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The role of a structured stakeholder consultation process within the establishment of a sustainable urban supply chain

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Abstract

Purpose – Whilst the importance of a well-functioning urban goods distribution system is widely acknowledged, city authorities have become increasingly aware of the need to minimise the disbenefits associated to the system. There are now many examples of initiatives to increase the eco-efficiency of urban freight deliveries; however, very few have made a notable impact. The success of such schemes often depends upon the response of a range of private sector freight stakeholders and their involvement during the planning process of these solutions is crucial. This paper describes and analyses a case of local freight stakeholder involvement to plan and design eco-efficient city logistics innovations in a small city in Italy.

Design/methodology/approach – To engage local freight stakeholders within the planning process of a city logistics project, the Logical Framework Approach, in the form of the Design and Monitoring Framework (DMF) developed by the Asian Development Bank, has been applied.

Findings – The structured consultation process implied within the DMF approach allowed urban freight stakeholders to share their aspirations from the beginning of the city freight planning process, despite their differences in priorities in adopting eco-efficient logistics innovations. The process ensured that city stakeholders accepted and committed to the city logistics strategies formulated during the consultation process, namely: changes to the Limited Traffic Zone regulation; the use of an urban consolidation centre; and hybrid electric truck adoption.

Research limitations/implications – The evaluation of the DMF application will be definitive after the demonstration/implementation stage of the city logistics project. It will then become clear if freight stakeholders have committed to the project and if it is effective in delivering the expected outputs and outcomes.

Practical implications – Local city authorities may find this method useful in situations where a structured consultation process is needed for addressing urban freight issues. This is especially the case in the context of introducing innovative, eco-efficiency solutions.

Originality/value – The application of DMF in the developed environment can be considered novel; this paper extends this with an application to the promotion of sustainable urban freight.

Keywords: urban freight; public consultation process; design and monitoring framework; city logistics.

Paper type: Research paper

1. Introduction

Supply Chain is a term used to describe a system of activities, people, technologies, information and resources targeted at delivering a product or a service along the entire chain - from the provider of raw materials, to the end customers. *Supply Chain Management* integrates supply and demand management, within and across companies, and encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers (Gibson et al., 2005). However, the theoretical basis of Supply Chain Management is weak, having grown out of multi-disciplinary studies; therefore it arguably does not qualify as a scientific discipline (Chicksand et al., 2012). *Logistics*, on the other hand, is an integrated planning, control, realisation and monitoring of all internal and network-wide materials, parts and product flows - including the necessary information flows - for addressing customer needs and gaining profit. Logistics is an application-oriented scientific discipline that models and analyses economic systems as networks and flows of objects, through time and space, which create value for people (Delfmann et al., 2010). Recent research demonstrates the awareness of both the logistics and supply chain industries of the importance of innovation in eco-efficiency (Rossi et al., 2013) and the role that suppliers can play in

improving the sustainability of supply chains, through governance mechanisms among the actors (Gimenez and Tachizawa, 2012). In supply network governance, trust and power have been identified as the key mechanisms of governance instruments in delivering specific outcomes of corporate social responsibility policy (Pilbeam et al., 2012).

‘Urban supply chains’ - on which this paper focuses - is a term used to identify that part of a supply chain charged with delivering goods to towns/cities (Danielis et al., 2012). Urban supply chain decisions are typically taken based on commercial efficiency, disregarding the wider environmental and social objectives. As a result, freight activities contribute to a range of negative environmental effects on the safety and quality of life in cities, such as air pollution, greenhouse gas emissions, noise, congestion and road accidents (Browne and Gomez, 2011). On the other hand, the importance of a well-functioning urban goods distribution system is widely acknowledged. For example, urban freight ensures adequate supply at stores and it is fundamental to the economic vitality of a city and its region (Crainic et al., 2004). A constant increase in these negative effects, together with a growing urban population, increasingly force city authorities to try to reconcile the conflict between private and social objectives, in the form of *urban/city logistics* schemes (Danielis et al., 2012). Urban/city logistics is a field that studies the best solutions for urban freight distribution, with a broad focus on social, environmental and economic objectives.

This paper presents the collaborative planning process of a city logistics project in Como, a small sized city in Italy. The process involved local freight stakeholders, from both the private and public sectors, and was guided by the Design and Monitoring Framework (DMF), developed by the Asian Development Bank (Asian Development Bank, 2007). The DMF is a form of Logical Framework Approach (LFA), which is widely used for the planning and evaluation of aid development projects by agencies and non-governmental organisations (NGOs). Key to the DMF is the involvement of stakeholders, during the whole project cycle, from project planning and implementation, to monitoring and evaluation. This collaborative planning approach was applied to a city logistics project in Como, to ensure that the different views of freight stakeholders were included within the project design. The importance of this is clear: the decisions of a wide range of local stakeholders affect urban freight and will therefore determine the success of an associated project. The city logistics project in Como includes urban freight solutions from different areas of innovation, including an urban consolidation centre (UCC), vehicle technology, and policy measures. The area of study, Como, represents a typical Mediterranean historic city - a concentrated, compact urban space with a high level of tourism. This poses constraints and challenges for city logistics activities,

especially in last mile delivery, requiring a reduction in congestion and pollution through better use of transport assets, knowledge sharing, shared consolidation facilities and limited traffic zones.

The remainder of this paper is structured as follows: Section 2 reviews the literature on urban logistics studies and focuses on the role of local authorities in shaping a sustainable urban environment. Section 3 describes the logical framework approach and its role in project management, being the methodology adopted for this study. Section 4 introduces the multiple urban freight stakeholders in Como and the context of its local urban freight. Section 5 analyses the process of DMF, as applied to defining the city logistics project in Como. Section 6 discusses conclusions and the directions for future research.

2. Literature Review

The importance of coordination, partnership and collaboration among urban stakeholders has long been recognised for effectively addressing sustainable urban freight development (Allen et al., 2000; Crainic et al., 2004; Lindholm, 2012a). According to Allen et al. (2000), a prerequisite for defining suitable freight policies is to identify which aspects of urban freight activities need to be influenced, in order to desirably alter its environmental and social impacts. This should preferably be done in collaboration with freight stakeholders (Allen et al., 2000). Similarly, Lindholm and Browne (2013) advocate the need for public authorities to involve the private sector in freight planning, in order to better understand the impacts of regulations and plans on freight operations. Conversely, the findings of Allen *et al.* (2000) highlight that the private sector lacks knowledge of the initiatives and regulations put forward by the public sector, to improve the sustainability of freight operations, suggesting that collaboration may be beneficial in increasing their awareness. In addition, it has long been recognised that stakeholder cooperation is a success factor for city logistics projects (Hesse, 1995). For example, key to the success of a city logistics project to establish the UCC 'CityPorto', in Padua, Italy, was agreement among the main local public authorities and business associations and the acceptance of the majority of transport operators of its use for last-mile delivery of their goods (Danielis et al., 2010). 'CityPorto' of Padua, in operation since 2004, is one of the few fine examples of financially viable UCCs in Europe.

Despite the findings highlighting the importance of freight stakeholder collaboration to successfully address sustainable freight development, there are only few cases where public authorities have engaged with private actors to consider freight in the overall transport planning process (Lindholm and Browne, 2013). The most recognised example is that of a public-private partnership (PPP), in the form of 'Freight Quality Partnerships' in the UK, with similar approaches

being found in Sweden, The Netherlands and France (Ballantyne et al., 2013). In the long-term, such partnerships result in positive effects on the outcomes for both the private and public sectors, as shown in a study by Lindholm & Browne (2013). The role of local authorities in shaping European city logistics has been scrutinised in current urban freight research and planning. Some of the main reasons for concern are due to a lack of awareness and knowledge of city logistics, thus pointing to an incompetence within city authorities for managing urban freight (Dablanc, 2007). In the past decade, a series of city logistics measures/schemes, promoted by the European Commission, have failed to live on once funding came to an end (Quak, 2011). Lack of participation from stakeholders prevented the practical implementation of some of the measures and schemes (Allen et al., 2012). Furthermore, the absence of national/regional bodies dealing with city logistics (Muñuzuri et al., 2012) and the incoherence of working between various aspects of urban freight were reportedly deepening the issues in addressing the local urban freight agenda, as described in Lindholm (2013). An example of such incoherence is unbalanced flows, where more goods are transported into urban areas - by ordinary distribution vehicles - than are transported out, and new establishments, such as out of town shopping centres or town centre shop-floor extensions. Notwithstanding the above arguments, research and planning have long failed to give the same level of attention to urban freight movement, as to the movement of people (Woudsma, 2001).

Recent observations have emphasised that modern logistics has been shaping urban development and land-use, due to new supply chain organisation and logistics network design. For example, re-development of warehousing districts, inner-city rail yards and freight consolidation facilities, among many others, have transformed land-use and the value of housing, retail or business services (Hesse, 2008). Furthermore, the EU medium- to long-term (2030 and 2050 respectively) agenda to address CO₂-free city logistics, requires the introduction of green truck fleets and that other technological interventions and economic measures - e.g. the green taxation regime suggested in LOGMAN (2012) - be adopted by cities. The importance of retail distribution in emerging megacities is covered in Blanco & Fransoo (2013); and the role of logistics clusters in global competitiveness and regional growth, in Sheffi (2013). These trends, along with increasing transport activity, apply pressure on local authorities to ensure an efficient and effective land-use policy, for service businesses and personnel, for a smooth-functioning economy. Recent efforts to examine the role of local authorities in addressing city logistics point to a need for generic decision-making frameworks, to facilitate meaningful interaction between the various urban freight stakeholders (Ballantyne and Lindholm, 2014; Ballantyne et al., 2013). In particular, to avoid the sole focus on the city logistics measures and schemes, and to envisage adoption of a monitoring and evaluation framework - supported by the assessment of performance indicators and knowledge transfer - to

help local authorities with urban freight policy decision making and coordination (Lindholm, 2013; Lindholm and Blinge, 2014). This paper aims to contribute to the development of such a decision-making framework, based on a collaborative approach to the planning and implementation of a sustainable urban supply chain.

3. Methodology

3.1. Overview

The DMF methodology is used by the Asian Development Bank (ADB) and outlines a systematic way of analysing, conceptualising, designing, implementing, monitoring and evaluating development assistance projects (Asian Development Bank, 2007). This methodology is a form of Logical Framework or LogFrame approach (LFA), which was developed in 1969 for the U.S. Agency for International Development, to assist in the evaluation of technical assistance projects (Rosenberg and Posner, 1979). Since then, its use by a wide range of development organisations - across the world - has caused it to be considered almost the aid industry standard tool, for project management (Crawford and Bryce, 2003).

The LFA is a set of interlocking concepts, used together in a dynamic approach, to develop a well-designed, objectively-described and evaluable project (Rosenberg and Posner, 1979). Over time, the LFA has evolved from a simple framework for structuring project objectives and summarising agreements about project design (Sartorius, 1991) into a more sophisticated, process-orientated approach. For example, for a long time the LFA approach was generally applied by international agencies without the participation of stakeholders: “by technocrats working within the comfort of their offices without regard to real community needs” (Sartorius, 1991, p. 143). In contrast, the key to many current applications of the LFA is its participatory approach, involving a wide range of stakeholders, for consensus building within the project. Although the LFA is understood and applied in a multiple of ways across institutions (Bakewell and Garbutt, 2005), the fundamental structure and purpose of the LFA has remained unchanged since the original conception of the methodology, in 1969 (Crawford and Bryce, 2003). The DMF methodology, on which this paper focuses, is a form of LFA; the DMF processes do not differ significantly, neither do their tools (LFA matrix and DMF table).

3.2. The DMF design process and the DMF matrix

The DMF methodology (Asian Development Bank, 2007) can be defined as an analytical, presentational and management tool. The DMF methodology consists of a design process and a matrix, visualising the results of this process. The aim of the DMF design process is to help to better

understand the complexity of the issues the project aims to address, to determine appropriate objectives, and to select the most suitable strategy to address the problem. The results of the DMF process are displayed within the DMF matrix, a 14 frame matrix with four major columns, similar to the logical framework used by aid agencies.

Key to the DMF design process is its participatory approach, involving stakeholders in all four stages of the project design phase: stakeholder analysis; problem analysis; objectives analysis; and alternatives analysis. The *stakeholder analysis* aims to shed light on stakeholder interests, their perception of problems, and their available resources to address them, as well as their mandates. The *problem analysis* intends to identify the major problem (commonly referred to as the “development problem”) that the project aims to address, and the related chains of cause and effect. The development and visualisation of these cause-effect relationships is achieved by means of a problem tree. Subsequently, the problem tree is transformed into an objectives tree, through an *objectives analysis*. As a result, the ‘cause-effect’ relationships related to the development problem are transformed into ‘means-ends’ relationships of the objectives. Finally, the *alternatives analysis* aims to develop alternative means of achieving the desired objectives, to assess the feasibility of each alternative and to reach an agreement among stakeholders on the most appropriate strategy. To summarise and present the project design in a standardised manner, the DMF matrix visualises the results of the DMF design process, as illustrated in Table 1.

Table 1. DMF Matrix (Asian Development Bank, 2007, p. 21)

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions/ Risks
Impact			
Outcome			
Outputs			
Activities with Milestones			Inputs

The vertical axis of the matrix presents a hierarchy of objectives (first column) and assumptions/risks (last column). It communicates how the project aims to achieve results, by converting a series of inputs into a set of outputs, which in turn are expected to achieve desired outcomes and contribute to a broader impact (Asian Development Bank, 2007). The objectives and assumptions, at each level of the matrix, must be necessary and sufficient to bring about achievement at the next level up. This

relationship is known as the ‘vertical logic’ of the matrix. The middle two columns of the matrix form the ‘horizontal logic’. These list verifiable performance targets and data sources for each level, to assess progress towards the objectives and thereby outline the basis for monitoring and assessment of the project.

3.3. Limitations

The LFA has been subject to notable criticism over the years and this has been acknowledged in the literature. For example, while it theoretically provides a framework that encompasses all stages of a project lifecycle, it has proven inadequate for project monitoring and evaluation. As a result it is, in practice, only used for the project planning process (Bakewell and Garbutt, 2005; Crawford and Bryce, 2003). This limitation is based on a number of factors, which includes the absence of a time dimension allocated to strategy implementation and the static nature of the LFA (Crawford and Bryce, 2003). Related to the latter point, however, it has to be noted that the methodology provides the basis for a revision of the LFA throughout the programme cycle, but in practice this rarely happens (Bakewell and Garbutt, 2005). Despite these criticisms, it is considered the best option currently available for planning and monitoring development work (Bakewell and Garbutt, 2005) and this explains why a large number of development organisations continue to rely upon it.

4. Case Study

The decisions of a variety of actors contribute to the realisation of freight activities within urban and non-urban areas (Ballantyne et al., 2013). To describe the urban freight picture in Como, it is hence useful to shed light on some of the main actors involved. This chapter presents three main groups of actors: receivers (companies that receive goods and services); carriers/logistics operators (companies that deliver goods and services into the urban area); and local authorities (responsible for implementing freight policies and regulations). It thereby draws on the categorisation used by Muñuzuri, Larrañeta, Onieva, & Cortés (2005), in the context of the actors capable of implementing city logistics solutions.

4.1. Receivers

In Como, there are approximately 1.700 retailers¹, with a high concentration in the historical centre. Most of them are small (95%), providing goods to the residents of the immediate neighbourhood². The fragmentation of the retail system is a common feature in Italy, in contrast to other European countries such as Germany, UK, France and Spain (Danielis et al., 2010). In addition to the retail

¹ 2013 data (ASR Lombardia), available at <http://www.asr-lombardia.it/ASR/i-comuni-della-lombardia/commercio-interno/> (accessed 5 April 2014).

² 2013 data (ASR Lombardia), available at <http://www.asr-lombardia.it/ASR/i-comuni-della-lombardia/commercio-interno/commercio-al-dettaglio-in-sede-fissa/tavole/90006/> (accessed 5 April 2014).

stores, there are 785 bars, hotels and restaurants³. This high overall number of commercial premises is also due to the touristic value of the city, which is visited by approximately 190.000 people each year (2003 data, LIUC Università Cattaneo, n.d.). Moreover, there are more than 11.000 local businesses and artisans in Como⁴, which may act as receivers, shippers and own-account freight operators. Finally, being the capital city of the Province of Como, the city hosts a social services infrastructure, such as a hospital, schools and a university.

4.2. Carriers/Logistics operators

This category encompasses companies that deliver goods and services into the urban area. These are generally transported by private carriers (third-party transport operators), the producing companies themselves (own-account operators) or by businesses on their own account (Gentile and Vigo, 2013)⁵. In Italy, the latter two categories represent an important segment of urban goods distribution. In fact, the share of these operators, compared to third-party transport operators, is 63% in the central area of Milan (Vaghi, 2009) and up to 78%, in other Italian cities (Danielis et al., 2010). These services are generally characterised by a lower loading factor, suboptimal routing and the use of more polluting vehicles, compared to third-party operators (Danielis et al., 2010).

It is difficult to clearly depict the actors who deliver goods in Como, due to lack of data. Almost 400 professional freight providers (own-account or third party transport operators) can regularly enter the Limited Traffic Zone (LTZ) in the historical centre, according to the number of authorisations issued in 2012 to enter this area⁶. In addition, the City Council released 95 permissions for retailers who haul their goods themselves.

4.3. Local authority: regulations and management of UCC

The third category of main freight actors is local authorities. These are generally interested in assuring an attractive city, for residents and tourists, as well as in fostering the economic activity of the city (Harris, 1994). Within this context, local authorities have the responsibility and possibility to optimise urban logistics activities through policy and planning, based on a neutral relationship with all stakeholders (Lindholm, 2012b). The initiatives undertaken in this area by the Como City Council are interesting, as they reflect well the general approach followed by local authorities throughout Italy.

³ 2013 data (ASR Lombardia), available at <http://www.asr-lombardia.it/ASR/i-comuni-della-lombardia/imprese/imprese-registrate-nelle-cciaa/tavole/13556/> (accessed 5 April 2014).

⁴ 2012 data (ASR Lombardia), available at <http://www.asr-lombardia.it/ASR/i-comuni-della-lombardia/artigianato/imprese-artigiane-registrate-nelle-cciaa/tavole/90001/> and <http://www.asr-lombardia.it/ASR/i-comuni-della-lombardia/imprese/imprese-registrate-nelle-cciaa/tavole/13556/> (accessed 5 April 2014).

⁵ In Italy, transport on own account is defined as delivering goods with vehicles of the company, which is also the producer or seller of these goods. Third-party transport operators provide delivery services on behalf of another company.

⁶ A specific geographical area within the urban area where the access and circulation of vehicles is restricted.

For a long time, transport policies in Italian cities consisted mainly of infrastructure and public transport planning. However, the past two decades have seen an increase in the establishment of limited traffic zones (LTZ), pedestrian areas, parking policies and cycling infrastructure (Ministero delle Infrastrutture e dei Trasporti, 2012). In 2010, out of 116 provincial capitals in Italy, 94 cities established an LTZ with similar features⁷ and the total number of LTZs enforced in Italy nears 170.

The LTZ in Como has been operational since the 1970s and covers the historical centre - in large parts pedestrianised - and restricts access, parking and the circulation of motorised vehicles. The regulation was issued, and often reviewed, in order to affirm the 'pedestrian priority' concept within the historical centre, which is very important due to the touristic character of the city. Authorisations for access and parking are available upon request, for 19 different vehicle and user categories, among which are three main categories classifying vehicles used for freight activities. Authorised freight vehicles are allowed to access the LTZ area for a maximum of 30 minutes, during one or two time-windows, depending on the category to which they belong⁸. Hybrid and electric vehicles – introduced in 2014 in the context of the city logistics project this paper describes – are not constrained by time windows and are allowed to enter for loading/unloading activities for 30 minutes.

In Italian cities, the same problem of lack of enforcement of traffic regulations by local authorities can be seen as in Spain, raised by Muñuzuri et al. (2012). In Italy, the legislation does not allow the monitoring of vehicles exiting LTZs, in order to protect the privacy of car and van drivers⁹. A result of this legislation appears to be a concentration of vans entering the LTZ in the morning and staying in the city centre all day, in contravention of the time window limitations.

Como has tested the establishment of an urban consolidation centre (UCC), following a common practice in Italian medium sized cities, since the early 2000s, to rationalise urban distribution of goods. For example in 2007, public funding supported the establishment or enlargement of 18 UCC schemes in Italy (Vaghi and Percoco, 2011). Following the concept of the UCC scheme in Padua ('CityPorto'), the municipality of Como established a UCC in 2009 (called 'Merci in Centro') and since then it has been managed by the in-house company 'Como Servizi Urbani'. The delivery service runs twice daily and collects freight from the UCC to distribute to Como,

⁷ 2012 data (Istat), available at www.istat.it/it/archivio/65969 (accessed 5 April 2014).

⁸ The ordinance distinguishes mainly among i) vehicles for self-provision of businesses; ii) own-account operators and carriers; and iii) postal services and express couriers. Vehicles for self-provision of commercial premises are authorised to enter for loading/unloading for 30 minutes during one time window. Own-account operators as well as carriers are allowed to enter during two time windows. The third category encounters the most favourable conditions with two extended time windows during which they are authorised to enter for 30 minutes, which is considered as a situation where *de facto* no time windows exists.

⁹ Presidential Decree n.250, 22/06/1999.

using two hybrid vans. The current volumes transported are too low for the service to be financially viable. Among the reasons for the unsuccessful market uptake of the scheme was the failure to provide a time window exemption for UCC vehicles, for entrance to the central area. This has now been corrected, in 2014.

4.4. Freight activity and major effects

This section attempts to outline the current picture of freight activity in Como and its major social and environmental effects. Freight activity accounts for 8.5% of the traffic volume in Como, according to a 2009 traffic count which showed that almost 40,000 motorised vehicles entered and exited the historical centre of Como between 7 a.m. and 10 a.m. on an average weekday (Comune di Como, 2012a). This means that during each of these three morning hours, an average of 1,100 commercial vehicles entered and left the historical centre. Most of the vehicles were vans (85%), followed by lorries (14%).

Transport related activity in Como contributes to several negative environmental and social effects - mainly congestion, air pollution and noise. Air pollution in Como is mainly based on high concentration levels of ozone (O_3), PM_{10} and nitrogen dioxide (NO_2). Throughout the past decade, these pollutants have regularly exceeded the target and limit values established by the European Directive 2008/50/EC for the protection of human health (Mondini and De Martini, 2013). The road transport sector contributes significantly to the emission of pollutants in Como and in particular to the critical values of O_3 , PM_{10} and NO_2 . In effect, sector related activity caused 74% of 2010's NO_x emissions, 40% of the precursors for O_3 and 29% of PM_{10} ¹⁰. Although freight accounts for less than 10% of total road transport volumes in Como, the majority of emissions related to transport activity air pollutants are generated by commercial transport (PM_{10} : 54%, NO_2 : 69%; precursors of O_3 : 62%)¹¹.

Congestion dramatically limits the accessibility to Como and significantly affects the quality of life of its residents. While there are no available data on congestion levels for this area, private transport relies highly on private, motorised vehicle use (Comune di Como, 2012b) - reflected in the high number of registered private vehicles. In 2010 there were 597 registered cars per 1.000 residents in Como¹² - slightly less than the Italian average, which is one of the highest levels in the world and second highest among the EU-27 states (European Union, 2013). Congestion problems in Como are also related to its particular orographic characteristics, which limit the physical space to

¹⁰ Ibid.

¹¹ Ibid.

¹² 2012 data (Istat), available at: <http://www.istat.it/it/archivio/96516> (accessed 5 April 2014).

access the city. In fact, the central part of the city is situated in a basin, limited by surrounding hills on three sides and by Lake Como.

5. Analysis

The DMF approach provides the framework for involving stakeholders in all stages of the design of a project. For the application of the DMF to the city logistics project planning in Como, four major events were organised in 2012 and 2013: two half-day workshops, involving a wide range of stakeholders and two short roundtables, with a few key stakeholders. Four facilitators, staff members of a research institute in Milan and the Region of Lombardy, guided the consultation process. A range of local freight stakeholders attended the two half-day workshops, held in October 2012 and February 2013, in Como. The following Table 2 provides an overview of the content of the stakeholder consultation events.

Table 2: DMF process and matrix in Como

<i>Analytical and planning process</i>	Stakeholder analysis	First workshop and
	Problem analysis	follow-up round-tables
	Objectives analysis	Not applied
	Alternatives analysis	Second workshop
<i>DMF matrix</i>		Desk analysis

‘Freight stakeholders’ includes all individuals, groups, organisations, institutions and companies that have an interest in the system of urban freight (Ballantyne et al., 2013). In Como, the following categories of freight stakeholder attended the DMF workshops: local and regional public authorities; associations representing local businesses and retailers; associations representing freight operators; scientific bodies; the operator of the UCC scheme in Como; and an environmental organisation (refer to Annex 1 for the complete list of participating organisations).

5.1. Stakeholder analysis

Following the Asian Development Bank (2007) methodology, the project design process starts with a stakeholder analysis. This helps to clarify which people and organisations are directly or indirectly involved in, or affected by, a specific problem and which groups are supportive of the project strategy and which oppose it and subsequently obstruct project implementation (Asian Development Bank, 2007).

Initially, each stakeholder filled out an input form, to state their interests and perceived problems regarding freight transport in Como, the resources they would put forth in support or in opposition to the project, and their mandates. The DMF facilitators then divided the stakeholders randomly into three groups and each stakeholder presented their template within these groups under the guidance of a facilitator. Subsequently, the facilitators summarised, to the plenary, the main elements which had emerged during the stakeholder analysis. The following main interests emerged:

- To promote environmentally, socially and economically sustainable urban freight transport in Como with a focus on reduced air pollution, congestion and traffic volumes;
- To improve the existing UCC service 'Merci in Centro' and to increase its financial viability;
- To promote the development of innovative vehicle technologies; and
- To satisfy the requirements for an effective provision of urgent maintenance services within the LTZ.

In summary, while the priorities of interests differed among some of the stakeholders, a broad consensus emerged regarding the need to increase the efficiency and sustainability of the current urban freight system.

5.2. Problem analysis and problem tree

The problem analysis is the second diagnostic tool applied in the DMF situation analysis, after the stakeholder analysis. It is applied to analyse the existing situation surrounding a given problem context, to identify the major related problems and constraints associated with the problem, and to visualise the cause-effect relationship in a diagram, which is referred to as the 'problem tree' (Asian Development Bank, 2007).

To create an environment that encouraged the discussion of problems, the facilitators created groups of stakeholders with similar background and knowledge levels: public authorities, transport sector, retailers and artisans, and local research institutes. Before starting the group work, the DMF facilitators explained the working steps necessary for developing the problem analysis. First, they proposed a major problem that the project aimed to address ('The freight transport system in Como is not efficient and sustainable') and then asked for the consensus of the stakeholders. Once all stakeholders had accepted the proposed issue and the problem was written on a flipchart, the breakdown of its causes and effects began. To start with, the facilitators proposed the following five related issues associated with the major problem, based on the feedback from the stakeholder analysis:

- Obsolescence of the freight vehicle fleet;

- Suboptimal rules regarding loading/unloading activities within the LTZ;
- Fragmented demand;
- Orography (characterised by its position in a converging valley and at Lake Como); and
- Congestion.

For each of the five problems, the four stakeholder groups had the task of analysing the causes and sub-causes. Furthermore, the facilitators invited the groups to think of additional problems - directly linked to the major problem - that had not yet been mentioned by the facilitators. The stakeholders wrote down, on post-it notes, all causes that emerged during the discussions. Subsequently, the facilitators presented each post-it note to the plenary and allocated them to one of five A4 sheets on a flip chart, pinned underneath the major problem and representing one of the five problem categories. These results formed the fundamental basis for the facilitators to develop a problem tree, thereby deciding on the relationships and hierarchies of the problems. Few effects had emerged during the DMF problem analysis, because the discussion had focused on the causes of the major problem, rather than its effects. Figure 3 illustrates the final problem tree on freight issues in Como, which emerged from the DMF problem analysis.

To illustrate the problem tree, consider the cause-effect chains related to a low load factor. In Como, this results from a highly fragmented demand for freight, on the one hand, and a highly fragmented supply, on the other. Fragmented demand is related to the customers' expectation of just-in-time deliveries, together with insufficient storage room. Heterogeneity of the opening hours of commercial premises also contributes to a highly fragmented demand. In addition, even though there exists a UCC service in Como that enables a consolidation of deliveries, receivers of goods decline to use this service. The UCC service is perceived as costly, since they are unaware of the benefits of receiving consolidated deliveries, rather than multiple deliveries per day. On the other hand, highly fragmented supply is due to the existence of a multitude of transport companies that organise their transport operations individually. This in turn is caused by their inability to perceive the benefits of collaboration. No information exchange platform exists to facilitate collaboration among companies, who have insufficient knowledge about the cost structure of the urban supply chain. The existing possibility to bundle last-mile deliveries, by using the service offered by 'Merci in Centro', is simply not attractive to them, mostly for perceived cost reasons.

Figure 3. DMF Problem tree for urban freight issues in Como

One work group of three key freight actors could not get involved in the problem analysis process; this included the representatives of the in-house company operating 'Merci in Centro' and two associations representing freight operators. Instead, they led an open discussion, guided by one facilitator. The outcomes of the discussion were useful for the project's purpose, because some consensus was reached. In particular, the representative of the association representing freight forwarders acknowledged the need for traffic regulations, such as the LTZ, as a means of preserving the attractiveness of the city for citizens, tourists and businesses. Moreover, he was generally in favour of a UCC service, but highlighted the burden of additional costs and time for the transport operators, in using this service. He argued that it could only become attractive if the price were to decrease substantially, in which case he would also support stricter LTZ regulations to foster the competitiveness of the UCC service.

In addition to the first stakeholder workshop, two additional roundtables were organised, with key stakeholders such as the local authority, the UCC service provider, freight receivers and transport operators, in order to clarify, confirm and further explore the results, especially regarding problems and possible solutions for revitalisation of the UCC and regarding the needs of receivers and private transport operators. Of note is that these processes included both political parties in power at the time.

5.3. Objectives and Alternatives analysis

The objectives and alternatives analysis specifies the desired future situation and is referred to as the project identification phase (Asian Development Bank, 2007). Within the objectives analysis, the problems captured in the problem tree are transformed into objectives, visualised in a diagram called the 'objectives tree'. For the city logistics project in Como, this step was not carried out with the participation of stakeholders, due to time constraints. Instead, the facilitators subsequently developed the main objective the project aims to address. Following the Asian Development Bank process (Asian Development Bank, 2007), this was simply done by reformulating the major problem at the highest level of the problem tree into a positive desirable objective. The main objective hence became: 'Freight transport in Como is sustainable and efficient.' This was introduced at the second stakeholder workshop, where the facilitators illustrated the main positive effects while considering the different points of view of the stakeholders. However, the main focus of the second workshop was the development of an alternatives analysis. This analysis was constrained to the available alternatives within the city logistics project in Como, focusing in particular on fine-tuning the following elements:

- The re-launch of the UCC in Como ('Merci in Centro') and
- Adapting the LTZ regulations to support the UCC.

It should be noted, however, that the interest and suitability of these two elements to address the urban freight issues in Como clearly emerged during the stakeholder and problem analysis. In particular, the re-launch of the existing UCC centre, as well as the revision of the current LTZ rules, found broad interest, as illustrated in Section 5.2.

In addition to the two city logistics elements discussed during the alternatives analysis, the project includes the implementation of a third element, related to the deployment of environmentally friendly vehicles (full electric vehicles) to deliver goods from the UCC to Como town centre, supported by the use of innovative routing devices to facilitate efficient delivery and trip planning. This technology element of the project was presented to the stakeholders during the second workshop.

The alternatives analysis was undertaken with the help of a questionnaire containing 13 major questions regarding the organisation of the future UCC service and the access rules to the city centre. These questions included: the location of the UCC; the kind of goods the UCC service should focus on; and whether UCC vehicles should be exempt from the LTZ regulations. As stated above, the alternatives analysis focused on fine-tuning the strategy, rather than being open to developing a range of alternatives, as suggested by the Asian Development Bank (2007). In summary, the following three steps were carried out during the consultation process:

1. Stakeholders individually filled in the questionnaires.
2. First round of discussion for consensus finding, within four groups of stakeholders.
3. Second round of discussion for consensus finding, within the plenary.

Regarding the second point listed above, the group of 16 stakeholders was divided into four groups. The groups were formed with the aim of establishing heterogeneity; however, some key stakeholders were put together in one group. Within the groups, each stakeholder had the opportunity to present their answers to the questions. The aim was to agree on a common position for each of the questions, within the group. In the case of diverging answers, the facilitator guided the discussion to find an agreement among the stakeholders. Point 3 was aimed at building a consensus among all stakeholders. To do this, the facilitators who led the group discussions presented the answers of each of the four groups to the plenary. During the presentation, one facilitator summarised and documented the answers, in real time, on a slide. For any diverging positions, the facilitators tried to find a consensus among the whole group and the slide was

accordingly adapted. As a result, the slide presented the main outcomes of the alternatives analysis, upon which all stakeholders agreed, including the following:

- The range of services that should be offered by the UCC service: stakeholders desired a delivery and collection/pick-up service. It should be checked if a storage area for shopkeepers could be made available at the UCC.
- Last-mile delivery price: some stakeholders estimated 2.50-3.00 Euros/100 kg as a suitable and competitive market price.
- Stakeholders agreed in principle to extend the geographic area of the LTZ, but gradually and only after consultation with shopkeepers.
- Stakeholders agreed in principle to exempt 'Merci in Centro' ecological vehicles from the LTZ ordinance.

The results obtained were the starting point to define further the Como city logistics project, since they reflected the stakeholder consensus regarding the regulatory issues of the LTZ and the design of the UCC delivery service.

5.4. Completing the DMF matrix

The DMF matrix, which illustrates the results of the DMF process, was produced by the facilitators after the end of the stakeholder consultation. It is presented in Annex 2.

First of all, the facilitators identified the expected impact, starting from the results of the problem analysis. The main problem had been transformed into an objective that became the main focus for the actions to be implemented. Following this approach, the main **impact** identified was defined as follows: 'The urban freight delivery system in Como will become efficient and sustainable'. This will result in both a decrease in the number of freight vehicles in the city centre and an increase in the number of low emission freight vehicles.

The expected **outcomes** of the project draw on the results of the alternatives analysis. Accordingly they focus on two main levels: first, the implementation of regulations and incentive measures at Municipality level (namely the adaptation of LTZ regulation) and, secondly, fostering the take up of the 'Merci in Centro' UCC initiative. Envisaged actions should bring the approval and enforcement of new regulations, followed by an increase in the number of deliveries by the UCC service.

The specific **outputs** generated within the project consist of the use of environmentally friendly vehicles for urban freight deliveries; the set up of a regulation fostering an efficient delivery pattern; higher reliability; economic efficiency; and user responsiveness to the 'Merci in Centro'

service. Therefore, according to the results of the consultation process, the project will generate the following tangible results: a field test of sustainable, technologically innovative solutions (electric vehicle plus ICT solution); a range of approved measures integrating the existing regulation dedicated to freight transport; and a new business model including a higher level of commitment by stakeholders to the 'Merci in Centro' initiative.

The approach helped to sketch a roadmap of activities and milestones representing the basis for the definition and implementation of the required actions, which include a preparation and design phase; testing; and review and consultation activities, in order to reach the goals set within the DMF process. Moreover, the DMF matrix reported the results of the analysis on assumptions and related risks, to be monitored during the development of the actions.

5.5. Results and conclusions of the DMF process in Como

The DMF design process applied to the city logistics project in Como involved a wide range of local stakeholders directly or indirectly responsible for and/or affected by freight traffic. This appears to have brought several advantages: first, the design of the project can draw on the knowledge and creativity of the stakeholders, that otherwise would not be accessible. Moreover, the implementation of the city logistics project builds on the consensus achieved among the stakeholders, making its success more likely.

To summarise the main results obtained by the DMF design process, it can first be stated that, while the priorities of interests differed among stakeholder groups, a wide consensus emerged, during the stakeholder analysis, to foster a more environmentally friendly and efficient urban freight transport system. Secondly, the DMF problem analysis revealed a series of problems linked to the current urban freight system, ranging from environmental, inefficiency and safety concerns to an insufficient quality of service of freight deliveries, from the point of view of the receivers. Finally, the alternatives analysis led to consensus building regarding a series of elements, which will be implemented or considered in the context of the city logistics project in Como.

The facilitators made several modifications from the original DMF process to fit the methodology to the specific context. Related to the problem analysis, they proposed a major problem to the stakeholders, rather than developing it together with the stakeholders. This made sense because the project objective was already predefined and the DMF approach served primarily to fine-tune and build consensus for the project elements. In fact, the problem proposed closely resembled that which emerged anyway, during the stakeholder analysis. Subsequently, the

facilitators proposed several problems (related to the major problem) for which the stakeholders were asked to develop the causes and sub-causes. This approach risked that the problem analysis would be affected and shifted in a specific direction. However, this was mitigated by including a wide range of stakeholders. As different disciplines need to work together and define one project plan, the risk of moving in one particular direction is significantly decreased. Finally, the objectives analysis was not carried out, mainly because it was unlikely to be able to provide useful insights for the planning of a project where the types of interventions (set up of a UCC, LTZ regulations, etc.) were already predefined.

The commitment of local freight stakeholders in attending the stakeholder events and in contributing to the project design process was high. This is clearly illustrated by the large range of stakeholders who attended both workshops and round tables (see Annex 1 for a list of organisations and individuals involved), their acceptance of the DMF methodology, as well as the quantity and quality of the contributions they put forward. A few key actors did not accept the invitation to the workshops. In particular, local authorities from towns and cities around Como and a few major transport operators, such as the Italian Post, were not interested in participating.

Three factors favoured the high level of commitment from local freight stakeholders. First, they perceived the project as being able to deliver long-lasting outcomes related to the urban freight system. This perception is based on the strong political support for the project, shown by the Como City Council. In particular, several Councillors and senior staff members of the local authority attended the stakeholder events to prepare the DMF framework. In addition, the local authority guaranteed financial resources for the local UCC service ('Merci in Centro') and the modification of the current LTZ ordinance. Secondly, neutral facilitators guaranteed the involvement of a diversity of stakeholders with different and sometimes opposing interests. This is different to the traditional urban freight planning process, which is usually guided by local authorities, since they have the responsibility and competencies to implement urban freight measures. If the local authority in Como had assumed the facilitator role, it is believed that the commitment of some stakeholder groups would have been less, in particular those who do not feel represented by the current local government, or who feel disappointed by previous initiatives put forward by the city council. Thirdly, stakeholders agreed that there is an urgent need for action to improve the current urban supply chain in Como and therefore were motivated to participate in the project.

As a final remark regarding the use of the DMF process in the context of urban freight planning, it is highlighted that the results obtained from the stakeholder consultation should be integrated with desk-based and empirical research, such as traffic counts. This is necessary to verify

the problems perceived by stakeholders and to obtain a more comprehensive picture of the urban freight system. In this context, it is helpful to invite stakeholders, during the workshop, to indicate data sources that may back up their perceived problems.

5.6. Project implementation

The interventions that emerged from the DMF process were applied to fine-tuning a city logistics project in Como. This resulted in a two-week trial, in May 2014, during which four elements were tested in parallel: a modified UCC; changes to the access rules of the LTZ; a new routing system adapted to electric vehicles; and the use of a battery electric van - including a new profiler giving information on the battery charge level expected on different routes. The aim of the trial was to obtain a clearer idea on the outcomes of the logistics project. In particular, it aimed to assess the magnitude of the costs and benefits for customers, to quantify impacts (for example in terms of external costs) and to attribute the benefits, by stakeholder. Following the trial, the main elements of the city logistics interventions remain in place. Specifically, the modified UCC and the changes to the LTZ access rules are to be made permanent.

6. Conclusion and directions for further research

The importance of a decision making framework to facilitate meaningful interaction among urban freight stakeholders was highlighted in the literature, to help local authorities in managing urban freight (Ballantyne and Lindholm, 2014; Ballantyne et al., 2013; Lindholm and Blinge, 2014; Lindholm, 2013). To address the gap in the literature, this paper illustrates a logical framework approach methodology, as applied to urban freight stakeholder engagement, in promoting a sustainable urban supply chain. The adoption of the design and monitoring framework (DMF) approach resulted in a structured consultation process, with urban freight stakeholders, to address city logistics challenges in Como, Italy.

This paper offers some new insights with regard to managing urban freight, which allows the city authority, receivers, carriers and other local freight stakeholders to include their aspirations from the beginning of the city freight planning process, despite their differences in priorities. Referring to the logical framework approach literature, such as Bakewell and Garbutt (2005), lessons learned from the urban freight stakeholder consultation in Como point to both strengths and weaknesses of the applied DMF approach. These can be seen in Table 3.

Table 3: Strengths, challenges and weaknesses of the DMF applied in Como

Issue	Potential strengths	Challenges	Weaknesses
Vertical Logic	Provides logical link between means and ends related to a hierarchy of objectives.	To achieve consensus on objectives among different stakeholders.	Assumption of vertical logic is simplistic because reality is far more complex.
	Increases the accountability of projects by producing visible impacts and by defining a clear set of expectations of what the work should achieve.		Failure to capture unanticipated objectives. This is especially a problem when the DMF is applied to project evaluation.
Horizontal Logic	Ensures consideration of appropriate indicators and takes account of the risks and assumptions.	To identify meaningful and measurable indicators, especially for the higher-level objectives.	Emphasis on objectives that are easier observable and measurable, rather than on more qualitative objectives such as for example improvement in the quality of life.
	Provides the basis for the monitoring and evaluation system.	To identify indicators for impact assessment that reliably link the work of the project to the progress towards its goals, since many other factors may come into play.	
Format and application	Provides a formal procedure for planning projects and provides a framework to carefully think through the project.		Requires training session and support to ensure that facilitators can apply the approach. For this city logistics project, a training session of half-day prepared the facilitators.
			Requires investment in time and resources to go through the DMF process.
	Provides a thinking tool, which allows flexible application. For example, it does not require that stakeholder participate within all steps involved and some steps may be applied in a reduced form.	To revise the DMF matrix during the project implementation. This may result in difficulty, e.g. because the stakeholder agreement on the project may act as a lock-in of solutions.	
	Participatory approach enables incorporation of different views, creating strong commitment among actors and disseminating the project successfully to the local community.	To put the participatory approach into practice e.g.: <ul style="list-style-type: none"> • need to involve a wide range of stakeholders who must be willing to invest significant time to go through the DMF. • difficult to involve stakeholders who are opposed to changes to the current system or who do not expect benefits from the projects. 	Difficult to make further revisions as the project continues if there has been a high initial investment in the consensus finding process, as any revision may be felt as undermining the consensus.

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- risk that not all stakeholders are listened to equally.

Provides a summary of the key elements of a project in a consistent and coherent way.

Matrix represents a simplification of the DMF process. Risk that some interesting details may be left out because they do not fit the matrix.

Enables comparison of city logistics projects in terms of their contents and for evaluation.

The DMF process in Como allowed a structured consultation process to introduce a demonstration of an initiative aimed at increasing the sustainability of the urban supply chain. Of course, the final evaluation of success or failure of the project still depends on many aspects that will emerge over the course of several years from the time when the consultation process took place. It is certain, however, that the DMF process led to a city logistics project that was based on the consensus of the freight actors and stakeholders involved. Specifically, they committed to increasing the sustainability and efficiency of the urban freight system by introducing three city logistics elements: a change to the regulations related to the Limited Traffic Zone (LTZ); the use of the (revised) urban consolidation centre; and hybrid electric truck adoption. Their acceptance and commitment regarding these elements is in turn very helpful for the success of a city logistics project. With regard to the urban consolidation centre in Como, this aspect is clear, as the stakeholders - in particular the receivers and transport operators - are the potential clients of the urban consolidation centre.

A city logistics project was developed via the DMF approach, based on the consensus of a range of stakeholders, which can be easily assessed and monitored. It will thus support the local authorities in promoting eco-efficiency innovations, as part of their sustainable city strategy - much in the same way that the private sector (see for example: Rossi *et al.*, 2013) is addressing the sustainable supply chains agenda. Further research is needed to compare the DMF approach with common or other types of public consultation processes that discuss eco-efficiency innovation. A cross-sector examination (e.g. health, education, military, etc.) would improve the richness of the findings of this study. Review of this study through the lens of institutional theory that exhibits

'coercive', 'mimetic' and 'normative' pressures within organisations (see for example: Kauppi, 2013; Moxham & Kauppi, 2014) would also broaden understanding of the ways that sustainable urban supply chains can be progressed to influence city institutional framework adoption and to contest a new theory from this case study research.

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Annex 1

The DMF design process in Como involved the following local stakeholder Associations and public Institutions:

- Local and regional public authorities:
 - Councillors and senior staff members of the City of Como, representing the Department of Environment, the Department of Transport and Infrastructures and the Department of Industry and Commerce;
 - Staff members of the Region of Lombardy, representing the Department of General Infrastructures;
- Receivers and shippers:
 - Chamber of Commerce Como;
 - Confcommercio Como (National Association representing shopkeepers and businesses);
 - Confederazione Nazionale dell'Artigianato e della Piccola e Media Impresa Como. (National Confederation of Artisans and small and medium-sized enterprises);
 - Confesercenti Como (Association representing small and medium-sized enterprises in the sectors of trade, services, crafts and industry);
 - Local shopkeepers;
- Forwarders and providers of maintenance services:
 - Associazione Piccole e Medie Imprese Como (Association of small and medium-sized enterprises. During the project workshops the Association represented mainly small enterprises providing maintenance services);
 - Associazione Lombarda Spedizionieri e Autotrasportatori (Road Haulage and Shippers Association of Lombardy);
- Local public transport provider: ASF Autolinee;
- Local scientific bodies:
 - Parco Scientifico Tecnologico Comonext;
 - Fondazione Politecnico;
 - Università di Insubria;
- Urban consolidation service provider in Como: Como Servizi Urbani (in-house company of the local authorities CSU);
- Environmental organization: Legambiente Como.

Annex 2

Completed DMF Matrix

Design summary	Performance targets/indicators	Data sources/reporting mechanisms	Assumptions and risks
Impacts			
Urban freight delivery system in Como will become more efficient and sustainable.	<ul style="list-style-type: none"> Decrease of number of freight vehicles in the city centre (%). Increase the number of low emissions freight vehicles in the city centre (%) 	<ul style="list-style-type: none"> Access restrictions monitoring system (municipality). Public register of vehicles. 	<p>A: Regulation will be effectively enforced on the street.</p> <p>R: Adaptation of main operators to new limits (e.g. low emission fleets), negatively affecting congestion (but positive impact on environment).</p>
Outcomes			
1. Implementation of updated municipality vehicle access regulations and incentive measures for sustainable transport solutions.	Approval and enforcement of new regulation.	<ul style="list-style-type: none"> Municipality regulations Policy reports on enforcement (if available, otherwise direct data). CSU – Merci in Centro performance reports (if available, otherwise direct data). 	<p>A: Results from drive tests will bring knowledge on most suitable technology to be adopted.</p> <p>A: New regulation fostering the take up of city logistics initiatives.</p> <p>R: Lack of acceptance of regulatory measures.</p>
2. The uptake of Merci in Centro UCC initiative (will improve sustainability of urban freight delivery system by using (hybrid-) electric freight vehicles).	Increase in the number of deliveries by Merci in Centro.	<ul style="list-style-type: none"> CSU – Merci in Centro performance reports. 	<p>A: New business model incorporating quality issues and effective pricing strategies.</p> <p>R: Lack of commitment of forwarders and other stakeholders in delivering via Merci in Centro.</p> <p>R: Infrastructural costs for enforcement not sustainable for municipality.</p>
Outputs			
1. Environmentally friendly vehicle fleets are performing urban freight deliveries.	<ul style="list-style-type: none"> Demonstration of electric vehicle and ICT solutions within the Merci in Centro initiative. 	<ul style="list-style-type: none"> Smartfusion project outputs (deliverables). Official publications of the measures. 	<p>A: Test activities will be successfully performed and provide consistent data for the evaluation of benefits and highlights possible criticalities.</p> <p>R: Policy commitment changes on regulatory issues.</p>

2. Regulation of access in the city centre is fostering a rational and sustainable delivery pattern.	<ul style="list-style-type: none"> Number of accepted measures dedicated to freight transport supporting Merci in Centro and low emissions vehicles. 	<ul style="list-style-type: none"> Commercial reports of the UCC. Smartfusion project outputs (deliverables). Official publications of the measures. 	<p>A: The consultation process provides information for the development of measures and incentives which are coherent with municipality objectives.</p> <p>R: Policy commitment changes on regulatory issues.</p>
3. The service provided by Merci in Centro becomes (a) more reliable (b) more economically efficient (and with higher load factor) and (c) more responsive to user needs.	<ul style="list-style-type: none"> Demonstration of efficiency for electric vehicle and ICT solutions within the Merci in Centro initiative (in terms of load efficiency – kg/ day, on-time deliveries rate of success, and cost). New business model including higher level of commitment by stakeholders for the Merci in Centro initiative. 	<ul style="list-style-type: none"> Smartfusion project outputs (deliverables). Commercial reports of the consolidation centre. 	<p>A: Test activities will be successfully performed and provide consistent data for the evaluation of benefits and highlights possible criticalities.</p> <p>A: The consultation and business planning activities generate a feasible development path for market conditions.</p> <p>R: Changes in the strategy of supporting the Merci in Centro initiative by the municipality.</p>

Activities	Inputs
<p>Output 1: Environmentally friendly vehicle fleets are performing urban freight deliveries</p> <p>Activity 1.1: Definition of tools and system for the experimentation (Jan 2013-Dec 2013)</p> <p>Activity 1.2: Set up of test activities (Sep 2012-Sep 2013)</p> <p>Activity 1.3: Experiment on freight delivery with electric vehicles and enhanced ICT systems (2014)</p> <p>Output 2: Regulation of access in the city centre is fostering a rational and sustainable delivery pattern</p> <p>Activity 2.1: Consultation and workshops for the definition of measures for urban freight delivery (Nov 2012-March 2013)</p> <p>Activity 2.2: Review and adapt the access restriction regulation to foster environmentally friendly delivery (March 2013-Dec 2013)</p> <p>Output 3: The service provided by Merci in Centro becomes more (a) reliable (b) economically efficient (and with higher load factor) and (c) respondent to user needs</p> <p>Activity 3.1: Consultation and business planning activities to foster the Merci in Centro take up (Nov 2012-June 2013)</p> <p>Activity 3.2: Restructure activities of Merci in Centro initiative in order to improve its effectiveness and maximise its impact on the system in terms of sustainability (March 2013-2014)</p>	<ul style="list-style-type: none"> EC, Green Cars Initiative financing By project partners (staff, resources, infrastructure) By Comune di Como (political discussion) with inputs from project partners (Regione Lombardia, Gruppo Clas) By Comune di Como and CSU (manager of Merci in Centro initiative) with inputs from other Smartfusion project partners (Regione Lombardia, Gruppo Clas) and other stakeholders (AICAI, forwarders, etc.)