Grant Agreement nº.SCS8-GA-2009-234061

Coordination and support action (Coordinating)

FP7-TRANSPORT SST.2008.3.1.4. Urban delivery systems

Project acronym: TURBLOG_ww

Project title: Transferability of urban logistics concepts and practices from a worldwide perspective

Handbook on Urban Logistics

Due date of deliverables D5, D5.1, D5.2: 31st of December 2011

Submission date: 31st of December 2011

Start date of project: October 2009 **Duration:** 27months

TIS.pt – Transportes, Inovação e Sistemas, S.A.

Version 0.1

Project co-funded by the European Commission within the Seventh Framework Programme		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Foreword

This TURBLOG_ww Handbook comprises Deliverable 5 (Recommendations for urban mobility plans), Deliverable 5.1 (Guidelines for urban mobility authorities) and Deliverable 5.2(Guidelines for logistic operators and service providers). It was produced by TIS.PT (Rosário Macário, Maria Rodrigues, and Ana Gama) and received contributions from the following members of the consortium:

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This document is set to be published and should be referenced as:
Macário, Rosário; Rodrigues, Maria; Gama, Ana; Timms, Paul; Lama, Cesar; Amaral, Marcelo; Schoemaker, Jarl; Tromp, Nathaly; Quinn, Derek; Abranches, Geraldo. "Handbook on Urban Logistics" - TURBLOG_ww (2011), Transferability of urban logistics concepts and practices from a worldwide perspective.

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QUALITY CONTROL INFORMATION:

Version	Date	Description
0.1	20/08/2011	Draft version of TURBLOG Handbook for partners comments
0.2	10/09/2011	Draft version of TURBLOG Handbook after partners comments
0.3	16/09/2011	Final version of TURBLOG Handbook
0.4	26/12/2011	Final version TURBLOG Handbook for quality control
0.5	29/12/2011	Final version TURBLOG Handbook after quality control
Final 1.0	31/12/2011	Submission of TURBLOG Handbook final version to the EC

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EXECUTIVE SUMMARY

This report synthesise the most relevant aspects of the work developed within the TURBLOG_ww project - *Transferability of urban logistics concepts and practices from a worldwide perspective*, including the outcomes of some of the most important characteristics of some countries and cities around the world, including urban freight data collection, current and expected transport problems, the institutional framework and the focus of their policies and the main measures used in the selected cities. Recommendations for the main instruments to be used in urban freight will be detailed, together with the main impacts and the potential for transferability.

In general, urban freight does not attract as much attention as urban passenger transport in policy documents or even in local authorities' policies and cities all over the world face common barriers to implement sustainable measures, even where there is a strong commitment, cities often lack the needed information, supportive national level policies, financing, etc.

In line with the EU Green Paper that points the need to integrate urban freight distribution issues in local policy-making and institutional settings instead of regarding freight issues as outside the competence boundaries of public authorities, passenger and freight transport should be treated in an integrated way, as they both influence the city and each other.

Urban freight is a specific issue where the key players belong to the private sector and local authorities cannot interfere too much in their business, as they do not have the power for that. Therefore TURBLOG_ww major recommendation for the efficient management of urban logistics is the development of a tool for the Strategic evaluation for the organization of urban logistic activities - SEOULA.

This handbook identify target groups of stakeholders and their needs for guidelines, summarising key recommendations orientated to those needs and to urban logistics plans, presenting in a road map style (from here to there what to do, how to do it and which implications) the content of Deliverable 5, Deliverable D5.1 and Deliverable D5.2.

The handbook is divided in three main sections.

- Section 1 set the current framework on urban logistics addressing the common problems relevant to urban freight in terms of economic, environmental and social impacts, the groups of key stakeholders and their needs and roles, the different types of urban areas and the different stages of development on urban logistics, the three levels of policies targeted to urban logistics. In the end of this section a worldwide overview of the current good practices adopted by public authorities, operators, service providers, etc. and data collection methodologies, approaches and indicators gathered around the world.

- Section 2 draw guidelines that aim to show how a city can evaluate their current stage of development in what urban logistic is concerned through the analysis of their problems, context, and how to select and transfer a good practice successfully adopted elsewhere. In the real world what can be observed is the implementation of measures usually imported from elsewhere where they were part of a successful case, often without careful assessment of whether transferability conditions are ensured and sometimes end up as failures. In TURBLOG_ww, transferability is defined as the ability to transfer/adopt in a given city successful measures previously adopted elsewhere, and achieve comparable results. However, to be able to evaluate a city and choose the most suited solutions and policies, there is the need to apply the business model framework and the logistic profile classification defined in TURBLOG_ww and that is why the business model framework and the logistic profile classification need to be explained in this section. Guidance on managing urban logistics is also an important part of this section.
- Section 3 present the lessons learned within TURBLOG_ww and present targeted recommendations for urban mobility authorities, for logistic operators and service providers and for the inclusion of logistic plans in urban mobility plans.

1. INTRODUCTION

Purpose of this Handbook

The purpose of this report is to present the work developed within the project TURBLOG_ww – Transferability of urban logistics concepts and practices from a worldwide perspective.

This handbook aims the identification of target groups of stakeholders and their needs for guidelines, summarising key recommendations orientated to those needs and to urban logistics plans. It comprises the content of Deliverable 5, Deliverable D5.1 and Deliverable D5.2.

Structure of the handbook

This report follows the structure of a handbook and it is structured along three main parts, each one with clear objectives and structure in such a way to enable the reader to follow a logical sequence from the setting of the current situation towards the recommendations and implementation of the change path.

The **first part** of the document sets the **current framework on urban logistics**, by establishing a common platform for understanding the problems, identifying the groups of stakeholders and their needs/concerns, type of cities and their stages of development and current policies targeted to urban logistics. Finally, it describes how the other cities are moving and which results have been identified in the current urban logistics solutions that are being adopted in the world. This section corresponds to the work developed in work packages 1 and 3 of TURBLOG_ww.

The **second part** of the document consists in guidelines that aim to show how a city can evaluate their current stage of development in what urban logistic is concerned and how to select and transfer a good practice successfully adopted elsewhere. To be able to evaluate a city and choose the most suited solutions and policies there is the need to apply the business model framework and the logistic profile classification defined in TURBLOG_ww and that is why the business model framework and the logistic profile classification need to be explained in this section. Finally, some guidance on managing urban logistics is presented. This section corresponds to the work developed in the work packages 2, 3 and 4 of TURBLOG_ww.

The **third part** is dedicated to the lessons learned from TURBLOG_ww, recommendations on urban logistics, implementation and management of the change process.

How to use this handbook

Urban mobility authorities and logistic operators will find in this handbook guidelines orientated towards the implementation of urban logistics improvements and recommendations on urban mobility plans. It is possible to understand this handbook as a road map: from here to there, what to do, how to do it and which implications.

It is possible to read this document according the type of stakeholder by choosing to read in chapter 3 the description of the group of stakeholder where you belong, and in chapter 11 the recommendations targeted to you. The remaining parts are common to all groups of stakeholders.

TURBLOG_WW Research

Although urban mobility involves the movement of both people and goods, in most cities, those who are responsible for urban transport policy and planning have historically paid more attention to the movement of people (developing many explicit ways of facilitating it) and less attention to the movement of goods. In spite of this general observation many cities around the world have tackled aspects of urban freight in an attempt to solve some particular or local issue or have used urban freight policy to contribute to broader transport or urban objectives. As Ogden (1992) states the "explicit consideration of urban goods movements has the potential to contribute in a useful and positive way to achieving both the goals of urban transport and some of the broader goals of urban policy and planning".

As acknowledged on the EC Thematic Strategy on Urban Environment, urban freight represents typically between 20% and 25% of road space use (space used x hours) contributing to between 10% and 20% of urban road traffic (vehicle x kilometres). This clearly highlights how indispensable for the economy of the city's urban freight is, but also how it may significantly affect the attractiveness and quality of life in urban areas (i.e. noise, pollution, congestion).

To a greater degree, the study of urban freight task is enormously complex and heterogeneous, involving an interdisciplinary engagement as a consequence of the difficulty to identify the common features between the requirements of different users and vehicle operators. Furthermore, urban freight is strongly interrelated with many other aspects of the urban system: urban passenger system, land use, regional development, socio-economic environment, employment, etc. It is thus necessary, when considering urban freight planning, to devote some effort towards understanding its integration in urban mobility planning. As pointed out by Macário and Caiado (2005), "acting on urban logistics domains implies intervening in different aspects of urban mobility management, particularly institutional, regulatory, social, infrastructural and technological, therefore requiring the joint and coordinated action of the different stakeholders in the urban logistics arena".

At the EU level, a set of different projects have been dedicated to urban logistics development. Extremely relevant research and consolidation of knowledge was undertaken in previous framework programmes: besides the specific individual projects such as the City-Freight, Mosca, eDrul, Fideus, etc., the integrating role of the Bestufs I and II thematic networks should be mentioned. At national level, different platforms and initiatives are also being promoted.

The project TURBLOG_ww addresses urban logistics from a wider (geographical) perspective, focusing upon a worldwide level and with a specific focus on Brazil and Peru. The main goal is to expand and transfer the existent knowledge to other countries and thus effectively contribute for the overall objective of extending the research and knowledge dissemination between EU and Latin America.

In a first stage the project pursued an in-depth review of the state of the art in urban logistics having collected experiences virtually all over the world. After this review, the analysis relied on the application of a business model rational to a set of pre-selected case studies, namely in Paris (Chronopost Concorde), Utrecht (Beer Boat), Belo Horizonte (Loading/Unloading requirements), Mexico (Public policies), Santiago Chile (Abertis Logistic park), Tokyo (Shinjuku joint delivery system), Beijing (Tobacco Logistics Centre), New York (Off-hour delivery programme) and Mumbai (Mumbai Dabbawalas).

At a third stage, transferability analysis was done aiming to assess the feasibility of implementation of some business models to other cities. The transferability process is applied to four other case studies and reported with much detail.

The project also acts as a coordination platform, gathering the experience to identify, generate and assess good practice solutions on urban freight initiatives, comparing experiences between Europe, Latin America, Asia and Africa as well as the promotion of workshops and site visits, based on which it is aimed to facilitate the exchange of information, raise awareness, disseminate and assess the potential to transfer and promote research results at the national, European and Intercontinental levels.

Overall the core mission of TURBLOG_ww is to support on going and future related initiatives and contribute to its transferability to Brazilian and Peruvian contexts, where the impact in reduction of social inclusion and enhancement of regional integration is very significant.

All the deliverables and workshop findings and recommendations are publicly available at the project website www.turblog.eu.

TURBLOG_ww Consortium

The consortium that undertook the TURBLOG_ww research gathers the experience and expertise of partners from 3 European countries and 3 Latin American partners.

The project co-ordination was assured by the TIS.PT, Consultores em Transportes, Inovação e Sistemas, SA, from Portugal in a consortium composed by the following entities:

Consortium partners	Country
TIS.PT, consultores em Transportes, Inovação e Sistemas, SA	PT
NEA transport research and training	NL
UNIVLeeds – Institute of Transport Studies	UK
Inovamais, SA	PT
BHTRANS - Empresa de Transportes e Trânsito de Belo Horizonte S.A	BR
PTL-UNI - Plataforma Logistica de Transporte, Logistica y Molivilidad Urbana	PE
TIS.BR	BR

SECTION ONE – SET THE CURRENT FRAMEWORK

The purpose of this section is to set the current framework on urban logistics. Chapter 2 describes the common problems relevant to urban freight in terms of economic, environmental and social impacts. Chapter 3 identifies and describes the groups of key stakeholders, their roles and concerns. The urban areas are characterised and the different stages of development on urban logistics, are presented in chapter 4. Chapter 5 presents the three levels of policies targeted to urban logistics as well as a couple examples of each level. Chapter 6 provides a worldwide overview of the current good practices adopted by public authorities, operators, service providers, etc. and data collection methodologies, approaches and indicators gathered around the world.

2. PROBLEMS RELEVANT TO URBAN FREIGHT

The most relevant impacts considering urban freight can be divided into the following:

- Economic impacts: congestion, inefficiency, and resource waste, and the effects that the economy have on urban competitiveness;
- Environmental impacts: pollutant emissions including the primary greenhouse gas carbon dioxide, the use of non-renewable fossil-fuel, land and aggregates, and waste products such as tyres, oil and other materials;

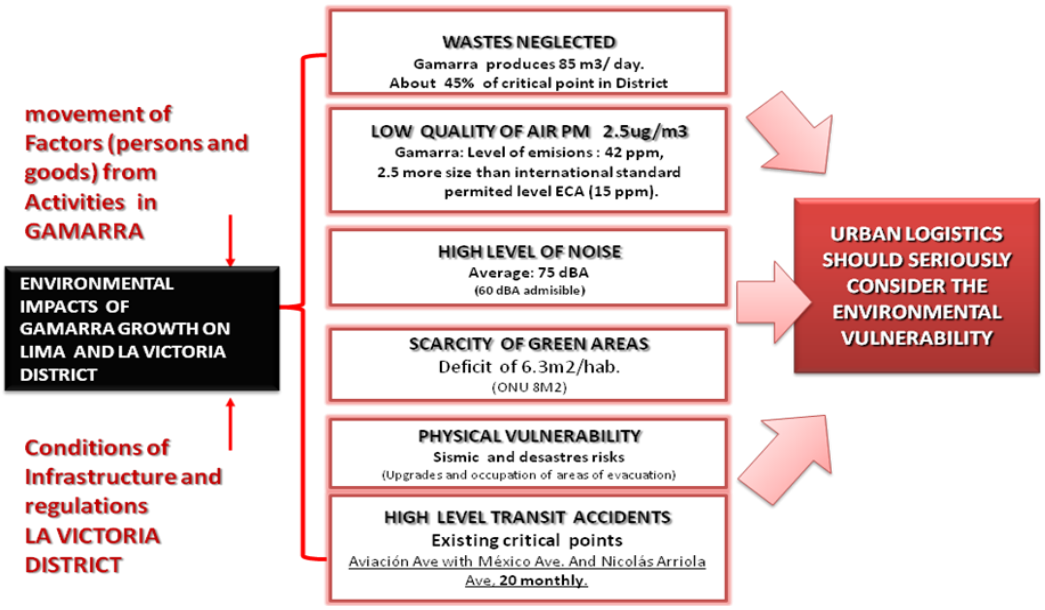


Figure 1 – Environmental impacts in Gamarra (Peru)

- Social impacts: the physical consequences of pollutant emissions on public health (death, illness, hazards, etc.), the injuries and death resulting from traffic accidents, noise, visual intrusion, and other quality of life issues (including the loss of Greenfield sites and open spaces in urban areas as a result of transport infrastructure developments)".

Furthermore, according to project BESTUFS (2007), "goods vehicle operators and drivers face a range of difficulties when carrying out freight operations in urban areas. These include:

- Traffic flow/congestion issues caused by traffic levels, traffic incidents, inadequate road infrastructure, and poor driver behaviour;
- Transport policy-related problems including, for example, vehicle access restrictions based on time and/or size/weight of vehicle and bus lanes;
- Parking and loading/unloading problems including loading/unloading regulations, fines, lack of unloading space, and handling problems;
- Customer/receiver-related problems including queuing to make deliveries and collections, difficulty in finding the receiver, collection and delivery times requested by customers and receivers".

These problems could be said to be generic, existing everywhere in the world. Within this overall context, the relevance of problems will vary between specific cities and a precise identification of problems can only be made by examining the circumstances of a particular city. TURBLOG_ww carried out a detailed diagnosis of problems for four cities: Belo Horizonte (Brazil); Cariacica (Brazil); Gamarra, Lima (Peru); and Lisbon (Portugal). Table 1 provides a summary of the most important problems concerned with urban freight identified for these cities.

Table 1 - Comparative (main) problems.

Urban problems	Belo Horizonte	Gamarra	Cariacica*	Lisbon
Congestion	+++	+++	++	+++
Roads concentration in city centre	+			
Lack of orbital roads / insufficient road network	++	+++		
Lack of planned urban transport system / unclear road hierarchy		++	++	++
Chaotic situation in land uses / demographic distribution encourages excessive movements		+++		++
Lack of finance for implementing measures			+++	
Noise and air pollution				+++
Accessibility (geometry, slope, narrow streets, type of pavement)				+++
Illegal parking problems – lack of enforcement				++
Damaged public space				+
Lack of security				+

Agents problems	Belo Horizonte	Gamarra	Cariacica*	Lisbon
Informal sector in transport activity		+		
Informal sector in shopkeepers		++		
Lack of municipal regulations		+++		
Lack of cooperation between the different agents of the city				+++

Freight problems	Belo Horizonte	Gamarra	Cariacica*	Lisbon
Lack of distribution centres	+	++		
Number of trucks in down town area / historic centre	++	++	++	
Size of trucks in down town area	++		++	
Amount of through-traffic using inappropriate roads			++	
Lack of regulation/signalisation for freight transport			+++	
Time window constraints due to the drivers and shop owners schedules				+++
Lack of freight oriented master plan/logistic plan/policy/regulation-lack of policy				+++
Lack of collaboration/cooperation systems between retailers and suppliers				+++
Lack of loading and unloading parking spaces		++	+++	+++
Loading and unloading parking places illegally occupied and lack of enforcement				+++
High number of operators visiting the same places with the same schedules				+++
Night deliveries constraints due to the noise				+++
Urban transport vs. good transport conflict				+++
Constraints to the circulation of larger and longer vehicles due to freight regulations				++
Safety issues				++
Several deliveries due to perishability of goods				++
Parking time (short time window)				++
Fragmented and diversified commerce				++
Access to pedestrian streets				+
Self-supply of the shop owners (small scale commerce)				+

Relevance (+ low, ++ medium, +++ large)

***Only relevant to the case study.**

It can be seen that, by making a comparison between these four cities, a wide variety of problems have been identified that are not “standard” across all cities. The following points can be made from this comparison:

- Congestion is seen as an important problem for all four cities.
- In general there is a difference between the problems identified in the Latin American cities and those identified for Lisbon. Apart from congestion, the only problems in common between (one or more) of the Latin American cities and Lisbon are: lack of planned urban transport system / unclear

road hierarchy; chaotic situation in land uses / demographic distribution encourages excessive movements; and lack of loading/unloading parking spaces.

- Loading/unloading parking spaces.
- The three Latin American cities identify problems due to the number of trucks in the central area and the size of such trucks. In Lisbon, however, one of the main problems identified concerns the constraints to the circulation of larger and longer vehicles due to freight regulations. The apparent contradictory nature of these problems (i.e. they appear to lead to totally different policy conclusions) reflects that it is an important issue to identify whose perspective is being considered when describing problems. It might well be the case that the identified Latin American problems reflect a public policy point of view whilst the identified Lisbon problems reflect more a truckers' point of view, so that the apparent divergence between "Latin America and Lisbon" in a geographical sense is somewhat misleading. However, this conclusion cannot be substantiated without further evidence.

3. GROUPS OF KEY STAKEHOLDERS IN URBAN LOGISTICS: WHO ARE YOU?

The stakeholders are very important in the decisional and implementation process of urban logistics measures. Following the experience of Paris, for instance, it became clear that public-private partnerships are crucial to develop innovative and efficient last mile solutions. Based on the case studies analysed in TURBLOG_ww, six different types of stakeholders were identified. However, in this handbook specific recommendations will be given to urban mobility authorities (Chapter 11.2) and urban logistic operators and service providers (Chapter **Error! Reference source not found.**), as they are the key players in promoting and developing good practices regarding urban logistics.

3.1. SUPPLIER/PRODUCER

Description: The supplier/producer is at the beginning of the supply chain, and provides a product/service that is of value to the customer.

Role: The main role is the production of things for sale.

Main concerns: Its main concern, as being part of a business, is profitability.

Needs: The major need for the producer/supplier is to bring its product to the final costumer. Preferably, the product should be delivered with the same origin conditions (this is valid especially for perishable products).

3.2. URBAN LOGISTIC OPERATORS/SERVICE PROVIDERS

Description: These are the agents responsible for the distribution process and for delivering the product to the consumer.

Role: The main role of these stakeholders is distribution, warehousing and other supporting activities.

Main concerns: The main concerns of the distribution business are stock management and other performance/efficiency aspects, as well as cost structure: fixed (salaries, renting), variable (operation) and sunk costs (namely with the internalisation of externalities to face public policies) and revenue streams (profits).

Nevertheless, the efficiency and performance of the distribution largely depends on the accessibility. Therefore this is also a major concern, the constraints to the circulation of large vehicles due to city freight regulations or lack of adequate transport infrastructures. Another issue relevant for freight transport is the urban design, namely the geometry, slope, and type of pavement of the streets, the access to pedestrian streets, and lack of distribution centres for loading and unloading. The absence of cooperation between different city agents, including cooperation systems between retailers and suppliers is also a key aspect to be considered.

Needs: In urban logistics, the major needs of the operators are the availability of loading/unloading parking spaces, good accesses, and warehousing space. Also, the city regulations and restrictions to the circulation of heavy vehicles in urban areas created the need for financial incentives to internalise the environmental impacts, such as to invest in environmental "friendly" vehicle fleet.

3.3. PUBLIC AUTHORITIES

Description: Public authorities define general land-uses on the territory and are responsible for the definition and implementation of public policies. They can be municipalities, government or environmental agencies.

Role: The main role of the public authorities is regulation of the circulation of freight transport, and facilitation of implementation of good practices (such as provide urban logistic spaces and promote the accesses for the delivery of goods). Summarising, the public authorities are responsible for:

- Enforcement and promotion, e.g. law and regulations enforcement;
- Traffic management (+ vehicle), e.g. vehicle size/type and time window restrictions for vehicle emissions movement standards, subsidies for low emission vehicle, fuel taxes;
- Access conditions, e.g. loading and unloading duration, time and access restrictions;
- Land use management, e.g. zoning for logistic activities, land use pricing/subsidies;
- Public infrastructure, e.g. new infrastructure for freight, truck routes.

The role of public authorities has been strongly highlighted in several TURBLOG_ww workshops: they should give guidelines, alternatives in terms of logistics solutions, funding and clear rules for all the actors involved in the sector in order to organise urban logistics activities (e.g production, distribution, warehousing, etc).

Main concerns: Major concern lies on consensus building among all stakeholders regarding urban freight policies and regulations.

Needs: The main needs are related with social and environmental impacts of freight movements, and how can public policies help to improve the citizens' quality of life and at the same time boost the economic development of the services and commerce located within city areas. Moreover, connectivity and accessibility are major concerns for urban planning and management of the infrastructures' capacity.

3.4. RETAILERS/CUSTOMERS

Description: People or groups of people that the producer/supplier of the urban logistic chain aims to reach with their products/service. They can be for example restaurants, supermarkets or individual customers.

Role: End receiver of the product or service.

Main concerns: Have their deliveries according the purchase order.

Needs: Have accessible, punctual and reliable deliveries, with the expected quality.

3.5. VEHICLE MANUFACTURERS

Description: Vehicles are the most important (and one of the more expensive) asset in the distribution business. Also, they can be a key resource for last mile solutions.

Role: Major role is to face the challenge to innovate in order to meet municipality restrictions and environmental standards, mainly through joint ventures with logistic services/operators.

Main concerns: The main concern is to have investment for the development of innovative solutions, in order to have revenues.

Needs: The major need is to establish business partnerships for the development of innovative transport solutions for urban freight.

3.6. CITIZENS

Description: The citizens represent all the population that is affected by the freight movement and distribution of goods.

Role: Society at large is becoming more and more aware of urban environmental issues. Freight transport was assumed to be an important source of local air pollution, and therefore the involvement of the population in decision making and public policies has an important role to raise awareness and promote discussion about urban environment in general and urban freight solutions in particular.

Main concerns: The main concerns are the social impacts such as road safety and time spent on congestion and environmental impacts, namely air, noise pollution and global warming.

Needs: The main need for the citizens is to have good quality of public space, and healthy environment with acceptable pollution levels.

4. URBAN AREAS CHARACTERISATION AND STAGES OF DEVELOPMENT ON URBAN LOGISTICS: WHERE ARE YOU?

This chapter describes how to identify and characterise urban areas, in order to best adjust the approach towards urban logistics improvements. The type of approach on urban logistics interventions also depends on the stage of development on urban logistics of an urban area, and therefore three stages of development were identified, considering the existing policies regarding urban logistics, the adopted practices and the restrictions and incentives applied.

URBAN AREAS CHARACTERISTICS

In order to define best policies for urban logistics is important to distinguish the different relationships that exist between urban areas, not only in terms of public authorities but also considering the distribution of public space (land uses, transport infrastructures), once recommendations should vary according to the geographic approach (can be more strategic or operational, according to the scope of the policies). For example, considering metropolitan areas, urban freight must be considered in master planning and a roadmap must be developed with guidelines for the development of business and commerce. In the other hand, in a small town, access and parking regulations can be useful, but in city centres sometimes these restrictions may not be sufficient, and so innovative measures have to be taken to change peoples' behaviour.

In the case of a small city or a part of a city (e.g. city centre) innovative last mile solutions have also to be considered, and in these case logistic business concept and logistic profiles have to be considered, in order to access the most efficient and effective improvements for urban logistics (Section 2 of this handbook).

The following criteria were chosen to distinguish the type of urban areas:

i. **dimension** of the urban areas (area and population);
ii. **governance** i.e. to which level of authority are we giving advice (local authorities, government, environmental agencies);
iii. **relations between the city and the metropolitan area** (intermodal hubs, transport infrastructure, important economic sectors, traditions).

According to these criteria, the following types of urban areas were identified:

1. Megacities

A megacity can be defined as a metropolitan area with a population of over 10 million people, and/or with minimum level for population density that at least 2000 persons/square km. As shown in the table presented in Belo Horizonte TURBLOG_WW workshop (20/09/2011), according to the population density criterion the first 30 major Mega Cities in the world are outside of Europe (Madrid is positioned at the 42nd place):

Table 2 – Ranking according to density

Rank	City / Urban area	Country	Population	Land area (in sqKm)	Density (people per sqKm)
1	Mumbai	India	14,350,000	484	29,650
2	Kolkata	India	12,700,000	531	23,900
3	Karachi	Pakistan	9,800,000	518	18,900
4	Lagos	Nigeria	13,400,000	738	18,150
5	Shenzhen	China	8,000,000	466	17,150
6	Seoul/Incheon	South Korea	17,500,000	1,049	16,700
7	Taipei	Taiwan	5,700,000	376	15,200
8	Chennai	India	5,950,000	414	14,350
9	Bogota	Colombia	7,000,000	518	13,500
10	Shanghai	China	10,000,000	746	13,400
11	Lima	Peru	7,000,000	596	11,750
25	Sao Paulo	Brazil	17,700,000	1,968	9,000
27	Mexico City	Mexico	17,400,000	2,072	8,400
28	Santiago	Chile	5,425,000	648	8,400
35	Rio de Janeiro	Brazil	10,800,000	1,580	6,850
36	Monterey	Mexico	3,200,000	479	6,700
39	Guadalajara	Mexico	3,500,000	596	5,900
42	Madrid	Spain	4,900,000	945	5,200
43	London	UK	8,278,000	1,623	5,100
46	Buenos Aires	Argentina	11,200,000	2,266	4,950
90	Los Angeles	USA	11,789,000	4,320	2,750
114	New York	USA	17,800,000	8,683	2,050

Figure 2 – Photos from megacities (Tokyo, New York, São Paulo, and Mumbai)

Source: Wikipedia

2. Metropolitan area

A metropolitan area generally refers to a region consisting of a densely populated urban core and its less-populated surrounding territories, which usually encompasses multiple jurisdictions and municipalities: neighborhoods, townships, cities, exurbs, counties, and even states[1]. Metropolitan areas have become key economic and political regions, so in these cases recommendations should be given to the authorities that control the metropolitan region as a whole.

Figure 3 – Picture from Paris and a map showing the Lisbon Metropolitan Area in yellow

3. Medium cities part of metropolitan areas

This type of city concerns cities that are part of a broader metropolitan region, so in this case, the policies should focus more on local authorities, although it can vary highly between countries. The relationship between the city and the metropolitan area has also to be considered.

Figure 4 - Photos from Sintra and Cascais (both belong to Lisbon Metropolitan Area)

[1] www.wikipedia.com

4. Free standing cities and smaller cities

This category refers to cities that geographically are distinct from a metropolitan area, usually medium or small cities (less than 500 thousand inhabitants). In this case recommendations should focus on local policies.

Figure 5 – Examples of small cities: Delft (The Netherlands), and York (UK)

STAGES OF DEVELOPMENT ON URBAN LOGISTICS

Each city has its own life cycle and its growing pace and the success for the implementation of a good solution (and/or a policy) has to have that in mind.

Regarding the types of measures adopted in urban logistics, it's worth noticing that the emerging economies, such as China, India, Mexico, Chile, Brazil, etc. seem to be at an early stage of development with regard to urban logistics practices, compared to more developed countries, such as France, the Netherlands, Japan, etc. The more developed countries show a broader range of measures, varying from restrictions to incentives and often including market-oriented initiatives by companies. In contrast, other cities in e.g. Latin America, India, China, etc. seem to focus more on restrictions and/or measures influencing freight transportation in general.

Some cities are already one step ahead in terms of urban logistics development and their policy is close to the one adopted in the mobility management, they are striving to change the behaviour, while others are still trying to organise the public space and transport accessibility, mainly focusing on transport infrastructure and traffic restrictions. According to the European project MAX, mobility management is a concept to promote sustainable transport and manage the demand for car use by changing travellers' attitudes and behaviour.

Considering TURBLOG_ww findings, it is possible to identify three stages of development in urban logistics according with the criteria mentioned below:

- Urban logistics related policies: is there any document or section of a policy document that address urban logistics?
- Urban logistics adopted practices: are there solutions targeted to urban logistics applied?
- Restrictions/incentives applied: are there restrictions and/or incentives related to urban logistics?

This enables the characterisation of the three stages on urban logistics that are represented in the figure below.

Figure 6 – Evolutional stages on urban logistics

The **first stage** is characterised by urban areas that show no evidence (or very little) of urban logistics policies in policy documents or even sections of other documents not logistics oriented. Also no evidence (or very little) of urban logistics solutions adopted. This stage corresponds to realities that are still raising awareness of the problems that urban logistics might cause.

The **second stage** corresponds to urban areas that already have some evidence of urban logistics policies in policy documents and there are some restrictions/incentives already being applied. There is some evidence of urban logistics solutions that are being adopted by the local authority, logistic operators, etc.

Finally, the **third stage** corresponds to urban areas that have already a good sample of policies, solutions and restrictions/incentives. This stage corresponds to realities that have solutions applied that have good impacts but have already understood that it is not enough, they are striving to change behavior.

5. POLICIES TARGETED TO URBAN FREIGHT LOGISTICS

A general observation made by many authors is that urban freight does not attract as much attention as urban passenger transport in policy documents. However, it is also frequently mentioned that improvements in this situation (though only in certain locations) have occurred over the past ten years. The text below provides some examples and/or analysis of urban freight policy on t**hree levels of policy-making** (transnational, national and city levels): European Union (EU); Japan; and London, Paris and Auckland (NZ).

5.1. TRANSNATIONAL POLICY: EU TRANSPORT POLICY

The main EC document concerning urban transport is the Green Paper "Towards a new culture for urban mobility" (CEC, 2007a). With respect to freight transport, the Green Paper stated the following:

> "Freight logistics has an urban dimension. In view of stakeholders, any urban mobility policy must cover both passenger and freight transport. Distribution in urban areas requires efficient interfaces between long-haul transport and short distance distribution to the final destination. Smaller, efficient and clean vehicles could be used for local distribution. Negative impacts of long distance freight transport passing through urban areas should be reduced through planning and technical measures.
>
> The "service economy" leads to new demands for road space. There is evidence that 40% of all vehicles other than passenger cars are service-related (vehicles for removals, maintenance services, small deliveries, etc.). Courier services often use motor-cycles or mopeds. Consolidated distribution in urban areas and zones with access regulations is possible but requires efficient planning of the routes to avoid empty runs or unnecessary driving and parking. The development of these solutions requires the involvement of all stakeholders.
>
> Urban freight distribution could be better integrated within local policy-making and institutional settings. Public passenger transport is usually supervised by the competent administrative body while freight transport distribution is normally a task for the private sector. Local authorities need to consider all urban logistics related to passenger and freight transport together as a single logistics system."

A subsequent EC communication "The EU's freight transport agenda: Boosting the efficiency, integration and sustainability of freight transport in Europe" (CEC, 2007b), echoed the Green Paper excerpt given above, as does the EC communication "Freight Transport Logistics Action Plan" (CEC, 2007c) made a number of commitments for urban freight:

- The Commission will encourage the exchange of experiences of representatives of urban areas to help establish a set of recommendations, best practices, indicators or standards for urban transport logistics, including freight deliveries and delivery vehicles. Deadline: Urban Transport Action Plan in 2008.
- Make recommendations of commonly agreed benchmarks or performance indicators to measure efficiency and sustainability of delivery and terminals and, more generally, in urban transport logistics and planning. Deadline: 2011.
- Reinforce the freight part of CIVITAS towards better co-ordination, or integration, between passenger and freight transport, between interurban (long distance) and urban transport logistics. This can lead to an integrated "CIVITAS Freight". Deadline: 2010.

5.2. NATIONAL POLICY: EXAMPLE OF JAPAN

The Comprehensive Program of Logistics Policies of the Japanese Ministry of International Trade and Industry dating back to 1997 involves urban freight as well as intercity and international freight transport. The three priorities identified in this Programme are a) improvement of infrastructure; b) promoting deregulation; and c) development of sophisticated logistics systems (ITS) (van Duin, 1999).

The Japanese government also decided to periodically review this programme's outcomes and published the first and second follow-up reports in 1998 and 1999 (Visser, et al. 1999). As described by Visser et al. (1999), specific policy measures related to urban freight in the Japanese national policy were as follows:

- investments in improving the infrastructure to reduce the time and cost for goods transportation based on the principle that beneficiaries should pay for part of the capital;
- further support to private enterprises by providing subsidies to logistics related facilities/equipment;
- to promote improvement and to strengthen the functions of the logistics business in urban areas and joint collection and delivery points where the sorting of goods for final consumers in metropolitan areas is carried out;
- to develop logistics facilities in the vicinity of major highway interchanges, industrial areas, and seaside industrial zones;
- to utilise the rail system for waste transport and as a feeder for international transport;
- to promote deregulation in the logistics field;
- voluntary co-operation, such as joint collection and delivery points in urban areas; facilities for disposal of goods towards buildings in metropolitan areas; facilities for joint collection and delivery in business district; stopping facilities for on-road collection and delivery; and setting up delivery boxes;
- to support the development of an advanced logistics system;

- the development and standardisation of the Intelligent Transport System (ITS);
- providing road traffic information through bringing the Vehicle Information Communication System (VICS) into nation-wide use;
- introduction of Electronic Toll Collection (ETC) system at tollgates;
- a shift from own-transport by private companies towards transport by professional carriers.

5.3. CITY LEVEL POLICY: EXAMPLE OF LONDON, PARIS AND AUCKLAND

London and Paris

Providing examples of improvements in city policy-making in Europe (for some cities at least), Browne et al (2007) state with respect to the particular cases of London and Paris:

"In the past, in both London and Paris, urban freight considerations have received little attention and have been poorly integrated into other transport policies. This situation has improved substantially in the last five years. In London, the establishment of the post of Mayor, together with the formation of the Greater London Authority (GLA) and the role played by Transport for London (TfL) has resulted in freight transport issues receiving far greater attention than previously. The Mayor's Transport Strategy (MTS) explicitly addresses freight transport in the capital (Mayor of London 2001). The Mayor and TfL have created a Freight Transport Unit and established the London Sustainable Distribution Partnership (LSDP), which has been used as a forum to consult a wide range of stakeholders about freight issues and potential solutions. Stakeholders include the London boroughs, distribution companies, trade associations and other public bodies in order to ensure that economic and environmental needs are addressed.

The city of Paris affirmed the importance of freight in its transport and street management policies of 2002. As in London, the Mayor of Paris is attempting to reconcile the two objectives of supporting the efficient movement of freight transport and limiting its negative impacts. Freight transport has been long neglected in the management of urban space and the policies of mobility in Paris. However, in 2002, freight was directly addressed as part of the development of the new transport policy 'Plan de Déplacement de Paris' (PDP). The PDP is a Statutory Plan. As a result of freight transport, work as part of the PDP dialogue was started with various stakeholders including the distribution companies and other commercial organizations involved. This consultation process is a new development – freight companies had not previously been involved in the discussion and design of transport strategies and policy measures."

Auckland

Auckland has developed the **Auckland City Freight Strategy** (Upton, 2008) to promote and support freight and commercial transport initiatives that are a benefit for the local, national and international business. The aim of the strategy is to maximize the safe and efficient movement of goods, whilst minimising adverse impacts on the environment and community. Figure 7 summarises the performance measures identified by Auckland City that are required to meet the objectives of their freight strategy.

Strategy	Performance Measures
For community and industry communication:	Regularity with which freight forum, consisting of members of the transport industry and other key stakeholders meet, with three times a year being the target Number of complaints received by Auckland City regarding freight issues, with the target being a decreasing trend Number of enforcement notices received by freight vehicles on Auckland city's roads with the target being a decreasing trend.
Freight Network Planning:	Number of freight related accidents on the road network, with target being a decreasing trend Reliability of freight journey times, with the trend being that reliability increases.
For Transport operations and technology	An increased knowledge of freight movements, with the target being an annual freight travel pattern report A regional freight strategy.
Local area freight management	Reduction of freight vehicles using local roads as through traffic Increased level of service on alternative arterial routes; the target being improved reliability in journey times on alternative routes.
Freight Operations	Reliability of freight journey times Freight vehicle accident levels
	Maintenance on routes with high freight vehicle flows.
City and development planning	Compliance with district plan loading and servicing specifications Development of freight routes through intensified growth areas.
Monitoring	Monitored increase in usage of main arterial routes Less use of through traffic on traffic sensitive roads Decreasing level of complaints received regarding freight vehicles.

Figure 7 - Freight performance measures for Auckland City, New Zealand

6. CURRENT PRACTICE: WHICH SOLUTIONS ARE BEING ADOPTED AROUND THE WORLD?

6.1. URBAN LOGISTICS SOLUTIONS

A wide variety of city logistics solutions are being adopted around the world. The different types of solutions are listed below by category.

1. **Interventions for loading/unloading**

- On-street loading bays
- Time regulations on vehicle loading/unloading
- Night deliveries

2. **Integration within comprehensive urban transport and land use planning**

- Signing
- Lorry routes
- Urban freight information and maps
- Urban Consolidation Centres
- "Last mile" solutions
- Vehicle weight and size regulations
- Environmental zones
- Lorry lanes
- Road charging systems
- Alternative Modes

3. **Business arrangements**

- Definitions of Regulation, Governance and Government
- Public-private partnerships – lessons learnt within START
- Public-private partnerships and Private Associations: examples from France, Sweden and Japan

4. **Technology**

- SMARTFREIGHT concept
- Vehicle and Fuel Technology

6.1.1. EXAMPLES FROM AROUND THE WORLD

This sub-chapter presents some examples that provide an insight of wide scope solutions implemented around the world. The following examples present a description of several case studies developed in TURBLOG_ww project, with different urban logistic solutions adopted in different urban contexts.

CITY OF PARIS, FRANCE

The main objectives of the **City of Paris** (France) are: (1) to alleviate the environmental impacts of freight traffic and (2) to provide the Paris business sector with a choice of efficient and environmentally-friendly solutions for their urban supply chain. To do so, Paris has designed a freight strategy which is served by a "policy-mix" of various and mostly interconnected measures. Most of the measures revolve around a recentralised logistics system. Logistics activities should find space and facilities within the Paris urban area, and not be located further and further away generating many additional vehicle km. The second emphasis of the Paris urban freight policy is on rail. Paris is promoting the re-use of rail freight facilities within the city. More recently, it has been promoting and studying a cargo-tram project. This policy-mix incorporates traditional instruments that are updated with more innovative approaches.

Examples of the updated traditional instruments:

- *Promoting consultation* with private stakeholders;
- *Regulating commercial vehicles' traffic and parking*: linking the trucks characteristics to specific restrictions and time-windows, promoting night deliveries and favouring environmental friendly vehicles;
- *Providing more efficient on-street loading/unloading areas*, for instance, with the help of a technical guide to delivery areas for the city of Paris and limiting the stopping time for delivery to a maximum of 30 minutes.

Examples of other innovative approaches:

- *Experiments in City Logistics*: The City of Paris decided to support innovative urban logistic organisations, by initiating and funding some feasibility studies and providing urban logistics spaces (ULS) at a reasonable price. Goods entering Paris are consolidated and then transported from the different ULS with "green" vehicles for final distribution. Chronopost Concorde and La Petite Reine are examples of companies using these ULS; and
- *Alternatives to road transport*, such as rail and water transport. The re-use of a traditional rail freight terminal in Paris Bercy by Monoprix is a successful example of this. Also the possibility of using the cargo tram service on the future tramway infrastructure is being evaluated. This could lead to a new alternative to road transport in 2013.

CASE STUDY: FREIGHT ORIENTED MASTER PLAN

Brief description:

In 2006 the City of Paris introduced freight orientations into its new Urban Master Plan (PLU). Measures in the Plan include: (1) compulsory delivery areas for the main generators of urban freight flows, (2) preservation of land in order to develop logistic facilities with railway or waterway access and (3) identification of areas to tranship goods from a boat to a delivery vehicle during certain times of the day.

How it works:

The following changes were made compared to the previous PLU:

- It is compulsory for the main generators of urban freight flows to integrate a delivery area into their premises in order to take care of all the deliveries and pick-ups generated by their activities. The businesses subject to these rules are the ones that have a minimal Net Floor Area Ratio of 500 m^2 for shops, 2,500m^2 for offices, one m^2 for warehouses. The rule also applies to hotels with a minimum of 150 rooms;
- Specific spaces have been reserved for logistics areas accessible by rail or waterways. Specific land-use areas called UGSU areas must accommodate logistics activities. Some areas with direct access by train or waterways cannot eliminate logistics activities in future developments. This provision makes it possible to design specific areas for intermodal logistics activities;
- Thirteen "part-time transit ports" have also been identified in the "UV" or green areas of Paris along the Seine, between the bridges Pont de Bercy and Pont de Grenelle: these areas may be used at certain times to tranship goods from a boat to a delivery vehicle, then resume normal use, as a promenade for example, for the rest of the day.

Main stakeholders involved:

The City of Paris, real estate developers, land owners, transport companies and/or retailers.

Impacts:

- Redeveloping train activities for inbound supply, such as the Monoprix in Bercy (see next page);
- Increased modal share of railway and inland waterway transportation;
- Less trucks needed;
- Decrease of CO_2 emissions and local pollution;
- Less congestion;
- Maintain or re-introduce industrial jobs, for people with low qualifications.

CITY OF UTRECHT, THE NETHERLANDS

Until around 2000, there was relatively little coherence in the policy measures of **Utrecht** (the Netherlands) in the area of urban distribution. Since 2003, the Municipality of Utrecht has structured its policies and there is a continuous effort on Utrecht's behalf to improve urban distribution. The measures used in Utrecht to combat congestion and to improve air quality range from enforcing restrictions to public-private partnerships. The following measures for urban freight transport have been identified:

- *Vehicle restrictions*: length and axis load restrictions in order to avoid damage to the bridges and the basements of historical buildings;
- *Time windows* in the pedestrian area in the inner city;
- *City Distribution Centres* since 1994;
- *Beer Boat* since 1996;
- *Delivery Profiles* of Utrecht in 2003 and 2009 (see section 2.3), which provides quantitative and qualitative urban freight transport information of the inner city of Utrecht;
- *Logistic routes* since 2004, in order to help drivers to find their way into the city centre and avoid residential areas as much as possible;
- *Distribution plan* in 2005: under this plan six new unloading zones, a checklist for loading and unloading zones, new road signs, a communication awareness campaign (folder "Bewust Bevoorraden") and other suggestions for sustainable distribution have been introduced;
- *Environmental zone* since 2007, in order to ban lorries that cause heavy pollution in the city centre;
- *Cargohopper* since 2009, which is a new last-mile transport mode specifically adapted to the city's characteristics and regulations; and
- *Stimulating clean vehicles* (2010): under the PIEK-programme, the Municipality of Utrecht is currently carrying out pilots with supermarkets to look for interesting options for cleaner trucks that can deliver goods to the supermarkets with silent materials.

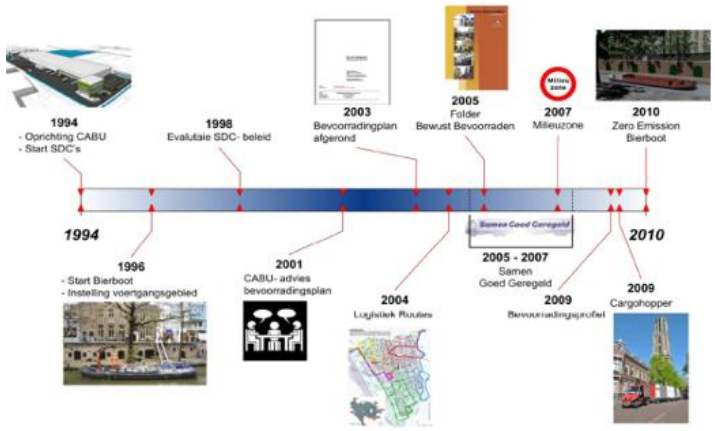


Figure 8 - Urban freight distribution measures in Utrecht

Source: Presentation Buck Consultants International, 2010

CASE STUDY: THE CARGOHOPPER

Brief description:

A private transport company in Utrecht called Hoek Transport decided to introduce a transport mode that would fit with the characteristics and restrictions of the city: the Cargohopper. The Cargohopper is a multi trailer, 16-metre long, yet narrow, solar powered road train, riding on pneumatic tyres.

How it works:

The Hoek City Distribution Centre (CDC) lies about 11 km outside the inner city limits. An extra transfer point was created because of the limited range (maximum 60 km per day) and low speed (maximum 20 km per hour) of the Cargohopper. First, the goods are loaded into boxes at the CDC of Hoek Transport. The boxes are then transported to the transfer point using a regular truck. The boxes are then put on the Cargohopper, which delivers them from there to the shops. The goods are thus not stored here, but immediately cross-docked. Loading the Cargohopper is done in less than 15 minutes. It also collects empty packaging from shops for recycling and has complete access to the entire city at any time. The operations of the Cargohopper are not subsidised by the government.

Main stakeholders involved:

Hoek Transport, Municipality of Utrecht and the shopkeepers.

Impacts:

- Less delivery van kilometers: around 122,000 from the inner-city streets per year;
- Less fuel needed: up to 24,000 liters of diesel fuel per year;
- Less pollution: up to 34 tonnes CO_2 per year;
- Less difficult and time-consuming trips to the inner city;
- More attractive city centre;
- Increased traffic safety.

CITY OF SANTIAGO, CHILE

In the City of **Santiago**, the urban transport policies are *mainly restrictions*. In general, these are restriction on a national level. However, specific regulations also allow municipalities to regulate cargo vehicle circulation at certain times, restrict access and parking on some roads and regulate loading and unloading times. Examples are restrictions on circulation and access to roads, vehicle weight restrictions, dimension restrictions, age restrictions, emission restrictions and regulations related to the transport of hazardous materials and waste. Other measures, such as the *Abertis Logistics Park*, have been introduced by a private company.

CASE STUDY: ABERTIS LOGISTICS PARK

Brief description:

The Abertis Logistics Park is the most comprehensive and modern logistics park in Santiago, with similar quality standards that the European and North-American parks have, in that they are considerably more demanding than those in place nationally, but adapted to comply with Chilean construction codes. The park is situated within the Metropolitan Region (near the International Airport) and has direct access to main highways of the city and routes to two major ports in the country.

How it works:

The Abertis Logistics Park is essentially a storage project, where the principal service is the rental of warehouses. However, the logistic centre will, in the future, also be equipped with multiple services such as a restaurant, high-ceilinged offices inside the warehouses, rest areas and restrooms for drivers and a modern automated security system which registers who enters and leaves and the time spent on the premises. The logistics centre will also offer the service of "keys in hand", which consists of designing storage centres tailored to the client particular needs, with the same construction standards.

Main stakeholders involved: Logistics operators, logistics providers, government, clients (retailers, manufacturers).

Impacts:

- The daily estimated flow (one way) is expected to increase from 16 vehicles in 2008 (first stage of the project) to 695 in 2019 when the logistical park is expected to be completely finished;
- More efficiency, due to the consolidation of goods and optimisation of the routes and less number of trips required;
- Expected reduction of transport and operating costs in the long-term. The Abertis Logistics Park is considered to be the best in terms of quality, but is more expensive than other warehouses. It is currently a trade-off between quality and pricing;
- More jobs for the region: The Abertis Logistics Company has signed an alliance with the Corporation for Sustainable Development of Pudahuel, to appoint all the new work positions which are generated both by the construction sector and logistics centre operations to the residents of Pudahuel.
- Positive impact on the attractiveness of the zone, in terms of appearance and investment opportunities;
- Less pollution: the Abertis logistics centre has developed a series of measures to ensure that its activity is compatible with major environmental concerns, such as landscape integration, collection of waste, the use of renewable energy and the minimisation of noise pollution;
- Improvement in the quality of life for logistics centre workers, for example by having pleasant, safe and environmentally friendly surroundings and satisfactory working conditions, such as the installation of restrooms for the disabled, an aspect that is not frequently taken into account for projects of this size in Chile;
- Improvement of the working conditions for drivers.

MEXICO CITY METROPOLITAN AREA, MEXICO

The main public policy measures used in the **Mexico City Metropolitan Area** are related to restrictions for freight transport vehicles on certain roads or areas and programs for controlling emissions of pollutant and greenhouse effect gases for all type of vehicles (including freight vehicles). The following measures were identified:

- *Zero Emissions Corridor in the Central Axis,* restricting freight transport vehicles from circulating there;
- *Freight Transport Regulation Programme for Perimeter "A" of the Historic Centre of Mexico City*, restricting the movement of commercial vehicles greater than 3.5 tons, between 7:00 to 22:00 hours;
- *Vehicle Verification Program* for controlling emissions by requiring vehicle inspections every six months;
- *Restriction* on the circulation of freight transport vehicles *on Federal District Freeways*;
- *Restriction* on the circulation of freight transport vehicles *on Insurgentes Sur Ave*. in the Federal District;
- *Time restrictions* for inter-urban freight vehicles to circulate on certain roads that connect with Federal District exits towards tollways;
- *Restrictions* on loading and unloading operations *on roads where Metrobus lines operate*.

The business sector has also introduced several measures to make their logistics more efficient, from the development of innovative alternatives for order processing to technology innovation in vehicles.

CASE STUDY: ZERO EMISSIONS CORRIDOR IN THE CENTRAL AXIS

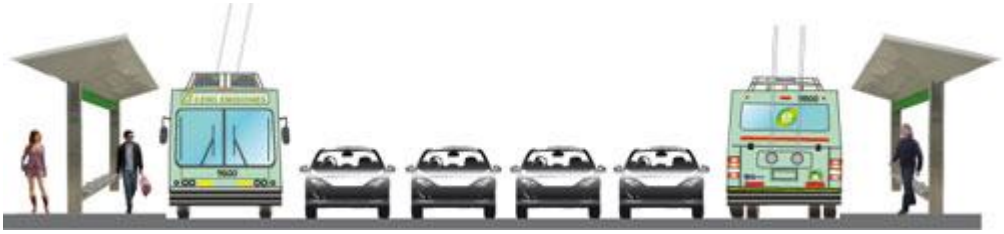
Brief description:

Restriction for freight transport vehicles and micro-buses to circulate on the Central Axis.

How it works:

The "Lázaro Cárdenas" Central Axis was frequently used by urban freight transport vehicles. On certain times of the day, more than 70% of the road was occupied by freight transport vehicles. This Central Axis used to operate as part of the South-North Road Axis 1, from North to South (see green line on following figure):

In order to tackle the pollution problems in the city, the Government of the Federal District decided to turn the "Lázaro Cárdenas" Central Axis into a one-way avenue from South to North, with 6 lanes, into a "Zero Emissions" Corridor.



BELO HORIZONTE, BRAZIL

In **Belo Horizonte,** emphasis has been placed on the reduction of the negative impacts of freight transportation, without ignoring its importance in the dynamics of the city and the stakeholders involved. Eight different types of measures were identified**:**

- *Loading and unloading parking places* for freight vehicles;
- *Requirement* of loading and unloading parking spaces and docks for *companies with large traffic movements (large traffic generators)*;
- *Time and access restrictions* for loading/unloading operations in central areas according to the size of the vehicle;
- *Time regulations* for vehicle movement on specific roads;
- *Goods Distribution Centres*, such as CEASA-Minas Metropolitan Food Supply Centre and the Postal Distribution Centre for mails and packages;
- Deliveries made with *alternative type of vehicles*, such as horse drawn vehicles and bicycles;

Figure 9 – Photos from alternative transport modes in Belo Horizonte

- *Internet/telephone sale and delivery* of organic food products *through planned routes;*
- *Consultation* between the government, carriers, traders and other stakeholders in order to develop urban logistics policies.

CASE STUDY: REQUIREMENTS OF LOADING AND UNLOADING SPACES AND DOCKS INSIDE COMPANIES WITH LARGE TRAFFIC MOVEMENTS

Brief description:

Large traffic generators must create areas, places and docks on their landsite for loading and unloading operations. These companies must have an area to manoeuvre and access the docks.

How it works:

The Municipality defines large traffic generators as a company or group of companies using non-residential land with an area of over 6,000 m^2. These companies must follow the next steps:

Step 1: Preliminary Licensing or LP – Logistic requirement criteria. It is necessary to acquire an LP with general characteristics of the project, including the construction of loading and unloading places and docks inside the company area or building, from the Environmental Municipal Council (COMAM). The COMAM also requires an Environmental Impact Study and an Environmental Impact Report. If it is a project with traffic impacts it is necessary to acquire also a Traffic Impact Report (RIC), with an assessment, quantification and definition of the scope of the impacts for the road system, measures to mitigate the negative impacts, and where necessary, compensatory measures.

Step 2: Implementation Licensing or LI – Procedures and Impact Reports to authorise construction. The company must show the architectural blueprints for all construction work, regularisation and expansion of enterprises in order for it to be approved by the City Hall. These projects must have the correct scaling, distribution of loading and unloading areas and their manoeuvring and docking areas.

Step 3: Operation Licensing - Compliance with the requirements. The company must demonstrate that the project is built according to the requirements in order to obtain an operating license and start to work.

Main stakeholders involved:

Private and trader entrepreneurs, super and hypermarket companies, shopping mall shop owners, suppliers, carriers, COMAM and its counsellors - who represent the governmental institutional sector.

Impacts:

- More costs (in time and money) for companies with large traffic movements;
- Reduction of loading and unloading operations on the streets and sidewalks;
- Less congestion caused by double parked trucks and less manoeuvring on the road;
- More efficiency: decrease of the time needed to deliver the goods;
- Reduction of polluting emissions and noise pollution;
- More safety on the streets and sidewalks.

MUMBAI, INDIA

In **Mumbai**, upgrading the infrastructural network and development of goods terminals have been the dominant strategies so far, although other alternative strategies have been envisaged in order to alleviate traffic congestion. Examples of the measures used in Mumbai are:

- *Major truck terminals*;
- *Relocation of wholesale markets,* in order to relieve traffic from the congested part of the city;
- *Time and access restrictions* for freight vehicles;
- *Traffic restriction scheme* based on number plates for regulating entry/exit to the Mumbai Metropolitan area;
- *Improvement of the existing public transportation network and fleet,* such as Mumbai's suburban railway system. This is especially important, as public transportation in Mumbai is also used for urban freight distribution;
- *Development* of all north-south & east-west arterial roads and missing links;
- *Development of freeways* around Mumbai and connecting with the hinterland;
- *Mumbai Dabbawalas operation system*.

CASE STUDY: THE MUMBAI DABBAWALAS

Brief description:

A Dabbawala is a person in Mumbai, whose job is to carry and deliver freshly made food packed in lunch boxes from home (between 7:00am to 9:00am) or canteens to the office of these workers during lunch time. Each Dabbawala visits his group of customers (up to 30) in order to collect the tiffin boxes on a fixed route. The public transportation system (suburban railways) is used to deliver these tiffin boxes. In the evening the lunch boxes are moved in the reverse direction. Around 200,000 lunch boxes, resulting in 400,000 transactions, are carried out per day.

How it works:

1) Dabbawala carries the boxes, either walking or by bicycle, from the houses or canteens to the nearest railway stations.

2) At the Mumbai suburban railway station a team of designated Dabbawalas sorts the lunch boxes according to their destinations, through a detailed codification system, and loads these on special compartments of the train. Also during the journey, the Dabbawalas regroup according to the number of Tiffin's to be delivered in a particular area.

3) At the destination railway station, the dabbas are re-sorted again.

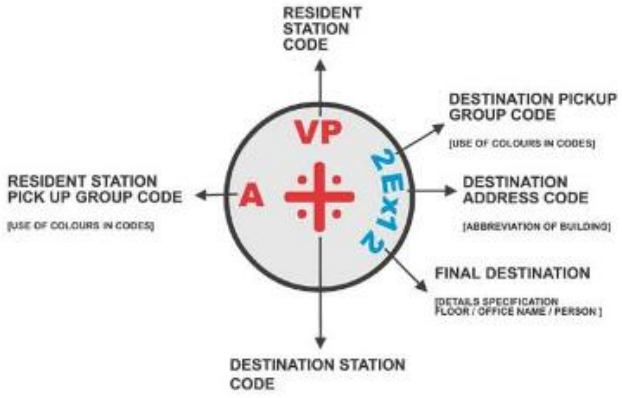
4) The dabbawalas then deliver the dabbas in handcarts from the destination railway station to end customer by lunch time.

Main stakeholders involved:

Working population and their family members, canteens/catering services, employees of the Dabbawala system, railway services, product manufacturers, service providers, retailers, etc.

Other information:

There are around 5,000 Dabbawalas in the system. The Mumbai Dabbawala operation system is an indigenous model, conceived, developed and perfected by a group of individuals in the informal sector who have very little or no formal education in the area of logistics. However, the mistake rate is just 1 in 16 million deliveries, that is 99.99% accuracy. Instead of technological advance solutions, the Dabbawalas use a unique coding system:



Impacts:

- Congestion: reduction of traffic congestion on the roads, due to the use of public transportation. However, also congestion especially near railway stations, due to the needed road space for handcarts;
- Reduction of operational costs, due to the employment of cheap public transportation and non-motorised modes of transport, walking and cycling;
- More efficient and timely delivery system, given the manoeuvrability and ease of parking the handcarts. On the other hand, the system relies heavily on the punctuality of the public transportation;
- Less delivery space required for the handcarts compared to motorised vehicles;
- Positive image for the city;
- More jobs and job security, since the members are never laid off unless they retire or have an accident;
- Many companies use the Mumbai Dabbawala operation system as a marketing tool;
- Less pollution due to the use of environmentally friendly vehicles;
- The road space is preferred by the Dabbawalas to footpaths, which has increased the risk of accidents.

BEIJING, CHINA

With regard to **Beijing**, the main measures identified are:

- Freight vehicles' *access restrictions* to the city centre in Beijing on certain roads and times of the day;
- Strengthening the coordination for the modern logistics industry by means of *system innovation;*
- *Adjusting the land use policy system* to the development plan of modern logistics of the Beijing Municipality;
- *Financial support*: each year, the Beijing Municipal Government grants appropriate funds to support the development of the industry, and gives special assistance to the construction of logistics infrastructure projects and the development of key logistics enterprises;
- The *selection of registered logistics enterprises* to apply for the key logistics enterprises of Beijing Municipality. Support is granted to the key logistics enterprises, to develop about 10 large-sized backbone logistics enterprises with advanced technology and powerful competitiveness by the end of "Eleventh Five" year plan;
- Accelerating the *construction of intermediary organisations* like trade associations;
- Accelerating the *construction of logistics public information platforms* of the Beijing Municipality;
- *Optimising the custom clearance pattern* and promoting international logistics development;
- Encouraging and supporting *logistics research*.

CASE STUDY: BEIJING TOBACCO LOGISTICS CENTRE

Brief description:

Tobacco logistics centres scattered over 18 districts were centralised into one Logistics Centre, to perform uniform storage, centralised sorting and graded distribution of tobacco for the whole city.

How it works:

The Beijing Municipal Tobacco Monopoly Bureau (BMTMB) had warehouses in 18 districts for their own distribution in order to ensure the timely distribution of tobacco products. These decentralised distribution centres caused very high warehouse, investment and labour costs. Also, the work was not performed efficiently, causing an increase in urban traffic. Therefore, in July 2004, the BMTMB decided to merge the original 18 warehouses into one uniform logistics centre for the city.

The BMTMB also established a logistics distribution and dispatch system integrating GIS, GPS and GPRS in order to optimise the routes. The process is as follows:

- the Call Centre of BMTMB confirms the actual orders each day;
- the system optimises, in 5 minutes, the distribution routes according to actual orders and reasonably distributes all the vehicles and routes by applying the 3G system (GIS, GPS and GSM/GPRS); and
- the goods are then loaded at the logistics centre and transported according to the information calculated by system.

Tobacco logistics distribution 3G system is a technology application system making use of GIS, GPS and GSM/GPRS technology, for retailers labelling, route planning, distribution optimisation and in-transit monitoring.

Main stakeholders involved:

The Beijing Municipal Tobacco Monopoly Bureau, cigarette factories, tobacco retailers, the employees of the warehouses and distribution centres in 18 districts.

Other information:

At present, the Beijing Tobacco Logistics Centre is responsible for the storage, sorting and distribution of 38 billion cigarettes for almost 36 thousand retailers in 18 districts and counties of the city. Within the Beijing city area, goods can be delivered to customers from the Logistics Centre directly, while in the suburbs, goods can be delivered from Logistics Centre to districts and counties first and then to customers by car. In 2008, the Beijing Tobacco Logistics Centre was praised as the first "National Logistics Demonstration Base" of China.

Impacts:

- Decrease of costs: warehouse rent decreased by 7 million Yuan per year, distribution costs by 12.25 million Yuan per year, labour costs by 6.3 million Yuan per year and operational costs (due to reduction of vehicles) by 34,626 million Yuan;
- Average inventory decreased from 43,300 boxes to 35,300 boxes, reducing around 100 million Yuan of occupied capital;
- Less storage space and land resources needed: the storage area was reduced to 2,800 m^2, which saved the floor area by 90% and the store quantity per unit area of the storehouse increased by 9 times;
- Delivery efficiency increased;
- Less distribution vehicles needed, through the consolidation of goods: from 111 to 82;
- Less time needed of arranging vehicles;
- Less loading and distribution errors;
- Less congestion;
- More accurate distribution time;
- Less jobs: decrease of the number of needed logistics personnel (from 810 to 600);
- More focus on marketing and customer service;
- A 99.8% customer satisfaction reached;
- Inventory turnover improved significantly and inventory turnover days decreased from 25 to 18;
- Less environmental pollution.

NEW YORK CITY, USA

In **New York**, the New York City Department of Transportation (NYCDOT) is continually trying to address the issues of congestion and curb space availability. The programmes include *parking pricing policies* aimed at improving the availability of parking in retail corridors located in residential area as well as in commercial areas, such as the PARK Smart programme which increases parking rates for on-street metered parking during peak hours. Other measures identified are the introduction of *dedicated delivery windows* and the encouragement of *off-peak hour freight deliveries*. With all the programmes, the NYCDOT made sure to work with the different stakeholders to develop the policies.

TOKYO, JAPAN

In **Tokyo**, different types of measures were identified, such as:

- Authorisation system for *streamlining comprehensive local logistics*: the stakeholders of local logistics cooperate and prepare a plan with their improvement ideas. If the Tokyo Metropolitan Government approves their plans, subsidies are granted and priority is given to use of loading/unloading spaces. To be approved, a positive traffic impact, such as reduction in freight traffic, elimination of on-street parking or improvement of traffic safety, must be realised through the project;
- *Mandatory placing of parking lot* for loading/unloading operation for buildings of a certain size;
- *Joint delivery projects*;
- *Environmental improvement measures*, such as measures to reduce the PM emissions. Examples of these measures are:
    - the "Say No to Diesel Vehicles" scheme in the promotion of low sulphur diesel fuel;
    - subsidisation programmes for the installation of the PM reduction devices; and
    - banning diesel vehicles older than 7 years which were unable to satisfy the PM standards (even after installation of PM reduction device).

  Low emission vehicles are also promoted and Automobile G-Men were introduced, this is a team of Tokyo Metropolitan Automotive Pollution Inspectors.

SHINJUKU JOINT DELIVERY SYSTEM (TOKYO, JAPAN)

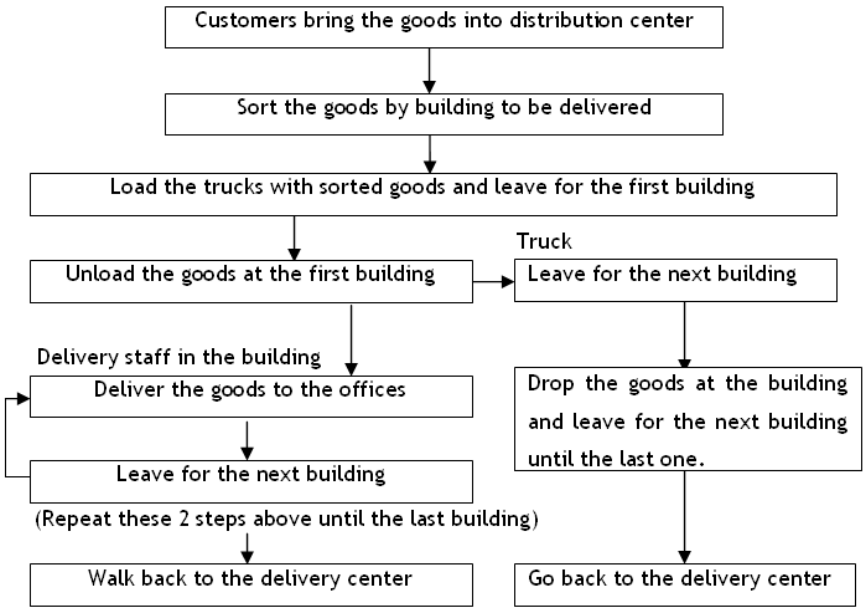
Brief description:

The Shinjuku joint delivery system is characterised by the unique form of delivery that combines truck deliveries to buildings and delivery by hand to each office in the building.

How it works:

Distribution to department stores in the Shinjuku Area was carried out by different carriers, causing inefficient deliveries (for example delivering just one package) and traffic congestion, especially near the carry-in entrance of department stores. In order to address this issue, the carrier association called "Shinjuku Land Transport Business Association" developed a joint delivery system called the Shinjuku Mantenro Staff. The Shinjuku Mantenro Staff has a distribution centre of 330 m^2 about 10 minutes away from the buildings to be delivered to and it owns four 2 tonne trucks (all CNG powered), one 4 tonne truck and a light vehicle.

The different carriers and retailers bring the goods in the morning (around 8am). The goods are then unloaded, while information is collected with a scanner. The unloaded goods are sorted according to the area to be delivered to. After a final check, the goods are loaded onto a truck. The trucks leave at around 9:30am. After arriving at the unloading area of the first building, the goods are unloaded, empty box pallets are retrieved and the truck leaves immediately to the next building. However, the delivery staff stays behind to deliver the goods to the different offices in the building. After finishing this, the delivery staff walks to the next building, where the truck has already dropped the goods. This process repeats itself, until the goods for the last building have been delivered. The following figure shows how the process works:



6.1.2. CROSS-COMPARISON OF THE MEASURES USED IN THE SELECTED CITIES

In most cases, the measures introduced are singular solutions for specific problems, without defining these measures as an integral part of a larger long-term strategy for urban transport policy. A policy package is described as two or more types of measures, *consciously aggregated* to reach a specific *(long-term) objective*. Thus, it is not only a set of different single measures solving individual short-term problems. Of the selected cities, only Paris and Utrecht meet these criteria.

The examples of Paris and Utrecht highlight the benefits of creating a policy package to achieve a higher policy goal. The urban freight policies in these cities, exemplify a win-win situation, where the Municipality acts as a facilitator and the business sector takes up the role of the investor and operator. These cities have mixed the more traditional approaches aimed at restricting freight movements, such as delivery time windows, vehicle restrictions and environmental zones, with more voluntary initiatives for innovative solutions taken up by local businesses. The combination of a policy-mix, restrictive and incentive-based measures, requires less public financial commitment and achieves a greater acceptance by the stakeholders involved. Therefore the implementation of a comprehensive long-term urban freight policy is more like to succeed.

Table 3 - Mix of measures

Country	City	Mix of measures
France	Paris	Conscious policy package
The Netherlands	Utrecht	Conscious policy package
Brazil	Belo Horizonte	Mix of single measures
Chile	Santiago de Chile	Mix of single measures
Mexico	Mexico City Metropolitan Area	Mix of single measures
United States	New York	Mix of single measures
Japan	Tokyo	Mix of single measures
China	Beijing	Mix of single measures
India	Mumbai	Mix of single measures

Regarding the types of measures, it worth noticing that the emerging economies, such as China, India, Mexico, Chile and Brazil, seem to be at an early stage of development with regard to urban logistics practices, compared to more developed countries, such as France, the Netherlands and Japan. The more developed countries show a broader range of measures, varying from restrictions to incentives and often

including market-oriented initiatives by companies. In contrast, other cities in Latin America, India and China seem to focus more on restrictions and/or measures influencing freight transportation in general.

6.2. DATA COLLECTION

Data collection is crucial for the decision making process and definition of public policies, as it provides a realistic assessment of the freight impacts in the cities, and enables the development of an efficient transports system.

The freight data collection usually takes place on a national basis, generally by the National Bureau of Statistics. However, these freight data are mainly on a national level and not on an urban or regional level. The urban freight data that is collected is mainly for studies solving a specific problem at a certain time. There is little continuous collection of urban freight data in the selected cities.

From a worldwide perspective, the countries covered by the state of the art report covering urban logistic interventions and data collection techniques have shown two different stages of development in what urban freight transport and related logistics measures are concerned. African countries are still under development and with the exception of South Africa, the rest of the countries have a weak economy and there isn't much information about policies or specific measures applied. Most of the remaining countries analysed have collected data on traffic of goods at a national and regional level, but very little has been done about the urban freight. Exceptions are Paris, Utrecht and Tokyo, where urban freight surveys take place in these cities every 5 to 15 years.

6.2.1. METHODOLOGIES AND APPROACHES IN FREIGHT DATA COLLECTION

The information provided by freight data experts in previous European projects has indicated the breadth of different techniques that are currently being used to collect urban freight data. These techniques include:

- Interviews with freight transport company manager;
- Interviews with receivers;
- Interviews with shippers;
- Roadside interviews with drivers;
- Group discussions (including discussions with drivers, representatives from a single supply chain, representatives from different supply chains);
- Questionnaires sent to freight transport company managers/drivers;

- Questionnaires sent to receivers;
- Questionnaires sent to shippers;
- Accompanied trips with goods vehicle drivers;
- Parking and loading activity surveys (i.e. observation surveys);
- Parking and loading infrastructure/inventory surveys;
- Traffic counts (manual and automatic);
- Data collection using new technology including:
    - Use of satellite tracking data containing goods vehicle activity;
    - Use of roadside camera data (including automated number plate recognition (ANPR) data);
    - Use of weigh-in-motion (WIM) technology to measure axle weight of a moving vehicle;

6.2.2. URBAN FREIGHT TRANSPORT INDICATORS

There are few indicators that are currently in use by national, regional or local governments in the surveyed countries to monitor the performance of urban freight transport. The most commonly used indicators are related to road freight and include: goods vehicle trips, and goods vehicle kilometres (usually based on traffic count data).

Other national freight transport indicators used by governments in one or more European countries include:

- Freight intensity (of heavy goods vehicles - tonne-kilometres / GDP);
- Lorry traffic intensity (of heavy goods vehicles - vehicle kilometres / GDP);
- Energy intensity (Fuel consumed per tonne-kilometre);
- Average length of haul;
- Loading factor;
- Empty running.

SECTION TWO OF THE HANDBOOK – EVALUATE YOUR CITY

The main objective of section two is to draw guidelines that aim to show how a city can evaluate their current stage of development in what urban logistic is concerned and how to select and transfer a good practice successfully adopted elsewhere (chapter 8).

However, to be able to evaluate a city and choose the most suited solutions and policies, there is the need to apply the business model framework and the logistic profile classification defined in TURBLOG_ww and that is why the business model framework and the logistic profile classification need to be explained in this section (chapter 7).

Finally, some guidance on managing urban logistics is presented in chapter 9.

7. WHICH ARE THE BEST TARGETED POLICIES TOWARDS URBAN LOGISTICS?

7.1. DEFINITION OF BUSINESS MODEL

The study of urban freight complex and heterogeneous, involving an interdisciplinary engagement as a consequence of the difficulty to identify the common features between the requirements of different users and vehicle operators. Furthermore, urban freight is strongly interrelated with many other aspects of the urban system: urban passenger system, land use, regional development, socio-economic environment, employment, etc. Understanding the relationships between the agents of the logistics activities and the major elements that influence the urban logistics is very important to know the functioning of the urban system and define the most feasible "logistic business".

For the characterisation and comparison of business models, the methodology developed in TURBLOG_WW uses the Osterwalder's (2004) business model as a starting point.

For whom is the organisation creating value?

The **customer segments** are defined by the people or groups of people that the organisation[2] aims to reach with their product/service. To better satisfy the customers, an organisation can group them

[2] For the description of the framework, whenever we would like to mention the producer/supplier of the urban logistic chain, we will mention the "organisation".

according to similar needs and behaviours. In TURBLOG_WW, the customer segment types are: **mass market**, **segmented** and **multi side market.**

What value does the organisation deliver to the customer?

The **value proposition** corresponds to the product or service that the organisation has to create for the customer. This is a rather important element because it has to solve a problem and/or satisfy a need. According to TURBLOG_ww, the elements that can contribute to the value creation are: **performance/efficiency, customization, reliability, price, cost reduction** and **accessibility.**

How does the organisation reach the customer?

The **channels** can be defined as the ways the organisation uses to get in touch with the customer. The channels are a valuable communication tool to raise awareness about the product/service, to enable the customer to buy the product/service, etc. In TURBLOG_ww, three types of channels are considered: the **direct channels** (e.g. sales force), the **indirect channels** (e.g. wholesaler) and the **informal channels**.

What type of relationship is established between the organisation and the customer?

Besides the channels, the other building block that makes the "bridge" between the value proposition and the customer is designated by **customer relationship** and describes the type of relationships that exist. In TURBLOG_ww three types of relationships are considered: **personal assistance, self-service/automated services** and **collaborative**.

What value are the customers paying?

The **revenue streams** describe how an organisation makes money. The TURBLOG_ww refers three ways of generating revenues streams, namely: **asset sale, service and advertising.**

What does the organisation need to create value?

The key resources are the "inputs" that are needed in a business model to make it work. The key resources can be physical, financial, human and "know how".

What are the key activities that must be taken?

There are **key activities**/actions that should be performed so that the organisation operates successfully. The difference between key resources and key activities is that the resources are often needed to perform the activities. In urban logistics we consider three types of activities: production, distribution and supporting activities.

Who are the "organisation" partners?

The "organisation" is often made up of a cooperative network of suppliers/producers/wholesalers/city authorities and so on that create alliances according to each partner's needs/wishes, to optimize their business model, reduce the risk or acquire resources. The type of partnerships can be: strategic alliances

between non competitors, partnerships between competitors, joint ventures to develop new businesses or buyer-supplier relationships.

What are the costs associated to the business model?

The cost structure represents all the costs incurred by the organisation to run the business model, namely with the key partnerships, key resources and key activities. In TURBLOG_ww, the costs are classified as fixed costs, variable costs, and sunk costs.

Internalisation of externalities

Several of the logistics improvement measures that needed to be made were investments in non-pollutant vehicles and noise reduction equipment that represent an increase on their transport costs but don't increase their profit. Those investments were made due to environmental regulations and/or circulation restrictions of the city policies. Urban Policies are therefore a major player in the urban logistics business. Hence, another block was added to the business model named **Internalisation of externalities**. These externalities represent not only a cost, but also a value proposition for these businesses once they win a competitive advantage for "being environmentally friendly".

The **Cargohopper** is a delivery solution that is allowed to enter into the environmental zone at any time in the City of Utrecht, and the Chronopost Concorde and La Petite Reine have the possibility to rent Urban Logistic Spaces at low prices because they use green vehicles. These environmental investments are also used as publicity and as a communication channel with customers, and represent revenues to society in general once they contribute to the overall environment.



The figure below represents the framework used to characterise a business model according to the building blocks described above.

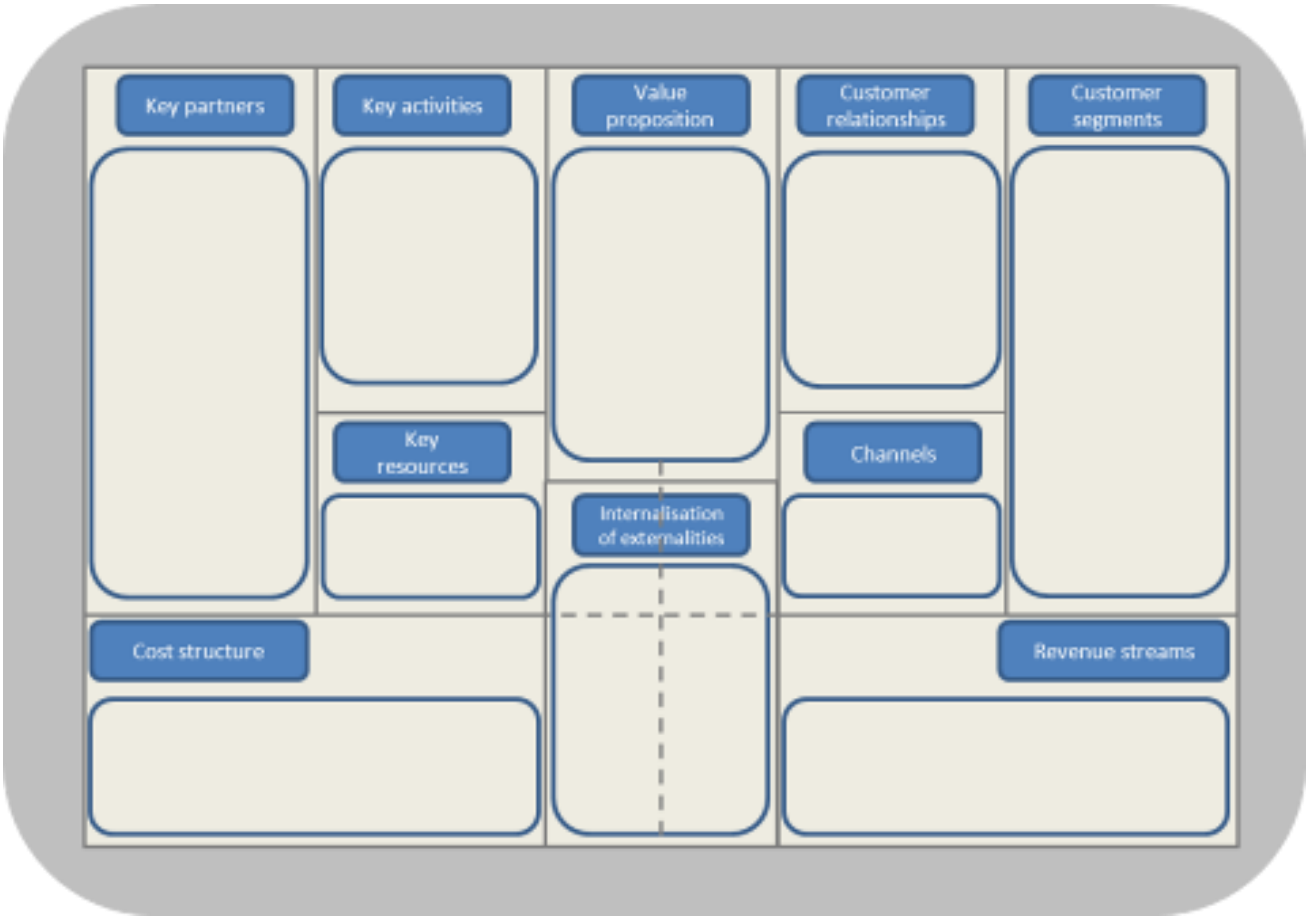


Figure 10 - Urban Logistics Business Model

Source: TIS.PT, 2011

7.1.1. DEFINITION OF LOGISTIC PROFILE

The concept of logistic profile is based on the hypothesis that, within a city, it is possible to identify areas with homogenous groups in terms of logistic needs, based on three key variables: the urban characteristics of the area, the requirements of the logistic agents, and the characteristics of the products they transact / type of delivery (Macário, 2007). For the definition of logistic profiles it is necessary to identify the characteristics that will define the city area features, the products' characteristics and the deliveries profile in the first phase. For the characterisation of the city area is important to identify the features that can represent a possible constraint, but also give a picture of the actual state of the art in terms of logistic conditions, such as commercial density and homogeneity,

logistic accessibility, or if there are any restrictions applied. The product characteristics are the ones that can determine the type of vehicle to be used or if there are any restrictions, such as easiness of handling and special conditions. Finally the agents' needs or delivery profiles (for example, frequency and urgency of deliveries) have to be analysed as well.

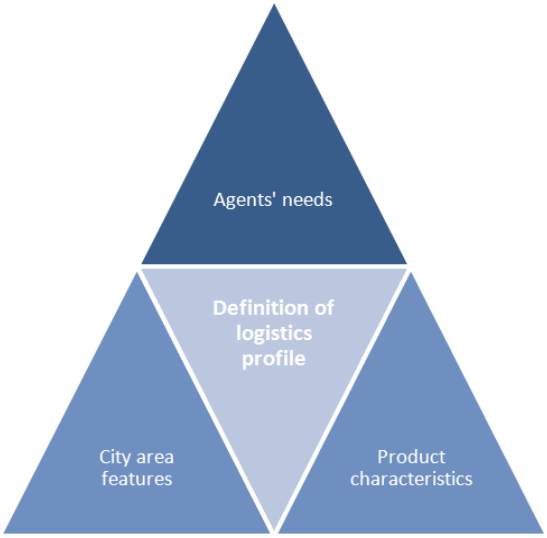


Figure 11 – Definition of logistics profile

Source: Macário et al (2007)

For the definition of logistic profiles it is necessary to identify the characteristics that will define the city area features, the products' characteristics and the deliveries profile in the first phase. For the characterisation of the city area it is necessary to identify the features that can represent any possible constraints, but also give a picture of the actual state of the art in terms of logistic conditions, such as commercial density and homogeneity, logistic accessibility, or if there are any restrictions applied. The product characteristics are the ones that can determine the type of vehicle to be used or if there are any restrictions, such as easiness of handling and special conditions; and finally the agents' needs or delivery profiles (for example ,frequency and urgency of deliveries). For each of these features the following classification scale was set:

CITY AREA FEATURES

Features	Classification		
1.1. Commercial density	**Low** <30% Commercial face to residencies/services/industry	**Medium** 30% to 70% Commercial face to residencies/services/industry	**High** >70% Commercial face to residencies/services/industry
1.2. Homogeneity	**Low** Several types of services and products	**Medium** Mix of residential areas with offices and commercial stores	**High** Cluster of one type of service or similar products
1.3. Logistic acessibility	**Bad**	**Reasonable**	**Good**
1.3.1. Measures considering logistic needs	Bad level of access between the shop and the parking (e.g. no loading bays)	Some specific measures considering logistic needs (e.g. loading bays non exclusive)	Transport network suited for the logistic needs (e.g. exclusive loading bays)
1.3.2. Level of Congestion	High level of traffic congestion (Commercial speed < 3km/h)	Reasonable (High on peak hours)	Low (Fluid traffic - commercial speed >12km/h)
1.4. Restriction applied	**Yes** Off-peak hours, week days, ...	**No**	

PRODUCT CHARACTERISTICS

Characteristics	Classification		
2.1. Easiness of handling	**Difficult**	**Reasonable**	**Easy**
2.1.1. Size	Large (wheelbarrow, crane)	Medium (> 1 person to carry one unit)	Small (>1 unit per person to carry)
2.1.2. Weight	Heavy (wheelbarrow, crane)	Medium (> 1 person to carry one unit)	Light (>1 unit per person to carry)
2.1.3. Holding conditions	Difficult	Reasonable	Easy
2.2. Special conditions	**Special needs** e.g. valuable products, frozen products, etc..	**Might have special needs** e.g. open packages, if food handled ambient temperature, chilled, etc...	**No special needs**
2.2.1. Fragility	Fragile	Might have special needs	No special needs
2.2.2. Perishability	Perishable	Not perishable	

AGENTS PROFILE/DELIVERIES PROFILE

Characteristics	Classification		
3.1. Urgency of deliveries	**Irrelevant**	**Relevant**	**Urgent**
3.2. Frequency of deliveries	**Low** < once a week	**Medium** Several days per week	**High** Daily
3.3. Amounts to be delivered	**Few**	**Several**	**Many**
3.3.1. Number of shops	One shop	Several shops	Retail center/big shops
3.3.2. Vehicles weight and size	Light goods vehicle or smaller vehicles	Van /small truck	Heavy goods vehicles
3.4. Planned deliveries	**No defined routine**	**Defined routine** e.g. after hours deliveries, 8-10 a.m., ...	

7.1.2. CLASSIFICATION OF LOGISTIC PROFILES

For the characterisation of the logistic profiles, there were some features that were considered determinant to its classification. Most of these features are related with the city area characteristics such as commercial density and homogeneity, logistic accessibility and restrictions applied to the circulation of goods vehicles. However, there is one profile that differs from the others, due to the particularities of perishable products such as grocery articles (greens, fruits and other foodstuffs). These products are commonly related to grocery stores, markets, cafeterias, restaurants and hotels.

The description of the five logistic profiles is presented below.

Profile A: Cluster of shops specialised in one specific type of service/product

Profile A	
City Area Features	
Commercial density	**High**
Homogeneity	**High**
Logistic acessibility Measures considering logistic needs Level of Congestion	**Reasonable/Bad** Some measures considering logistic needs High/Reasonable
Restriction applied	Yes/no
Product Characteristics	
Easiness of handling	**Easy/Reasonable/Difficult**
Special conditions	**No special needs/special needs**
Agent Profile/Deliveries Profile	
Urgency of deliveries	**Irrelevant/Relevant/Urgent**
Frequency of deliveries	**Medium/High**
Amounts to be delivered	**Many**
Planned deliveries	No defined routine/Defined routine

Gamarra, being the largest garment factory in Peru, fits into this profile, as illustrated in the figures below.

Source: Presentation "Business Model Caso Gamarra Perú", Victor Plaza

Profile B: Hotels, restaurants, small grocery stores, small neighbourhood markets

Profile B	
City Area Features	
Commercial density	Low/Medium/High
Homogeneity	Low/Medium/High
Logistic acessibility	Bad/Reasonable/Good
Restriction applied	Yes/No
Product Characteristics	
Easiness of handling	Easy/Reasonable/Difficult
Special conditions	**Special needs**
Fragility	**Fragile**
Perishability	**Perishable**
Agent Profile/Deliveries Profile	
Urgency of deliveries	**Urgent**
Frequency of deliveries	**High**
Amounts to be delivered	**Several**
Planned deliveries	**Defined routine**

Organic Product Company in Belo Horizonte, Brazil delivers organic products, mostly greens directly from the producer to the final consumer. Some aspects of the products involved in this practice are the ones that fit into profile B:

- High fragility;
- Extremely perishable (the products last approximately 4 to 10 days); Difficulty of handling;

Source: www.fito.com.br

Profile C: Business centre

Profile C	
City Area Features	
Commercial density	**High**
Homogeneity	**Low**
Logistic acessibility	**Reasonable/Bad**
Restriction applied	**Yes**
Product Characteristics	
Easiness of handling	**Easy**
Special conditions	**No special needs**
Agent Profile/Deliveries Profile	
Urgency of deliveries	**Relevant/Urgent**
Frequency of deliveries	**High**
Amounts to be delivered	**Few/Several**
Planned deliveries	No defined routine/Defined routine

The examples that better illustrate this profile are the CBD of highly populated cities such as New York or Singapore.

Source: http://en.wikipedia.org/wiki/Central_business_district

Profile D: Large commercial stores

Profile D	
City Area Features	
Commercial density	High
Homogeneity	Low
Logistic acessibility	Good
Restriction applied	No
Product Characteristics	
Easiness of handling	Easy/reasonable/Difficult
Special conditions	Might have special needs
Agent Profile/Deliveries Profile	
Urgency of deliveries	Relevant
Frequency of deliveries	Medium/High
Amounts to be delivered	Many
Planned deliveries	Defined routine

One common example in metropolitan areas are technological clusters or logistic parks, which are composed mainly of warehouses and/or offices and various support facilities such as hotels, conference centres, health clubs, food courts, etc…

Source: http://www.lagoaspark.pt/

Profile E: Residential areas with local trade

Profile E	
City Area Features	
Commercial density	Low/Medium
Homogeneity	Low/Medium
Logistic acessibility	Reasonable/Bad
Restriction applied	Yes
Product Characteristics	
Easiness of handling	Easy/reasonable/Difficult
Special conditions	Might have special needs
Agent Profile/Deliveries Profile	
Urgency of deliveries	Irrelevant/Relevant/Urgent
Frequency of deliveries	Low/Medium
Amounts to be delivered	Few/Several/Many
Planned deliveries	No defined routine/Defined routine

Alvalade, a neighbourhood located in Lisbon, Portugal is an example of Profile E - residential area with commercial establishments on the ground floor.

Source: http://infohabitar.blogspot.com/2007/03/sobre-o-bairro-de-alvalade-de- faria-da.html

7.1.3. ADJUSTING BUSINESS MODELS TO LOGISTIC PROFILES

At the end of TURBLOGs methodology, and based on several case studies, the logistic profiles were crossed referenced with the business models, in order to find the most suitable business model for each type of logistic profile.

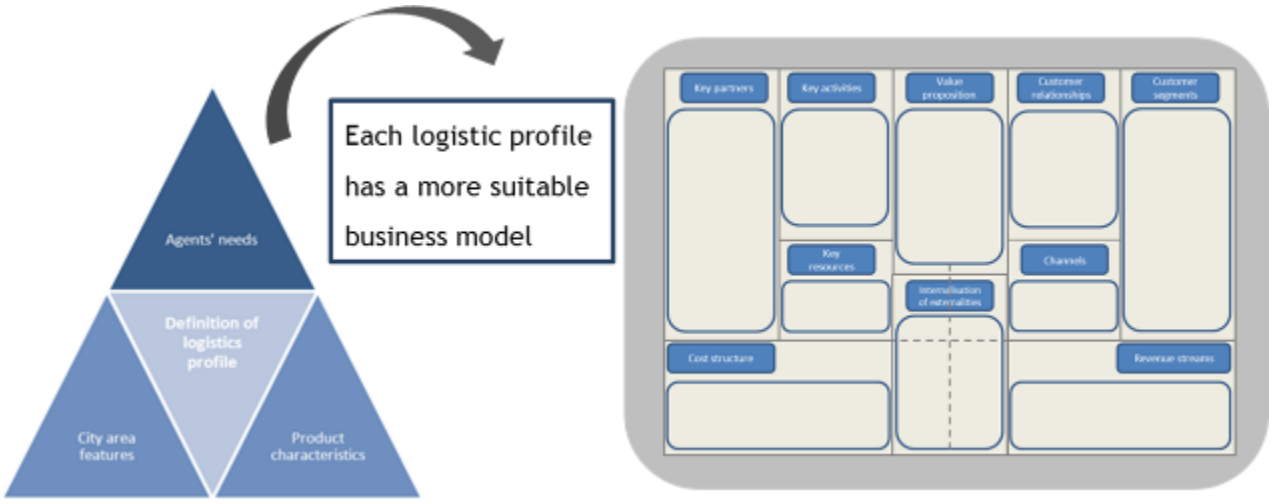


Figure 12 – Relation between business models and logistic profiles

A classification was made to evaluate the suitability of each type of business model considering the identified logistic profiles, which were grouped into three different types of urban logistics solutions:

- Optimisation/Intermodal distribution
- Logistic Parks/Centres
- Last mile solutions/Micrologistics Centre

Throughout the analysis of several urban logistic solutions studied in TURBLOG_ww project, it was possible to observe that the major outputs that came from this comparison is that last mile solutions are generally a concern of densely built areas, namely residential areas, offices and commercial activities (Profiles C and E). The innovative approaches considering Profile B also consider last mile solutions, but in these cases logistic measures incorporate the entire logistic chain, from the producer to the final consumer. Due to the large amounts of products that are subjected to the type of businesses considered in Profile D, warehousing and supporting activities are major concerns and therefore, optimisation solutions such as logistic centres with several supporting facilities and good accessibilities, including intermodal distribution, as the Monoprix rail project in Paris are considered.

Example (Profile B)

A Dabbawala is a person in Mumbai, whose job is to carry and deliver freshly made food packed in lunch boxes from home (between 7:00am to 9:00am) or canteens to the office of these workers during lunch time. Each Dabbawala visits his group of customers (up to 30) in order to collect the tiffin boxes on a fixed route. The public transportation system (suburban railways) is used to deliver these tiffin boxes. In the evening the lunch boxes are moved in the reverse direction. Around 200,000 lunch boxes, resulting in 400,000 transactions, are carried out per day.

Main benefits of this solution:

- Reduction of traffic congestion on the roads, due to the use of public transportation. However, also congestion especially near railway stations, due to the needed road space for handcarts;
- Reduction of operational costs, due to the employment of cheap public transportation and non-motorised modes of transport, walking and cycling;
- More efficient and timely delivery system, given the manoeuvrability and ease of parking the handcarts.
- Less delivery space required for the handcarts compared to motorised vehicles;
- Positive image for the city;
- More jobs and job security, since the members are never laid off unless they retire or have an accident;
- Many companies use the Mumbai Dabbawala operation system as a marketing tool;
- Less pollution due to the use of environmentally friendly vehicles;



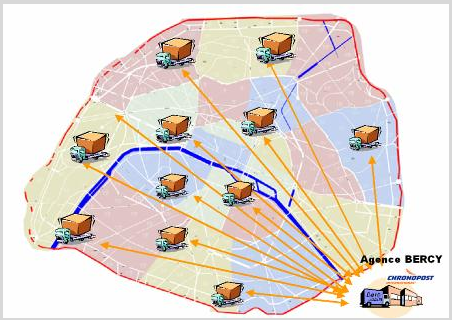

Example (Profile C)

Chronopost Concorde is an innovative organisation of parcel deliveries using electric delivery vehicles for final deliveries. An underground parking lot is used as an Urban Logistics Space (ULS).

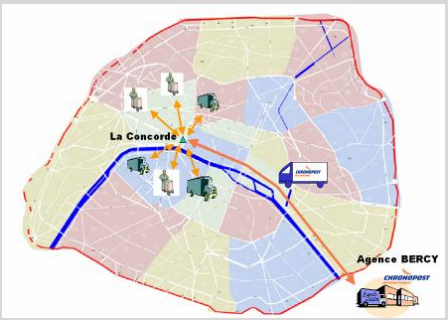
Main benefits of this solution:

- No wasted time in congestion before delivering to the first customers and higher productivity: 70 addresses per route instead of 56, when the route started from a hub outside of the city limits;
- The total distance travelled by traditional vans decreased by 75%;
- Less noise and environmental pollution: CO_2 emissions calculated over a six month period decreased with 16.6 tonnes. Over one year of activity, local emissions of NO_x had decreased from 192 to 48 kg and PM_{10} emissions from 12 to 3 kg;
- Each year 41,000 km by fuel powered vehicles are saved by using electric vehicles;
- The balance between additional costs and savings (compared to the previous situation) is null;
- 19 new jobs within Paris (mainly low qualified jobs) and good working conditions.

Without Concorde ULS



With Concorde ULS



8. HOW TO EVALUATE YOUR CITY AND TRANSFER A GOOD PRACTICE

In order to evaluate an urban area in terms of urban freight policy and solutions, a city should gather a specific amount of information that will enable the understanding of the city context through a "screening" process. This consists in the first four steps of the transferability methodology that TURBLOG_ww have applied to 4 case studies in Latin America and Portugal. The remaining six steps correspond to the transferability process itself. This section describes what you should do and how you should do it, in terms of key issues to be analysed, barriers and enablers and information that should be gathered.

The transferability assessment and evaluation allows verifying the chances for undertaking both quantitative and qualitative analysis, by means of a dedicated step-by-step methodology. Moreover, the transferability process also focus on how a required policy instrument for supporting an urban logistic initiative can fit in the context of a receptor city. TURBLOG_ww project tested and validated the methodology developed in the METEOR project for several urban logistics contexts, with extensive validation by stakeholders. The major assumption of the proposed methodology is that transferability is expressed through the applicability, optimum packaging, and community acceptance of the proposed measures. The application of the proposed framework further requires its operationalisation through the provision of implementation guidelines (transferability algorithm along 10 steps) as presented in Figure 13.

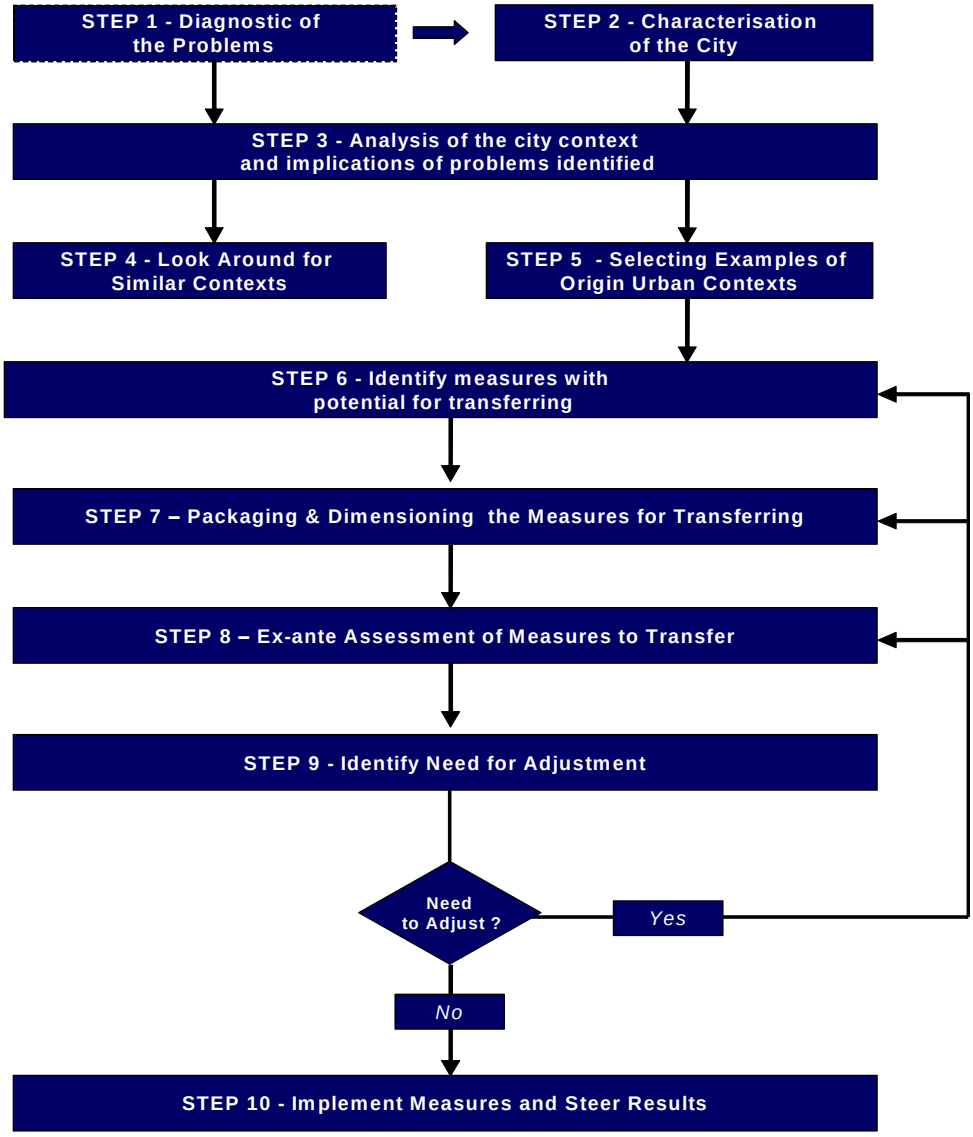


Figure 13 - Methodology of Transferability adopted in TURBLOG_ww (see TURBLOG Deliverable 4 for more information).

8.1. HOW TO EVALUATE THE CITY IN WHAT URBAN LOGISTICS IS CONCERNED

The **steps 1 to 4** consist in the evaluation that should be done to the city, as a starting point.

This chapter describes in what those 4 steps consist, the processes that should be followed and the information that should be gathered and analysed to perform this task.

STEP 1 – Diagnostic of the problems

A receptor city is the city where the replication of actions undertaken elsewhere is intended to take place. The first step is to develop a structured analysis of the own situation and assess the need to take actions, which is normally identified through the deviation from objectives. At that stage, it will then be ready to engage in a source/target city analysis in view of transferring and adapting practices adopted elsewhere. To do this requires a number of preconditions framing the approach, such as having a clearly defined number of guiding objectives, without which the ability to undertake an effective improvement process will be lost. Hence, should a city have a clear definition of its strategic orientations, it will be possible to frame and identify specific key areas contributing to or against attaining those objectives.

Information that a city should provide to perform this task:

- Information on the **major urban problems** and obstacles that city X has faced, and/or is currently facing, which have impacts on the freight system, for example: congestion, shortcomings of the (existing) transport systems and processes.
- Information on the **major freight problems** and obstacles that city X has faced and/or is currently facing, for example: shortcomings of the (existing) freight systems and processes.
- A box indicating the relevance of the problem facing the impact in the freight efficiency. For example:

Urban problems	**Relevance (+ low, ++ medium, +++ large)**
Congestion	+++
Road network insufficient	+
Etc.	
Freight problems	**Relevance (+ low, ++ medium, +++ large)**
Lack of distribution centres	+
Trucks in history centre city	++
Etc.	

- Information on the expected future urban and freight problems of city X. Some of the expected transport problems might be due to many factors, such as a rising level of population and/or

mobility (cars and trucks) expected, specific plans for the future. Please describe any of the factors which are expected to impact city X.

Step 2 – Characterisation of the city

A detailed identification of the characteristics of the city environment and urban structure is required in the transferability process, at for example, the geographic, structural, demographic, architectural, cultural levels. This should allow a first screening of the setting in which the city operates, helping to frame the range of problems within specific urban contexts. It will be important later to check whether candidate measures that were successful elsewhere in mitigating similar problems did share similar contexts.

As no single measure can be said to be uniquely related to a specific type of city context, reasonable latitude for discussion should be permitted. Given the overall objective to transfer conclusions from the demonstration cities to other European cities, the variables chosen to make this characterisation are expected to fit within a set of common parameters. One must focus on this point in order to identify and discuss those variables. Two major variables can be identified as a first step: Physical variables and Institutional variables.

Background literature review allows identification of some further preliminary conditions to pre-ensure comparability and subsequent transferability, namely the identification of demographic, geographic and transport system-related factors. This means the definition of the physical and socio-economic context of an urban area such as population density, area of city, number of households, number of cars, length of major road network, average income, and influence over surrounding areas.

Information that a city should provide to perform this task:

- Summary information about the *country profile:* Where is the country located? What is the total population of your country? What is the GDP per capita?
- Information about *city X profile*: *Where is City X located in the country? What is the total population of City X? What is the GDP per capita in the City X?*
- Information about urban transport and logistics conditions:
  - logistic accessibility (describe the accessibility, e.g. levels of congestion of the area, existence of delivery bays, etc);
  - restrictions of hourly and weekly periods of delivery (identify the existence of restrictions to freight vehicles or load/unload operations);

- urban sprawl: Is the city densely populated in the city centre or is there a sprawl towards the outskirts of the city? In other words, is there suburbanization?
- road users: In the urban roads of City X, what types of users are there (e.g. cyclists, pedestrians, cars, trucks etc.)? If possible also indicate the number of vehicles (cars, delivery vans, trucks, taxi's, etc.) driving in city X.
- transport infrastructure: for which modes of transport is there transport infrastructure available in the City X (e.g. road, railway, inland waterway, maritime, etc.)? Is this infrastructure in good conditions? Please also indicate the modal split of the freight transport in City X.

- Is there any *other relevant information* that can give a good indication of the city's profile? For example, how technologically advance is city X? Or is there any specific information about the city's (business) culture, other than the one indicated in the previous paragraph?

STEP 3 – Analysis of the city context and implications of problems identified

Based on the previous, it will be necessary to set up a city profile based on a set of variables describing the main characteristics of specific context and the results of the diagnostic steps. This will be a key step in the clustering approach, with other ''source contexts'' sharing similar conditions. This will be a preliminary step before looking for compatible situations within the selected cluster, allowing case-by-case city comparisons. At this stage, the city context is clear, based on the characterisation previously done. The obstacles or problems that play a role in challenging achieving the strategic goals set were already identified. By themselves, these two initial steps set the foundations of the transferability process.

Information that a city should provide to perform this task:

- Clarify what are the current issues that must be given more focus and also the major areas of intervention that may help to sort out problems and promote convergence towards HLOs (High Level Objectives). Examples of such areas in the urban context are: significant reduction in transport-related emissions and significant reduction in congestion.
- Make a quantification of the real impact of the obstacles/problems identified in the 1st STEP, as not all problems have similar influence across the range of HLOs. Ranking of major problems as identified above will further help creating a list of priorities, in view of the best possible efficiency of the resources applied in any future mitigating measures. The net result of this part will then be:
  - A detailed characterization of the high level objectives considered;

- Selection and ranking of the related problems identified; and
- Subjects for further discussion about HLOs and problems (current and predicted for the future).

Step 4 – Look around for similar context

The concept of similarity is fundamental comparison of situations, taking ‘‘inter-object similarity’’ as a measure of correspondence or resemblance between contexts. To some extent, the so-called Similar Cases (either in their current condition or sometime back in the past) will have to share the general setting characterising in the Target City. Seeking out similar cases will therefore imply identifying groups with similar characteristics, calling for an existing stock of situations against the situation set previously. It is important here to assess similarity of the context itself, rather than limiting the scope to e.g. geographical or sizing conditions.

It is important to note that we are discussing ‘‘Conditions of Comparability’’, rather than ‘‘clustering the cities’’. These steps requires specific data collection to clarify whether application conditions are met, including the collection of specific elements such as indicators expressing the physical (geographical) structure, elements in relation to transport usage, demographic elements, social and economic background, technological advancement, institutional background of a city. The EC research project SESAME 194 (1999) has adopted a database used to survey a sample of 40 European cities. The data gathered relates to the following domains: ‘‘land-use’’, ‘‘socio-economy’’, ‘‘transport supply’’, ‘‘travel demand’’, ‘‘impact indicators’’, ‘‘local policy’’ and ‘‘cultural indicators’’.

Information that a city should provide to perform this task:

- Classify the city X with elements (or indicators if it exists) expressing the physical (geographical) structure, elements in relation to transport usage, demographic elements, social and economic background, technological advancement, institutional background of the city.

To be compared, please use the domains proposed in the research project SESAME 194:

- land-use;
- socio-economy;
- transport supply;
- travel demand;
- impact indicators;
- local policy; and,
- cultural indicators.

8.2. HOW TO SELECT AND TRANSFER A GOOD PRACTICE TO OUR CITY

The steps 5 to 10 consist in the process of selecting good practices and assessing the potential of transferability to our city. This chapter describes in what those 6 steps consist, the processes that should be followed and the information that should be gathered and analysed to perform this task.

Step 5 – Selecting Examples of Source Urban Contexts

Having selected similar contexts as a starting point for transferability, in this the stage it becomes possible to focus on the practices adopted in those contexts, based on the likelihood that the rationale adopted in sorting out problems is to some extent adaptable. A definition on what is considered as a successful implementation of a measure or a package of measures is required, in order to qualify it as a candidate initiative to be transferred elsewhere. The definition of success will naturally depends on the objectives set. Even when objective elements for decision indicate that feasibility is positive, there is still place to further examine whether the operational environment is favourable to the implementation of a given measure. This requires a number of qualitative analyses, which should include the transportation system, to check the viability of the proposed measure in the given setting. Some of the most important indicators, needed to obtain basic insight in the functioning of urban systems are the ‘‘core indicators’’.

Core indicators are indicators, which can be used to make comparisons between similar programmes or measures. In some cases, they may be aggregated to a higher level. However, the diversity of practices and definitions suggest that different indicators can be categorised as ‘‘core’’ by different user groups depending upon the objectives being pursued.

Information that a city should provide to perform this task:

- A box indicating the selected cities and the reasons of this selection, identifying the similar factors.

Step 6 – Identify Measures with potential for transfer

Even if a measure is proven to be applicable in a given setting (environment), it is not guaranteed that transferability will be successful, unless further operational viability analysis returns positive.

Is the operational viability a sufficient condition for transferability or it is required further evaluation of the measure in terms of its costeffectiveness in the new setting (environment) where it is supposed to be transferred?

Finally, is it sufficient to identify a measure as cost-effective for the new setting (environment) where it is supposed to be transferred, or the community acceptance of the measure should also be considered, before the measure is actually transferred?

The answers to the questions provide the framework for characterizing a candidate measure or package of measures as transferable between similar settings (environments).

Information that a city should provide to perform this task:

- A box with the group cities with similar urban contexts and all measures of each selected city in STEP 5. So, classify all measures with the potential to be transferred, using the aspects: physical, organizational, and functional. Select and identify which have reached success thresholds.

City	Measure	Potential to transfer 0 (not indicated) + (low) ++ (medium) +++ (high)	Reasons

- A box with the built list of the selected candidate measures, including specific remarks on crucial conditions of applicability identified in the peer review, as well as other pertinent comments.

STEP 7 – packaging and dimensioning the measures for transferring

Stemming from the research in TRANSPLUS, strategic issues related to the design of the package of measures will have implications on its effectiveness. Therefore, the analysis of transferability should consider not only individual measures considered as eligible, but also the relationships between measures that may enhance their impact. The effect of combining measures enhancing the individual success of each measure represents one of the major challenges when defining optimum packaging. The suggested procedure is to assess the most promising relationships in order to set up the packages of measures. This should account not only for operational aspects but also for policy and acceptability related issues. For instance, how important would it be for the success of the measure ‘‘Set up of city centre clean zone’’ to have measures such as ‘‘Time based entrance/road pricing policies’’ or ‘‘Adoption of flexible parking policies and environmentally linked parking charges’’?

However, the success of transferring a given measure or package of measures, will also depend on the dimension of the implementation. Which scale will best fit the target city in relation to the origin city will depend on the nature of the measure itself. Therefore, it will be important to recognise that there are groups of measures that may be more affected by scaling than others, before even entering such analysis, which may otherwise be worthless or at least non-critical.

Information that a city should provide to perform this task:

This step involves the creation of packages of measures. These packages should include a number of measures which help support each other, in particular helping to overcome barriers associated with any specific measure in the package.

- Identify packages of measures (if it's not possible, identify at least one package).

To compose the packages, select the principal(s) measure(s) from the list created at STEP 6 and compose the package with a group of measures from the same list and also with other measures that can be logistic measures or complementary measures.

Given that the success of transferring a given measure or package of measures will also depend on the dimension of the implementation, please propose a scale of application of the package (a street, a neighbourhood, all of the city) and identify which measures may be affected by scaling.

- The contents of this step in boxes with the packages proposed identifying the measures from TURBLOG_ww, the complementary measures and the scale proposed.

<table>
<tr><td colspan="2">Policy package X
Name of package (try to indicated the most important objective in the name)</td></tr>
<tr><td>Measures
· Measure 1
· Measure 2
· Etc.</td><td rowspan="2">Proposition of application scale(s)
and the non recommended scales</td></tr>
<tr><td>Complementary measures
· Measure 3
· Measure 4
· Etc.</td></tr>
</table>

STEP 8 – Ex-ante assessment of measures to transfer

Target cities need to have identified the goals that the selected measures are expected to meet. These should be set out with considerable coherence, the main objective being to develop an ex-ante evaluation plan that will permit an assessment of the extent to which the implemented measures achieve the high level objectives. The following issues should therefore be pre-assessed:

- Relevance: to what extent is the adoption of selected measures relevant in relation to the evolving needs and priorities at the local/National/EU level?
- Efficiency: how were the resources (inputs) turned into outputs or results?
- Effectiveness: how far has the transferability process contributed to achieving its specific and global objectives?
- Utility: will the process have an impact on the target groups or populations in relation to their needs?
- Sustainability: to what extent can the changes (or benefits) be expected to last after the measures have been completed?

The basic principle of ex-ante evaluation is to compare two future situations:

- What would happen, at a future target year to be defined, if the measure is not implemented.
- What is expected to happen at that time if they are implemented.

In terms of the conditions of implementation of the measures, ex-ante evaluation relies on micro-indicators. For example, in the case of a fiscal measure on motor fuel, the micro-indicators might show the percentage of tax in the gasoline price at the end of the implementation with and without the measure, the change in this percentage over the time resulting from the measure, and the change in this percentage.

Information that a city should provide to perform this task:

This step could be carried out by organising a workshop with stakeholders from the receiver city to discuss the potential of transferability, success factors and barriers of the measures identified in the package(s) of STEP 7. If it's not possible to organize a workshop, interviews should be carried out with responsible policy-makers and/or logistic experts in the city.

The objective of the workshop (or interview) is to gain sufficient information so as to be able to fill boxes with an assessment of measures, including the identification of barriers and factors of success, using the typology given in pages 1 and 2 above. Example:

Package	Measures	Relevance	Efficiency	Effectiveness	Utility	Sustainability	Global evaluation
1	*Measure1*	+++	++	0	+	+	++
	Measure2	Graduation:					
	MeasureN	--- high negative					
2	*Measure1*	-- medium negative					
	Measure2	- low negative					
	MeasureN	0 neutral or non available					
3	*Measure1*	+ low positive					
	Measure2	++ medium positive					
	MeasureN	+++ high positive					

Package	**Measures**	**Barriers**	**Adaptation**	**New measures**
1	*Measure1*	*Fill the barriers for each measure (if identified), considering the typology:*	*Fill suggestions of adaptation in order to remove, or at least lessen the importance of, those aspects of the measure that are undermined by barriers*	*Measures which counteract the barrier concerned.*
	Measure2	· *Financial*		*Measure with popular amongst to compensate measures that has negative impacts on a section of the population (involving a political barrier).*
	MeasureN	· *Physical*		
2	*Measure1*	· *Technological*		
	Measure2	· *Political*		
	MeasureN	· *Legal*		
3	*Measure1*	· *Security*		
	Measure2	· *Cultural*		
	MeasureN			

With the results of the workshop (or interview), provide a box identifying the major measures and the complementary measures with their levels of importance in the package. Example (from transferability article: Macário and Marques, 2008, with a new column):

Policy field	Relative relevance in package	Barriers
Clean Vehicles and Fuels Car Sharing and Car Pooling Cycling		
Zones with Controlled Access Public Transport Parking Management Mobility Management Goods Distribution and Logistic Services Road Pricing		

STEP 9 – Identify the need for adjustment

In order to assess whether adjustments are needed, it is desirable to review the conditions for transferability. To this end, published data sources, networks, co-operative projects, skills exchanges, and various NGOs can provide additional valuable inputs. As transferability will depend to some extent on compatibility of institutional context, there may be a need to transplant a policy with part of its institutional context, i.e. transfer not only a measure but some of the relationships between institutions and territories may have to be replicated as well.

STEP 10 – Implement measures and Steer results

A minimum amount of information is necessary to allow proper monitoring of the implementation strategy. Global objectives and specific targets should be stated and quantified along with any expected results (City Evaluation Report). A detailed description of measures together with a quantification of the associated operational objectives should be contained in the programme drawn up at city level, as foreseen in the Inception Reports. Establishing operational monitoring arrangements covers the following areas:

1. The definition of the data to be collected in order to provide the necessary information on outputs, results, impacts, and corresponding indicators.

2. The methods used to quantify the data or estimates generated by e.g. surveys must be specified (sample, panel data, databases, monitoring mechanisms, etc.) as well as authorities or bodies responsible for their collection.

3. The definition of data to be provided to the monitoring activities and the frequency and timing of their transmission.

4. The definition of operational links with the evaluation activities (ex-ante, mid-term, and ex post).

5. The definition of programme-specific indicators for use to allocate the performance at mid-term, if possible.

The preparatory work for setting up a monitoring system must also serve to detect the gaps that the information systems contain. This may require relying on technical assistance and outside experts to fill gaps and deficiencies, improve the general implementation conditions, and make monitoring more effective.

8.3. TRANSFERABILITY PROCESS: WHAT IS IMPORTANT TO PAY ATTENTION

- The most promising way to follow a transferability process is a **step by step procedure at the local level, with clear milestones**. A uniform approach with local optimisation usually works best.
- It is important to **look first at the current situation** (i.e. problems, existing policies, how the market works, etc.) in order to reflect the level of complexity, rather than identifying a measure and then look for a way to apply it to a location. Looking at the 10 steps of the transferability methodology, this means that many cities start at step 5 ('selecting examples of source urban contexts'), instead of the first step: 'diagnostic of the problem'.
- There is never a single optimal solution. The success of a number of individual measures depends on several different, specific conditions. This means that the transferability analysis of an individual measure might be insufficient for a city that wishes to assess its own situation (before the actual transfer). One has to **look for a combination of measures** that is specifically aimed at achieving the desired result (i.e. reduce the problems identified and improve conditions). In order to assess the current situation and also monitor and evaluate the actions that are performed, **quantitative and qualitative data collection** is essential. Periodic and permanent data collection surveys are therefore needed.

- It is necessary to **identify in which areas improvements are possible**; preferably look for the highest impact.
- **Sustainability** means that economy, environment and social aspects must be balanced. This means that it is important to find projects which save resources, reduce waste and pollution, are cheap and therefore attractive.
- Urban freight initiatives and projects must be considered as **business propositions**. Nobody will go for a more expensive solution that adds no value.
- One of the main drivers for the successful implementation of a measure or set of solutions in a city is **political commitment**.
- The need for **cooperation between actors**. It is important to understand the positions of other stakeholders and understand that people have to make decisions. Also **coordination between policies and activities** from different tiers of government is needed (clear objectives and approach).

From Civitas experience, TURBLOG_ww validate four issues:

1. **Political involvement:** It begins with the integration of freight organisation in land use planning. Once the main principles are defined, public authorities must determine clearly the objectives to be reached, the general framework (identification of main relevant stakeholders, actors), and the role each one will take in the implementation. This may include high quality problem analysis, data collection, benefits assessment, networking among stakeholders, facilitating exchange of information, and even financial support.

2. **Target groups:** It is essential to identify target groups which will facilitate the design and implementation of solutions, according to the type of goods flows or/and activity sector they represent. They will provide state of the art analysis, requirements, establish consensus, and find appropriate detailed solutions and facilitate their implementation.

3. **Methodology:** It is necessary to have a strong and rigorous project management and methodology, which sets up milestones and objectives in order to measure the progress of the project and identify the barriers to its implementation.

4. **Modelling:** The design and the adaptation of organisational and technical solutions must be based on a reliable representation of the reality, although this has to be built according to the local context and the objectives of local authorities. Several techniques are currently available, all based on a crucial aspect: the reliability and accuracy of data. This model must also be the source of the adequate indicators which will measure the progress and the benefits of the implementation of the solutions.

Barriers and enablers

The analysis of transferability puts strong emphasis on looking closely at the enablers (success drivers) and the barriers affecting the adoption of candidate measures for (potential) transfer. Therefore it is necessary to systematise what potential barriers to policy implementation exist and, for any transferability case study, to identify when they are likely to occur. A typology of barriers is provided below. The enablers can be viewed as the inverse of barriers. For example, if the receptor city is very wealthy this is an enabler for the transfer of a measure that requires financial resources.

Various barriers can be identified that might potentially undermine the successful implementation of a transferred policy measure in a 'receptor' city.

- Financial (the financial cost of the measure in the receptor city is considered to be too high);
- Physical (the natural and/or built aspects of the receptor city make the transferred measure inappropriate);
- Technological (the transferred measure has technological elements that are unavailable in the receptor city or are inconsistent with the technology currently operating in the receptor city);
- Cultural (the traditional culture operating in the receptor city makes the transferred measure seem 'strange' and/or difficult to implement);
- Political (the transferred measure has a perceived negative impact on one or more sections of the population, thus leading to political conflicts);
- Legal (the national and/or local legal system operating in the receptor city makes elements of the transferred measure illegal);
- Security (security problems hinder the implementation of the transferred measure).

This typology can be used as a checklist when considering the possibility of transferring any policy measure. In many cases, it is feasible to overcome a barrier. Two general (complementary) approaches exist for doing so:

- The transferred measure can be adapted in order to remove, or at least lessen the importance of, those aspects of the measure that are undermined by barriers;
- The measure can be combined with one or more other measures (in a policy package) which counteract the barrier concerned. For example a high-cost measure (involving a financial barrier) can be combined with a revenue-generating measure. Alternatively, a measure that has negative impacts on a section of the population (involving a political barrier) can be combined with a measure that is popular amongst that section of the population.

9. MANAGING URBAN LOGISTICS

Urban freight does not attract as much attention as urban passenger transport in policy documents or even in local authorities' policies. Cities all over the world are facing common barriers to implement sustainable measures, aimed in particular at an efficient freight distribution and transport management. Even where there is a strong commitment to improve efficiency levels, cities often lack the needed information, supportive national level policies, financing, etc.

The EU Green Paper points the need to integrate urban freight distribution issues in local policy-making and institutional settings instead of regarding freight issues as outside the competence boundaries of public authorities. Passenger and freight transport should be treated in an integrated way, as they both influence the city and each other. However, local authorities often lack a "city logistics manager" or a similar role whose role should be the management of urban freight in an integrated way.

Urban freight is a specific issue where the key players belong to the private sector and local authorities cannot interfere too much in their business, as they do not have the power for that. Therefore TURBLOG_ww recommendation for the efficient management of urban logistics is the development of a tool for the Strategic evaluation for the organization of urban logistic activities - SEOULA.

SEOULA will provide key stakeholders (public and private) with information about how logistics activities should be organised and the impacts that they might have.

The following table is an output of the analysis done in TURBLOG's research and relates the business models and logistic profiles with the key activities that it is possible to find in the urban logistic chain, namely a) production, b) distribution, c) warehousing, d) supporting activities, and e) distribution.

Table 4 - Combination of Logistic Profiles with the most suitable business models

Key Activities	Production + Distribution	Warehousing + Supporting Activities	Distribution
Business Model / Logistic Profile	Optimization / Intermodal distribution	Logistic Parks/Centres	Last mile solutions /Micrologistics Centre
A	+ + +	+ + +	0
B	+ + +	+ +	+ +
C	+	+ +	+ + +
D	+ + +	+ + +	0
E	+ +	0	+ + +

It is possible to conclude that for logistic profiles that involve a great amount of goods deliveries (profile A and D), the best business models are the ones that aim to optimise the distributions, such as intermodal distribution and the concentration of related services in specialised areas, such as logistic parks/centres, as the successful logistic practices of Monoprix and Abertis Logistic Park showed.

The case studies that fit into Profile B are the Dabbawalas in Mumbai, and the organic products sale and delivery in Belo Horizonte, Brazil. These examples present good solutions to deliver perishable products using alternative modes of transport and to deliver products straight from the producer to the final consumer. Therefore, business models involving optimisation and intermodal distribution were considered as the most adequate for this profile.

Profiles C and E usually correspond to areas that face problems related to congestion and accessibility, and therefore business models regarding last mile solutions are the ones considered with more potential to be implemented within areas with these features

This shows the better targeted business model to each type of profile and the key activities that should be improved to reach better results.

The main findings from TURBLOG_ww show that the most suitable logistic solution is defined not only by the business characteristics, but also by the delivery, product and city area features (logistic profile), as well as the policies adopted/to be adopted for the city. It is the combination of these three pillars that constitute the backbone of the decision making for best urban logistics solutions.

After identifying the most suitable business model for each logistic profile, they were then related to the five types of policies:

- Enforcement and promotion
- Traffic management
- Access conditions
- Land use management
- Public infrastructure

The main outcome from the relationships of these policies with the urban solutions and logistic profiles can enable us to draft the following recommendations for the successful implementation of the measures:

- For the implementation of logistic parks/centres and micrologistics centres, it is recommended to adopt land use management policies, to define zoning for logistic activities, land use pricing and/or subsidies. For logistic parks/centres, it is also recommended to adopt public infrastructure policy, such as new infrastructure for freight, new transport network infrastructure and so on;
- For the optimisation/Intermodal distribution, the key activities are production and distribution and the main characteristic of the business model is related to the product characteristics. Due to this, the policies related to access conditions and traffic management, together with the land use management and public infrastructure, have presented a successful implementation of the measures assessed in this project as good practices.
- From the analysis it is possible to induce that entrepreneurship is a key factor for the enhancement of urban freight solutions but it requires also the intervention of public policies to encourage that entrepreneurship.

All this information presented above should be part of the SEOULA and should help to clarify key issues and promote dialogue with stakeholders concerning key issues in urban logistics and proposed methods for survey, evaluation and assessment.

SECTION THREE OF THE HANDBOOK – RECOMMENDATIONS AND STRUCTURING THE CHANGE PROCESS

The objective of this section is to present the lessons learned within TURBLOG_ww and to present targeted recommendations for urban mobility authorities, for logistic operators and service providers and for the inclusion of logistic plans in urban mobility plans.

10. LESSONS LEARNED FROM TURBLOG_WW

10.1. WORLDWIDE SNAPSHOT OF URBAN FREIGHT INTERVENTIONS AND DATA COLLECTION TECHNIQUES

Deliverable 1 of TURBLOG_ww ("A worldwide overview on urban logistic interventions and data collection techniques") was based upon a number of Regional Reports written by the TURBLOG_ww partners. Due to the lack of importance attached to urban freight, there is a resulting lack of publicly-available information about interventions, so that the task of compiling these Regional Reports describing such interventions was typically challenging (particularly in the case of the Hispano-American Regional Report). The one obvious exception to this comment concerns the situation in Europe, mainly due to various research projects funded under the various Framework Programmes. Such projects have created a situation whereby a vast amount of information is publicly available, typically through the internet, on relevant developments in Europe. It is hoped that similar initiatives will be carried out in future in other parts of the world.

A further conclusion concerns the transfer of appropriate technology. Whilst one emphasis of the deliverable has been put upon "high-tech" solutions, it is important not to forget "low-tech" solutions. This issue is particularly apparent with respect to emerging (actualised) concepts as to how freight distribution and collection can be integrated within comprehensive urban transport and land use planning. Deliverable 1 includes examples of non-motorised and low-energy modes for urban freight, which have increased recently in popularity due to environmental and (lack of) energy concerns. Whilst such modes are being investigated and implemented in wealthy countries, much can be learnt from the experience of their use in poorer countries (or poorer parts of countries, as in Brazil).

10.2. CASE STUDIES ASSESSMENT

Deliverable 3 of TURBLOG_ww "Urban Logistics Practices - Synthesis of Selected Case Studies" was based upon a number of case study reports of worldwide best practices concerning urban logistics. Comparing these different practices, there are a few lessons that can be learned when implementing a measure in another city. These lessons concern the importance of the following:

1. The need of strong political commitment and cooperation between the private and the public sector.
2. Well-located logistics areas.
3. Stability. The cases of the Abertis Logistics Park in Santiago, the Land Use and Master Plan in Paris, the Beijing Tobacco logistics centre and the off-peak hour delivery programme in New York demonstrate how important economic, political and jurisdictional stability is.
4. Existence of some restrictions to truck movements inside the city. The use of restricting measures can encourage the private sector to invest in other alternatives for urban distribution.
5. It is difficult, but possible to use the urban public transport system to deliver goods. The use of the urban public transport system for freight transport can be difficult in countries where the provision of freight rail services is poor, or rail slots for freight trains are difficult to accommodate within a busy passenger rail network.
6. Customer focus and continuous adjustments and innovation. When using innovative vehicles, attention must be paid to the availability of adequate vehicles for final deliveries or pick-ups. In Paris, the available freight tricycles or cargo bikes still need to be improved; the electric, hybrids and CNG vans and light trucks are still very expensive to buy, can be difficult to maintain, and do not provide adequate loading capacity.

A critical issue when transferring a measure is to keep in mind the characteristics of the area. It is essential to also keep in mind that the impacts that are obtained in a city can be completely different in another surrounding. The results of a measure are not only heavily influenced by the geographical and institutional characteristics of the area, but also by the quality of implementation, the acceptance by the stakeholders and by other measures and polices implemented. In order to be able to transfer a specific measure within or to another city, one has to examine the basic elements of the measure and adapt these to the legal, geographical, economic and social characteristics of the area. An example of this is seen in the case study of Chile.

It is essential to note that there is no single best solution for urban logistics issues. A combination of initiatives needs to be developed, serving the interests of the stakeholders in the city as much as possible. For the development of effective and efficient urban freight transport policies it is also important to collect data at an urban level and even more important: in a continuous way or at least regularly. The urban freight data collected in most of the selected cities was collected mainly for studies to solve a specific problem at a certain time, and not a continuous collection of data.

Comparing the different practices around the world, one of the most important lessons learned is the need of strong political commitment and cooperation between the private and the public sectors. Cities that involve the businesses sector in policy development from the very beginning, achieve greater acceptability by the stakeholders that are involved and are more likely to succeed in the long-term.

An essential concluding remark, when transferring a measure is to keep in mind the characteristics of the area. In order to be able to transfer a specific measure within or to another city, one has to examine the basic elements of the measure and adapt these to the legal, geographical, economic and social characteristics of the area and needs of the stakeholders involved. In other words: not copy-paste, but copy-adapt.

10.3. IDENTIFICATION OF DYNAMIC MECHANISMS FOR BM IMPLEMENTATION AND TRANSFERABILITY

From the analysis of the different examples of successful urban logistic measures reported in TURBLOG Deliverable 2 (“Business Concepts and Models for urban logistics”), it is possible to conclude that most of the innovative business concepts presented rely on partnerships other than the typical buyer-supplier relationship, with the expectation to improve performance (efficiency) and accessibility of their services as core value propositions. Moreover, some business concepts were only effectively implemented because they were sustained by public administration policies, which provided availability of warehouse spaces or accessibilities and, in some cases, financial incentives, resulting in partnerships with the municipality or other government administrations (e.g. Monoprix, Chronopost, La Petite Reine). In order to meet the municipal environmental requirements and restrictions and also looking towards improving service performance, some companies developed joint ventures to develop these new services (e.g. La Petite Reine, that developed the tricycle needed for its business with a local manufacturer, and the Beer Boat that is operating in the City of Utrecht). The need to optimise resources and also to obtain other supporting services and infrastructures, leads to partnerships among competitors, such as in the case study of Japan, where the key partners are exclusively private. In these cases, the relationship with the customer (business-business) is called collaborative, meaning, they share infrastructures and services expecting to exchange knowledge and problem solving, which are common to other logistic companies.

In the business model comparisons there were three key activities considered in urban logistics: production, distribution and supporting activities, such as warehouse renting (which basically consisted of the design and processing of goods subject to a certain service), With the exception of the Abertis Logistic Park located in Santiago (Chile), all the businesses considered are mainly located in the distribution section of the logistics chain.

The analysis that have been done in TURBLOG_ww is based on the idea that the most suitable logistic solution is defined not only by the business characteristics, but also by the delivery, the product and city area features (logistic profile), as well as the policies adopted/to be adopted for the city. It is the combination of these three pillars that constitute the backbone of the decision making for best urban logistics solutions.

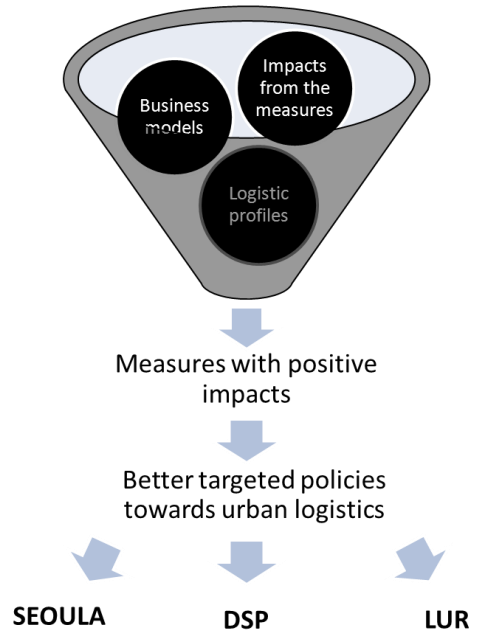


Figure 14 - Relationship between business models, logistic profiles and impacts from the measures

In the end of the process it is expected to be able to identify the best practices considering the logistic profile, the business models and the expected impacts. These good practices are divided into three different “urban logistic tools”:

- SEOULA - Strategic evaluation for the organization of urban logistic activities. This tool provides key stakeholders (public and private) with information about how logistics activities should be organised and the impacts that they might have.

- DSP – Delivering and Servicing Plan. This tool aims to optimize deliveries, and thus decrease the number of trips and reduce the impacts of urban freight movements.
- LUR – Loading and unloading regulations - This tool aims a set of measures including parking regulations and restrictions on movement of heavy goods vehicles (time frames, truck routs, vehicles weight and size restrictions, etc.), in order to regulate the operations of loading and unloading.

Based on the case studies analysed during the TURBLOG_ww project, the policies adopted were summarized and crossed with the characteristics of the business model, the logistic profiles and the impact evaluations of each good practice case study, as presented in the table below:

Table 5 - Policies according to the combination of logistics profiles with the most suitable business models

	Combination of Logistic Profiles with the most suitable business model				
Profiles	PROFILE A	PROFILE D	PROFILE B	PROFILE C	PROFILE E
Business models / Policies	Optimization/ Intermodal distribution Logistic Parks/ Centres	Optimization/ Intermodal distribution Logistic Parks/ Centres	Optimization/ Intermodal distribution Last mile solutions/ Micrologistics centre	Last mile solutions/ Micrologistics centre Logistic Parks/ Centres	Last mile solutions/ Micrologistics centre
ENFORCEMENT AND PROMOTION				●	
TRAFFIC MANAGEMENT			●	●	●
ACCESS CONDITIONS	●		●		●
LAND USE MANAGEMENT	●	●	●	●	●
PUBLIC INFRASTRUCTURE	●	●	●		●

From the table above it is possible to conclude that for logistic profiles that involve a great amount of goods deliveries (profile A and D), the best business models are the ones that aim to optimise the distributions, such as intermodal distribution and the concentration of related services in specialised areas, such as logistic parks/centres.

According to the description of Profile A, it is possible to describe some Profile A cases as being equivalent to Profile D, but in a less mature stage of development, considering the solutions for transportation and distribution logistics. Therefore, the logistic improvement solutions that are most suitable to Profile D, are also adjustable to Profile A. However, in the last case additional measures will have to be taken into account together with regulation and freight policies.

For the profile B, the best solutions involve the distribution of perishable products using alternative modes of transport and to deliver products straight from the producer to the final consumer. Therefore, business models involving optimisation and intermodal distribution were considered as the most adequate for this profile.

Profiles C and E usually correspond to areas that face problems related to congestion and accessibility, and therefore business models regarding last mile solutions are the ones considered with more potential to be implemented within areas with these features.

The main outcome from the relationships of these policies with the urban solutions and logistic profiles enable us to draft the following recommendations for the successful implementation of the measures:

- For the implementation of logistic parks/centres and micrologistics centres, it is recommended to adopt land use management policies, to define zoning for logistic activities, land use pricing and/or subsidies. For logistic parks/centres, it is also recommended to adopt public infrastructure policy, such as new infrastructure for freight, new transport network infrastructure and so on;
- For the optimisation/Intermodal distribution, the key activities are production and distribution and the main characteristic of the business model is related to the product characteristics. Due to this, the policies related to access conditions and traffic management, together with the land use management and public infrastructure, have presented a successful implementation of the measures assessed in this project as good practices.
- From the analysis it is possible to induce that entrepreneurship is a key factor for the enhancement of urban freight solutions but it requires also the intervention of public policies to encourage that entrepreneurship.

10.4. TRANSFERABILITY PROCESS

Deliverable 4 of TURBLOG ("Transferability guidelines and Evaluation") described a 10 step transferability process. One of the most attractive features of the process is that it is highly city-specific. Rather than attempting to identify generalised measures that "will work everywhere", the process focuses upon the particular features of the location to which the measure is being transferred, under the implicit assumption that each location is different. Whilst this feature of the process is admirable for real world transport policy making, it clearly presents a challenge for making generalised conclusions about policy and technical measures for facilitating urban freight movement.

In deciding upon this transferability process, TURBLOG_ww compared (and presented in Deliverable 4) a number of different methodologies of transferability used in a selection of studies from the EU which concentrate upon urban freight distribution and more generally on urban transport, presenting the main lessons learned from these studies with regard to transferability. The projects concerned were CIVITAS, BESTUFS, NICHES+, SUGAR, and ELTIS, and their insights on transferability were synthesised with the results on transferability from four TURBLOG_ww "transferability case studies". This synthesis was validated using the ALTER-MOTIVE conclusions, as described below (where the ALTER-MOTIVE conclusions are given in blue italics and are followed by the conclusions resulting both from the TURBLOG case studies and from other elements of the project):

- ***Transferability depends to some extent on compatibility of institutional context which implies attention for individual policy instruments and how that fits its context.*** The issue of institutional context has been a recurring theme throughout the four case studies, with all case studies mentioning the potential problems associated with having different institutions responsible for different aspects of policy-making and implementation with regard to urban freight measures. This was particularly relevant to the development of strategic measures (such as infrastructural master plans and definitions of regional distribution networks/centres) which involve large levels of finance that only the higher levels of government could provide.
- ***Different kinds of transferability are recognized in terms of transfer of policy instruments between territories or situations, e.g. scaling up a policy measure (vertical transfer) and transferring a policy from one situation to another (horizontal transfer).*** The TURBLOG_ww transferability case studies have been primarily concerned with horizontal transfer. However, vertical transfer has also been an underlying issue.
- ***Different phases of transferability are identified, e.g. demonstration, test and implementation phase.*** The TURBLOG_ww case studies did not involve demonstration or full-scale implementation. However, central to the 10 step transferability process is the concept that there are a number of "phases" of transferability.
- ***Different kinds of process assist transferability, e.g. networks, skill exchanges, co-operative projects, etc.*** Three general comments can be made here. Firstly, the TURBLOG_ww project itself has created a worldwide network of organisations for helping to assist good transferability practice. A large part of the project (separate to the transferability case studies) has been devoted to organising international workshops to support this network and accompanying skill exchanges. Secondly, each transferability case study has run local assessment workshops which facilitate the development of local networks. Finally, as is evidenced by participation in the international workshops, some of these local networks have been able to "plug into" the international (TURBLOG_ww) network.

- ***Transferability may be indirect via osmosis, e.g. via direct and indirect contact between different organisations and individuals (site visits, information gathered by phone and internet, etc.).*** TURBLOG_ww has encouraged such osmosis, particularly through the "technical visits" that accompany each group project activity. The main impact of these visits has been for visitors to learn (by direct experience) about innovative practice in order to pass on in a variety of fora.
- ***Acceptability is crucial, however difficult to predict. Therefore it is more relevant to develop a methodological process for transferability than to try to find a universal solution for transferability based on quantitative analysis.*** This point is key to the overall TURBLOG_ww transferability methodology, and underpins all the work that has taken place in the transferability case studies. The fact that the case studies have all taken place successfully, with enthusiastic workshops generating a large number of insights at a local level, appears to validate the point emphatically.

11. RECOMMENDATIONS FOR MANAGING URBAN LOGISTICS

This chapter provides recommendations for managing urban logistics targeted to specific groups of key stakeholders.

As addressed in chapter 9, TURBLOG's recommendation for the efficient management of urban logistics consists in the adoption of tools that will help public authorities to induce a change in the behaviour of private parties. These tools together with restrictions and incentives will contribute to a better management of the city.

Such tools are more or less necessary depending on a) the decision level(s) concerned (strategic, tactical and/or operational) and b) the logistic profile identified. The table below recommends whether a tool should be mandatory, recommended or optional according the type of logistic profile identified. Three types of tools are shown in the table: a SEOULA (which provides key stakeholders with information about how logistics activities should be organised to be as efficient as possible); specific plans that target deliveries; and loading/unloading regulations.

Table 6 – Recommendation of the urban logistics management tools according the type of logistic profile

Logistic Profile	SEOULA	Specific plans that target deliveries: e.g Delivery and Servicing Plans (DSP)	Loading and Unloading regulations
Profile A: Cluster of shops specialised in one specific type of service/product	Optional	Mandatory	
Profile B: Hotels, restaurants, small grocery stores, small neighbourhood markets	Recommended	Mandatory	
Profile C: Business Centre	Mandatory	Recommended	
Profile D: Large commercial stores	Mandatory		
Profile E: Residential areas with local trade	No need	Optional	Recommended

The table shows that:

- For profiles C and D, a SEOULA should be mandatory, as these profiles have a large number of activities.
- For profile A and B, the mandatory tool should be a specific logistic plan focused on deliveries such as a DSP, as this profile is characterised by a defined routine and a high frequency of deliveries in a high commercial density area.
- Loading and unloading regulations are recommended to residential areas with local trade (Profile E) in order to define parking spaces and loading and unloading time windows, etc.

11.1. RECOMMENDATIONS ON TRANSFERRING MEASURES TO LATIN AMERICA

As in Europe, a key issue in Latin America concerns how to assemble individual measures to form packages. When doing so, one should bear in mind the first steps of the transferability methodology (described in Chapter 8, namely: the type of problems that exist in the receptor city; the city context; and the city objectives that are affected by freight. Other relevant recommendations for the assembling of measures into packages are:

- Special care needs to be taken on defining the geographical scale of the measures. If the geographical scale is the entire city, the measures should be more policy related, for example a freight-oriented master plan.
- When there is a 'restriction measure' in the package, it is useful to also to add a (complementary) 'incentive measure' to the package.

Given that most Latin American countries are in a lower stage of development than European countries with respect to urban logistics, the above-mentioned recommendations for policy packaging are of particular importance in Latin America in order to avoid 'early mistakes' (which have far-reaching long-term negative consequences) in developing urban logistics.

A further issue of importance for transferability to cities of Latin America concerns the informality in urban logistics transactions and the excessive number of autonomous carriers. We therefore recommend that particular attention is paid (in Latin America) to involving these informal stakeholders in the ex-ante assessment of any package of measures being considered. Furthermore, it is also important to develop strategies to raise awareness among carriers and traders about the theme of urban logistics, providing information on experiences of success from around the world.

CASE STUDY: GAMARRA LIMA, PERU

This case study was considered due to the movement of persons and goods related to activities in Gamarra: the movement of visitors daily is reaching 250,000 people.

Taking as a first step a seminar-workshop about transferability of the best experiences on urban logistics to the Latin American context that took place in Lima within TURBLOG project, the following recommendations were obtained for the city of Lima:

- In La Victoria District (Gamarra), political meetings should be held with local authorities, who should also promote discussions with regional authorities such as Metropolitan Lima authorities and Region of Callao authorities;
- Strengthen Gamarra commercial zone as one of the most important in all Metropolitan Lima;
- Improve national roads infrastructures (North Pan-American Highway, South Pan-American Highway and Central Road) that connect Gamarra area, La Victoria District and Metropolitan Lima;
- Improve safety and security through installing a specialized station with security cameras to watch logistics activities in Gamarra commercial zone.

Several urban logistic approaches were also recommended, as a result of the transferability method presented in this handbook:

- Port of Callao – Integration of urban design for urban logistic facilities (Amsterdam experience);
- Historic Centre of Lima – urban design of logistic supply (Paris experience);
- North Lima – Develop a pilot project to integrate and articulate urban logistics (Mumbai experience);
- General Law for urban mobility (Brazil experience)

CASE STUDY: BELO HORIZONTE, BRAZIL

Some recommendations were raised by various stakeholders in a workshop held in February 2011 to discuss the transferability method in Belo Horizonte, regarding the implementation and deployment of a package with selected measures:

- Carrying out a freight origin/destination survey in the metropolitan area of Belo Horizonte, since several agents concluded there is an urgent need for more detailed information about urban and metropolitan logistics. The Metropolitan Agency, an entity linked to the state government of Minas Gerais, is preparing to conduct the survey about people origin/destination (this survey is conducted every ten years covering the metropolitan area) and it is considering about including metropolitan logistics data collection.

- Establishment of a forum from different agencies and institutions to discuss issues pertinent to urban logistics. Belo Horizonte City Hall and BHTRANS (Transports and traffic authority of Belo Horizonte) have the historical tradition of creating spaces for debates with civil society and would not have trouble creating this forum. The coordination meetings initiated by Turblog_ww in Belo Horizonte, involving various stakeholders, have demonstrated the viability of this recommendation and its likelihood of being implemented in future.

- In 2010, the Mobility Master Plan of Belo Horizonte for the next ten years was concluded and one of the suggested products is to create a plan of Urban Logistics. Moreover, one of the strategic projects of BHTRANS is the project LogBH - Urban Logistics in Belo Horizonte, which should incorporate measures included in the project Turblog_ww.

11.2. RECOMMENDATIONS FOR URBAN MOBILITY AUTHORITIES

It is recommended that urban mobility authorities (UMAs) consider the planning and implementation of urban logistics on two distinct levels: strategic and tactical.

Strategic level

At the initial stage of developing any type of strategic plan of relevance to mobility (urban master plans, territorial plans, and sectoral plans) UMAs need to take into account the following issues:

- *Past plans for the relevant geographical area*. Various questions need to be considered. Were these plans implemented? If so, with what success? Has a formal audit been carried out with regard to their impact upon urban logistics, taking into account both objective impacts (for

example traffic flow conditions) and subjective impacts (views of stakeholders)? If not, is it feasible to carry out such an audit before developing new plan?

- *Currently existing policies for urban freight transport adopted by "higher level" government authorities, such as national and transnational*. Examples of such policies are given in Chapter 5 above for Japan and the European Union respectively. How might such policies affect the policies of the UMA? Do such policies have financial or legal implications for the UMA? Furthermore, is the UMA responsible for a medium-sized city that is part of a wider metropolitan area (in the sense described above in Chapter 4) If so, does the wider metropolitan area have a planning authority with its own (politically derived) policies? If so, are there any potential conflicts between the policies of the UMA and the (wider) metropolitan area? If so, what can be done "in advance" to minimise the effects of these conflicts?
- *The motivation for the new strategic plan (currently being initiated)*. Is the plan motivated by an identification of problems? Do any of these problems have relevance to urban freight transport? If so, how (on a high level of generality) might improved urban logistics help solve these problems? Are stakeholders and the general public involved at this stage in a process of helping to think about such solutions?
- *Inter-departmental coordination*. Is the strategic plan being initiated by a different local authority department to the department responsible for transport? If so, how will coordination between departments be achieved so as to ensure that urban freight transport issues are fully incorporated in the plan?
- *Intra-departmental coordination*. Does the UMA fully take into account freight transport issues (separate to considering the movement of people)? If not, how might the UMA give a greater emphasis to freight transport?
- *Coordination between UMA and neighbouring UMAs*. Depending upon the area type associated with the UMA (as described in Chapter 4), it is likely that there will need to be coordination in planning with neighbouring cities. What type of coordination is appropriate? In answer to such questions, it is useful to identify the extent to which supply chains cross city boundaries. How is such an identification to be made?
- *Learning from other city experiences*. What examples of worldwide good practice exist for helping a UMA incorporate urban logistics in strategic plans? Various indications of such good practice, such as that from Paris, have been given above in this report.
- *Distribution centres*. Amongst other measures, a strategic urban plan needs to identify the location of freight distribution centres (both unimodal and intermodal). What logic should apply to the location of distribution centres? What transport modes are involved? What examples of

worldwide good practice exist? When researching examples of good practice, is the UMA aware of all the various terms used for distribution centre? (i.e. Public distribution depot; Central goods sorting point; Urban transhipment centre; Shared-user urban transhipment depot; Freight platforms; Co-operative delivery system; Consolidation centre (sometimes specific, e.g. retail, construction); Urban distribution centre; City logistics (or city logistik) schemes; Logistics centre; Pick-up/drop-off location; Off-site logistics support centre; Freight village etc).

- *Data*. What data is available for answering any of the above questions? What (new) data collection activities are required? Who will carry out such data collection?
- *Funding and resources*. What levels of funding/resources are available for ensuring that urban logistics issues are incorporated in the strategic plan? Who will provide these resources?

Once the initial stage has been completed of specifying the urban freight characteristics of a strategic plan, it is important to maintain momentum throughout the process of developing the plan to ensure that these characteristics are not "forgotten" (and hence omitted from the final version of the plan). The following inter-related issues thus need to be addressed:

- Is there a continual monitoring process to ensure that urban logistics issues are being included in the strategic plan as it is developed? If so, who is responsible for this monitoring?
- What are the methods for ongoing facilitation of the various types of coordination listed above? How are conflicts between organisations resolved?
- How is the expertise of the UMA (with respect to urban logistics) best used in the formulation of the strategic plan?
- Are there examples of worldwide good practice for ensuring that urban logistics issues are not forgotten in the process of developing an urban plan? It is frequently the case that knowledge of such good practice is not in the public domain; rather it is held informally by participants in a specific process. How might contact be made with such individuals to access their knowledge and experience?

Tactical level

The recommendations for UMAs about tactical planning follow immediately from the material presented throughout this report (including all the examples given of measures adopted around the world for "last mile solutions", traffic regulation and intermodality). The following main recommendations can be made:

1. Any tactical measure should be consistent with any relevant strategic plan covering the area, as described above.
2. It is extremely useful to learn from the experience of other cities in the implementation of measures, whether successful or unsuccessful. The 10 step transferability approach described in Chapter 8 provides a logical method for considering (and possibly implementing) a good practice example from another city.
3. In general, it is recommended that the UMA think in terms of implementing a sequence of complementary measures (over time) that form a well-defined package of measures.
4. When considering any specific measure, it is important to carry out a barrier analysis to identify ex-ante what problems might occur with the implementation of the measure. Solutions can be constructed before such implementation to help overcome such problems. One of the main benefits of constructing a package of measures (as in (3)) is precisely that the problems associated with any one measure in the package can be reduced by the inclusion of another measure which solves these problems.
5. It is important for UMAs to be aware of the definitions (both in theory and as related in practice to their own cities) of business models and logistic profiles, and how tools employing these concepts might be used in logistics planning and management.
6. At all stages in the process of designing and implementing a tactical plan it is important to involve stakeholders and the public in discussions about the plan.
7. Once any measure has been implemented, it is important to monitor its impacts. This will almost inevitably require data collection, and sufficient funds should be made available for this.

11.3. RECOMMENDATIONS FOR LOGISTIC OPERATORS AND SERVICE PROVIDERS

Logistics operators and service providers, together with the receivers of the goods, are the private sector stakeholders in city logistics. Few of them however see themselves as actual key players whose strategies, behaviour and actions are determining factors whether or not solutions proposed by the city will be successful and beneficial to the city and to themselves as commercial operators. Instead, many tend to see themselves as victims of regulations implemented by cities even though these are intended to keep traffic moving and keep the city open to road users. The reason for this attitude is because operators mainly experience problems at an operational level and do not typically consider the wider scope of the problems and proposed solutions.

Many city logistics academics, advisors and practitioners have noted this at biased (or limited) view and opinion of market players and have developed recommendations and tool-kits and implemented knowledge and discussion platforms that aim to bring all stakeholders together, share their views and try to reach a common understanding of the wide scope of problems. The many workshops held in projects like BESTUFS and TURBLOG_ww, but also national and regional initiatives are instrumental in building this understanding.

Specifically for logistics operators and service providers this means there is a genuine potential for improving their performance instead of "falling victim" to regulations and solutions imposed by the city. Many examples exist of cases where companies have achieved benefits of open dialogue and working together towards solutions. For instance, cities like Utrecht have developed regulations on access restrictions (time windows), but they allow operators less strict restrictions if they use the consolidation centre to meet the load fill target and use an environmentally friendly vehicle. In this way both the city and the private sector benefit.

11.4. RECOMMENDATIONS FOR THE INCLUSION OF LOGISTIC PLANS IN URBAN MOBILITY PLANS

According to the European Commission's Green Paper – Towards a new culture for urban mobility, *Mobility plans integrating the wider metropolitan conurbations, covering both passengers and freight transport in the city or town and in its surrounding region, also form a sound basis for efficient urban mobility planning.*

This is the main reason why this handbook includes recommendations for urban mobility plans. Logistics should be included in these plans, covering: freight corridors; freight transport infrastructure (including intermodal hubs); and location and premises for warehousing and haulage facilities. For example, the Paris Freight Oriented Master Plan foresees the preservation of dedicated land which can only be used for the development of logistic facilities with railway or waterway access, as well as the identification of areas to tranship goods from a boat/ship to a delivery vehicle during certain times of the day.

Regarding the top down planning approach (from strategic to operational), it needs to be taken into account that wide-scale logistic measures should not neutralise other measures that are specific for one particular area, product or delivery type. By doing so, strategic plans will facilitate innovative urban logistic actions, which frequently commence on a small-scale localised basis.

12. STRUCTURING THE CHANGE PROCESS

Each city has its own characteristic and the previous cases presented make the evidence that diversity is an inherent attribute of any approach to the logistic problems in a city. Besides, any expert will always be confronted with existing practices that have evolved along time in the city under analysis. This means that solving urban logistic problems in a city means initiating a change process, that will be continuously maintained. For this a monitoring process providing feedback to decision structures is fundamental.

For an urban logistic system to maintain its value driven character along time the following properties are indispensable:

- Robustness, meaning long term stability and sustainability;
- Adaptability, meaning the dynamic capacity to adapt services to evolutionary demands or new technological opportunities;
- Efficiency, meaning high productivity for the stakeholders served,
- Diversity, capacity to respond to the aspirations of the different segments of customers with different types of services in a continuous adjustment between supply and demand for urban logistics.

The underlying logic of the project that is now concluded assumes the existence of three levels of decision that have different roles in the city as illustrated in the figure below, where the relations between the different elements are translated into quality criteria, forming a cycle for the planned intervention, that can be either a policy, a measure or simply an action. Whatever the purpose, outcomes and results must be measurable so that the change process can be smoothly driven towards the established objectives.

The definition of objectives starts with the decision-makers' interpretation of several elements, namely:

- the importance of the needs (or aspirations) of the citizens;
- the importance of the problems to be solved, measured through their impacts on social and economic live of the city;
- the assessment of the probability of success of each of the actions and policies envisaged as potential solutions for those needs and problems, as well as to the superior objectives of sustainable development of the urban environment;
- The assessment of what is expected from each of the agents directly or indirectly engaged in the logistic system.

Therefore objectives are defined upstream of the prioritization of actions and policies. Indeed, whatever the context, the formulation of a strategy always requires the establishment of a hierarchy of objectives and the setting of the level of their ambition. Cities differ substantially in their vocation and in their development strategies. Besides, even if we are dealing with similar problems, in any given moment each city is conditioned by the choices made in the past that configure a different departure point for the problem under analysis and, consequently different perceptions are derived on which are the main problems and which are the best solutions to mitigate them. This is why addressing urban logistics is always addressing a multidisciplinary change process.

Achievability and relevance are major concerns when defining an objective. The degree of achievement of an objective is easier to recognize when it is verifiable and associated with a measurable indicator. Relevance of the specified objective, in turn, implies: attainability with the means made available for that specific purpose; and coherence with the different levels of intervention of the encompassing policy, which is achieved by aligning the decoupled objectives ensuring that the objectives set at the strategic level are correctly declined in the tactical and operational goals, as we have described in previous chapters (Macário R., 2011)

Generic strategic objectives (e.g. good accessibility, traffic fluidity, low environmental aggression, efficient distribution systems, etc) are easy to transfer, but their operational translation is not directly transferable from one city to another, because the weights allocated to each operational objective differ, as a consequence of the representation of stakeholders interests, as well as the intervention strategy that depends not only on those weights but also on the degrees of freedom each system has. No universal solution exists for urban logistics and, contrary to what happens in passenger mobility, with freight the possibilities of adoption of mass solutions are extremely reduced, if any.

The rationale underlying an approach to urban logistics must take into account the degrees of freedom of every agent and the individualism associated to each business. A key input for an Urban Logistic System is the interaction between policies, namely between land-use, environment and socio-economic development of the urban area, since these aspects are upstream the generation of needs to transport freight within the city

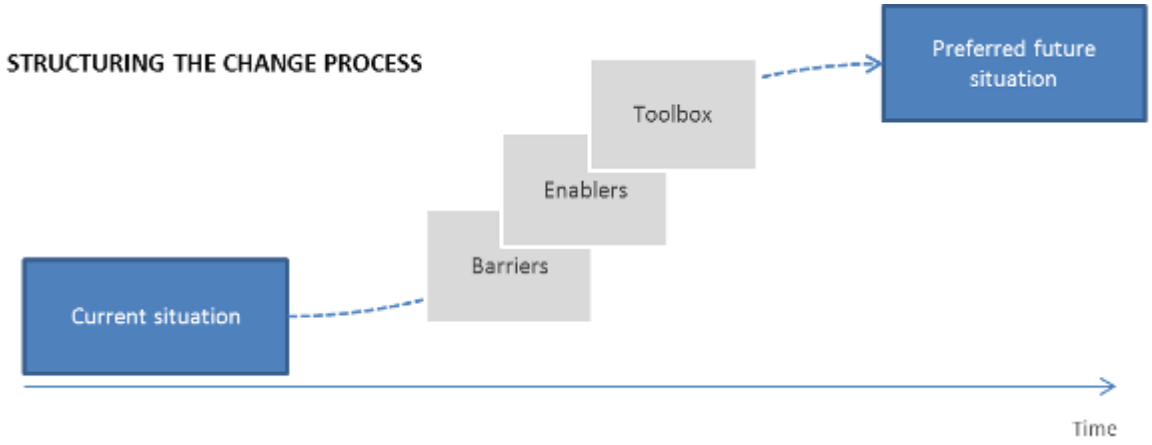


Figure 15 –Structuring the change process

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