to the question how every interested road user can be contented. One answer to the question is buried in the projects implemented in the past. Most successful case studies, especially in the urban settings, tend to establish conferences involving various representatives of interests. The representatives express their

opinions about the concerned matters on the table and listen to opinions of other representatives. In the case of Paris, there was a tension between the City and freight businesses at the beginning, because the initial measure of installation of exclusive lane for busses and bicycles seemed unfair and insufficient treatment to freight businesses. However, as the conference went on, they became to relax toward constructive attitude.

It can be best summarized in the following sentence; partnership-building and consensus-building are extremely important in the smooth progress of the project without causing feelings of inequality.

e. Communication

The case studies indicate that communication is a key to success for building consensus. FORS of London and Freight Partnership in Tyne and Wear provide good examples of how the use-friendly websites work efficiently to link the people. Once a website was launched, frequent updates are essential to keep the interested people's attention. Programs like FORS have to have more than certain number of members in order to have influence. FORS has been successful in this regard having more than 200 members, which is over 10% of the vans and Lorries in London. Newsletters prove useful in informing new schemes, regulation, and news as well. Shibuya's case various tools other than website; radio, poster, brochure and so on. A multiple communication tool can attract various people's attention.

f. Vision/goal Setting

After successfully building consensus, it is also important to set a vision or goal of the conference. For an example of project to eliminate on-street parking, a vision can be a creation of open café, vehicle-free promenades, festivals, more vegetations or flea markets on streets. Or more quantitative goals such as certain number of illegal parked vehicles on streets or satisfactory results from retailers, freight drivers or pedestrians. The case of Kichijoji set several expected results (or goals) and validation methods; survey of change in traffic volume, number of parked vehicles, travelling speed between before and after the pilot project and a questionnaire to visitors to the shopping street. The surveys are useful for presenting objective results to the members of the conference so they can regard whether or not each measure of the project works well or decide whether or not precede the project and explain the situation to the distributor of the government subsidy.

g. Wise Use of Subsidies

Either national or municipal governments usually provide subsidies intended for better Urban Freight Management or other forms of projects in the context of city planning.

In the case of Norwich, the distribution centre was developed in suburban area as one of CIVITAS projects of European Committee. Tyne and Wear Freight Partnership is funded by Local Transport Plan Partners, bringing together local authorities, Highways Agency and freight businesses. Pilot projects in Japan can be offered subsidy if approved. Ministry of Land, Infrastructure, Transport and Tourism of Japan defrays costs of formulation of planning and preparation of the pilot project, with amount of subsidy between 10 and 15 million yen (about 100,000 to 150,000 in US dollars).

4.2. BARRIERS

Costs

Costs can be a major barrier to any projects. In the case of Garonor in France, SOGARIS Corporation faced going under because of the financial situation. The situation was recovered by the publicly-shared group, the project would have been compelled to abandon. Conference in Kichijoji is still struggling for operational expenses. City of Shibuya had to give up setting a permanent parking lot off street due to financial shortage, too. It is, therefore, necessary to think of a way to secure funds so the program runs for a long period.

Parking Space

In the urban settings, road space might not be wide enough to hold vehicle traffic and pedestrian traffic. Freight vehicles are sometimes forced to park for loading/unloading on streets, blocking pedestrians' traffic or causing traffic congestions. Keeping parking lots for a long term is costly, which brings the previous "Costs" barrier.

Conflicting interests of different groups

There is a possibility of serious conflicts between different groups. The more representatives of group, the more likely different opinions there will be. Without strong leadership, a project can be stuck with no progress.

Lacking awareness of issues

Sometimes residents or shop owners in the target area of the program are not even aware that there is an issue. In this case, it can be difficult for officials to explain why a new measure is needed.

4.3. HOW TO OVERCOME THE PROBLEMS

Costs

As seen in the previous section of *"Wise Use of Subsidy"*, costs can be reduced with aid of subsidy. In addition, cost-sharing for operating joint delivery is problematic. It is not easy to reach an agreement in that everyone feels fair and satisfied. The key is consensus-building among the interested groups. In case of Yokohama, the conference requested a local company that has no interest in the project for operating joint delivery so that every transport business would feel fair.

Parking Space

Limited resource can be shared in terms of space or time; public parking space can be opened to freight drivers or time-sharing of parking space can be also realistic. If there is room for public space, it is possible to develop a new parking lot or expanding road so that on-street parking for loading/unloading can be allowed.

Conflicting interests of different groups

Consensus-building is the key to success. If a conference becomes too large or too formal for members to present honest opinions, dividing into several workshops can solve the problem. Granted and open-minded discussions tend to occur at smaller groups.

Lacking awareness of issues

From Shibuya's case, we can learn a lesson. The officials made a rough plan first then explain it to residents and tenants. This way can bring awareness of issues and clear image of solution and their next action. In addition, it is always a key to clearly explain what their benefits are and what they will have to pay for the benefits.

Stating clearly the expected impacts of the measure is also important to raise awareness of issues. FORS of London states the impacts on business and on London in its specification for performance. Bronze performance requires the candidate members to provide snapshot data per 100,000 vehicle km for vehicle incidents and penalty charge notices or other infringements. The specification says that the expected impacts on London include safer roads and less congestion due to collisions. In this manner, freight business recognizes anew that their daily operation has a great deal to do with traffic situation in the city as a whole.