

# Sustainable Supply Chain Management in Urban Logistics

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**Abstract** Urban logistics is a field that studies the best solutions for urban freight distribution with high environmental objectives. However, most actions are started by public authorities without taking into account the impacts of the new organizational schemas in the existing distribution enterprises' organization. This chapter proposes a conceptual framework for urban green logistics planning and evaluation, in order to relate urban logistics to green supply chain management, i.e. the public authorities' perspective to the enterprise's vision. Therefore, a dashboard is proposed and illustrated, as well as the conceptual framework, via a case study: the urban logistics system Cityporto (Padua, Italy).

**Keywords** Case study • Dashboard indicators • Sustainable SCM • Urban freight distribution

## 1 Introduction

Sustainable logistics and transportation constitute a primordial research axis in the enterprises' governance. For example, in 2009, at the International Meeting of Logistics Solutions (SITL<sup>1</sup>) in Paris (France), the Environment and Logistics

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<sup>1</sup> <http://www.sitl.eu>

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Demeter Club and the French Agency of the Energy (ADEME) have validated 10 categories of “good practices” for a better respect of the environment.<sup>2</sup> Sustainable transportation and logistics needs to refer to the concept of sustainable development (Rio of Janeiro summit 1992). Its practice needs to be focused in a generational horizon (more than 25 years) and to join three consubstantial elements, which are respectively related to the economical, the environmental and the social spheres of the sustainable development. However, and as stated in Routhier et al. (2009), although some fields like building and manufacturing industries and energy production are doing quite well, there are still some “bas elements”, from which freight transport and urban logistics energy management.

Before the 1980s, the management of freight flows for urban supplies did not had an important impact to road congestion and air pollution in urban areas. Moreover, public authorities’ actions related to logistics and freight transportation policy and planning in urban contexts were limited to specific measures to deal with emergencies (Gonzalez-Feliu and Morana 2010). With urban traffic increasing, and the raise of congestion not only in big but also in medium cities, some public administrations have affronted the problematic of urban freight distribution, that was managed traditionally only by the transportation carriers. Between the 1990s and the beginning of the twenty first century, with the contribution of public administrations and other support funds, several studies and pilot tests have been made to learn how to organise urban freight distribution in order to decrease traffic and pollution derived from this transportation sector. Most of these studies are oriented to support public authorities in decisions related to urban freight transportation planning. However, and since the urban logistics are mainly related to the last mile of classical supply chains, the enterprise’s strategies have to be confronted to the collective interests related to urban freight transportation and logistics operations.

This chapter aims to identify and present the relations between the enterprise’s interests and the public authorities’ goals through collaborative sustainable urban logistics systems. The chapter is organized as follows. First, the chapter presents the main principles of Sustainable Supply Chain Management (SuSCM) and relates them to urban logistics through a synthetic literature review. Then, such principles are illustrated by their practice at Cityporto, a sustainable urban freight distribution system in Padua, Italy. This experience shows however that, although this project incorporates practices that can be considered as part of a SuSCM approach, the global reflection is only at its beginnings.

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<sup>2</sup> Information retrieved from *Les Echos Magazine* professional magazine, of 2009/03/24, p. 30. We thus find (1) In advance of the transport phase (upstream), design products differently, (2) Reorganize the company’s production and purchasing, (3) Organize your logistics and transport better, (4) Combat unnecessary miles and speeds, (5) Reduce consumption of the means of transport, (6) Consolidate transport operations so as to reduce unitary costs and emissions, (7) Mutualize and cooperate between carriers and providers, (8) Optimize your storage and distribution platforms, (9) Improve the later links in your distribution chain, and (10) Communicate in order to lend value to pioneering approaches.

## 2 Urban Distribution in Sustainable Supply Shain Management

Traditionally, urban freight transportation planning has been made by the operating companies. In the last 20 years, we see that the public authorities have started to get involved into the development of solutions to deal with the major problems of freight transportation in city centres (Ambrosini and Routhier 2004; Munuzuri et al. 2005): congestion, air pollution, noise and other nuisances. Therefore, urban logistics researches are in general related to public authorities or to public—private collaboration, and supply chain management theories and methods are seldom used when evaluating urban logistics (Gonzalez-Feliu and Morana 2012). However, the main organisational aspects of urban logistics schemes are closer to those of many logistics operators, and a city logistics solution needs to be considered in a global (sustainable) supply chain management point of view, integrated in the global chain(s) of the delivered products (Allen and Browne 2010). For this reason, it is important to include urban logistics developments on sustainable supply chain management logic in order to make a strong link between a city logistics solution and the supply chain(s) it is related to.

Considering the current economic, environmental and social/societal context, it is imperative that an enterprise thinks “sustainably”. More and more academic works are interested to the link between logistics and sustainable development (Belin-Munier 2010). Regarding SuSCM, Seuring and Müller (2008) consider the pressures as such legal demands and regulation, customer demands, response to stakeholders, competitive advantage, environmental and social pressure groups and reputation. Effectively, logistics is often considered by the different actors as the “reason to be” of each firm belonging to a supply chain. Without logistics, no raw material can be extracted, transformed and delivered to the final user. As a natural continuation of the last works on logistics, more concretely those related to SCM, we reckon that it is now primordial to focus on Sustainable SCM that associates, reassociates and integrates all the works and reflections on the SCM, the Green SCM, the Social/Societal SCM, and, of course, all considerations about the transportation’s improvements.

Let us explore first the economic component of SuSCM, i.e. classical SCM. From the literature in logistics we can retain that Supply Chain Management (SCM) must be considered by the definition done by CSCMP (Council of Supply Chain Management Professionals<sup>3</sup>): “*Supply Chain Management 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. In essence, Supply Chain Management integrates supply and demand management within and across*

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<sup>3</sup> <http://cscmp.org>

*companies. Supply Chain Management is an integrated function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance and information technology”.*

Generally, SCM can be examined on the basis of three types of prerequisites: co-operation, customer satisfaction and performance (GRLT 1995; Lambert et al. 1998; Mentzer et al. 2001; Min and Mentzer 2004). But, nowadays, considering the non-negligible weight of the human factor in the transportation and logistics fields; we think that the human factor has to be specially studied in the Social/ Societal SCM. In fact, SCM approach focuses on the co-operation of intra and inter-enterprise processes and the measure of its performance.

Firstly, and in a general way, the co-operation prerequisite highlights the importance of a clear product/service design and process along the supply chain. In this context, a reflection must be done on the entire supply chain (upstream, production and downstream). Two elements are important in this prerequisite: traceability (ability to trace and follow a product) and transportation (physical transport of each product from point A to point B, defined respectively an origin and a destination point). Secondly, the performance prerequisite consists of simplifying a complex process for each organization in the business network. It highlights the driving role of information systems such as Advanced Planning Scheduling (APS), Enterprise Resource Planning (ERP), Electronic Data Interface (EDI), etc. But also, its recognition, from an organizational, tactical and strategic perspective, requires in an end result the definition of Key Performance Indicators or metrics in order to appreciate the competitive advantage through Balanced Scorecard (Morana 2002).

Specifically on the transportation component of the SCM, it is important to carefully think about and to adapt the distribution (or upstream) network to the economical, geographical, organizational and quality constraints (Gonzalez-Feliu 2012). More precisely, the main questions in freight distribution tactical and operational planning are related to supply and inventory policies (warehousing), vehicle routing and scheduling (transportation management), vehicle assignment to a route and crew assignment to each operation. In city logistics solutions, many aspects have to be considered in strategic planning (Gonzalez-Feliu 2008; Ville et al. 2012):

- **Financial aspects:** financing is important for such systems. Many of them are based on public–private–partnerships (PPP), or in strong public authorities’ subventions.
- **Infrastructural aspects:** the infrastructures’ usage, alongside to the need of realizing new infrastructures, is evaluated.
- **Organisational aspects:** the distribution system has also to be defined.
- **Vehicle-related technological aspects:** once the distribution system is defined, it is important to find the adequate technological solution.
- **Information and Communication Technologies:** mainly related to traceability, assistance to drivers, communication tools and intelligent transportation systems.

- **Transportation planning tools:** to optimise routes, to manage vehicles and crews (even in real time situations), or to model the traffic in order to evaluate the different solutions.

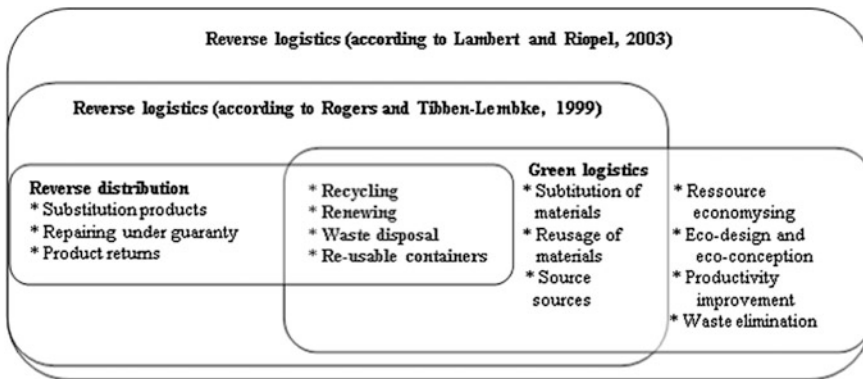
The second element of SuSCM concerns the Green SCM that highlights the environmental aspects of the supply chain. We have to note that since the main goals of urban logistics solutions are environmental, so mental work must be done on how to integrate them into Green Supply Chain Management strategies. It is in the 1990s that the Green SCM found a recognition in the scientific literature (Srivastava 2007). In this field, we find several concepts like the eco-conception and eco-design (Michelini and Razzoli 2004; ADEME 2006), the reverse distribution (Carter and Ellram 1998) and the reverse logistics (Rogers and Tibben-Lembke 1999). Eco-conception and eco-design (related to product design, building and infrastructures with environmental respect targets) are similar concepts that have become popular in the 1990s decade (Michelini and Razzoli 2004; Le Pochat et al. 2007). Eco-designing products and eco-conceiving infrastructures for logistics purposes encourage a global approach designed to prevent or minimise impacts emerging throughout the whole life cycle of products and infrastructures concerning all types of environmental impacts.

In GrSCM, another important concept is that of reverse logistics, defined by Lambert and Riopel (2003) as the environmentally efficient practices of recycling, reusing and reducing amounts of material used. Dekker et al. (2004) refer to it as the logistics process that concerns the integration of used and obsolete products back into the supply chain as valuable resources. According to Rogers and Tibben-Lembke (2001), it is important to distinguish the green logistics and the reverse logistics concepts because they don't follow the same schemas, although several common points can be found (see Fig. 1). The vision of Green logistics proposed by the authors involve eleven domains, i.e. (1) energy and (2) materials conservation, (3) efficient land-use, (4) traffic and congestion reduction, (5) air, (7) water (8) visual, (9) smell and (10) acoustic pollution reduction and waste management, for both (10) conventional and (11) hazardous materials.

Another “global vision” of reverse logistics is that of Lambert and Riopel (2003), who propose a combination of reverse distribution, green logistics and reverse logistics measures and approaches and where the definition of each component does not exactly meet that of Rogers and Tibben-Lembke (2001) (Fig. 2).



**Fig. 1** Connections between reverse logistics and green logistics, according to Rogers and Tibben-Lembke (2001)



**Fig. 2** The main principles of reverse logistics (Lambert and Riopel 2003)

In conclusion, we retain the definition of Green SCM proposed by Srivastava (2007): the “*integration of the environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life*”. It can then be consolidated by three elements: (1) the consideration on the necessity and importance of GrSCM as crucial by all directors, (2) the green design that includes the eco-conception criteria, developing an ‘*understanding of how design decisions affect a product’s environmental compatibility*’ and (3) the green operations that symbolise all the reflections about waste management or, in a more general way, the reverse logistics management.

We have seen above the importance of the economic and environmental aspects of supply chains. However, the human factor is central to the management of any organization. If genuine attention is not paid to the role of individuals within the organization and between organizations, the gains that arise from SuSCM may be diminished. It is primordial to develop a Social/Societal SCM, in other words, to incorporate social/societal issues (in terms of data, network, and interactions) into the management methods and processes of a supply chain. To make it, we refer to Gond’ work (2006), who addresses the convergence between human resources and sustainable development. Indeed, for this author, the sustainable development needs to be based on the human resource management. In this way, it is important to consider both the intra-organizational stakeholders (the employees of the company or the trade unions, for instance) and the inter-organizational ones (recognition made from all others stakeholders).

New trends on Human Resources Management have to be taken into account. In literature, we find several works that analyse the expected competencies by the logistical responsible figures (But following the thoughts made by Gond (2006), the Social/Societal SCM needs to consider each actor in a sustainable development approach. And, according to Morana et al. (2008), it becomes necessary to define a

Social/Societal SCM that integrates a social thought into the SCM. In the same order of idea, Ciliberti et al. (2008) consider a Corporate Social Responsibility where the motivation and the loyalty of the employees increase. In this context, the SA8000 certification must be the norm. In consequence, we suggest to follow the model proposed by Gond (2006), including the literature’s social/societal dimensions applied to the SCM field (for example: the general behavioural context, to be reconciled with the managerial and behavioural components + common culture/ definition of roles/sharing of risks and rewards, rythms of work, reduction of conflict, training, suggestion box), and to Green SCM (for example: professional health and safety).

In brief, from the literature review, we can deduce a general framework for a SuSCM approach of urban logistics. We propose to define the components of SuSCM following Morana’s (2013) representation and include the last-mile transport component as shown in the Fig. 3.

According the importance of sustainable development, we consider that it is important to define clearly a SuSCM. It becomes so convenient to conceptualize a specific aspect for economic SCM, green SCM and social/societal SCM which include sustainable transport. However, we should not forget that SCM (and also SuSCM) is a transverse concept. De facto, each dimension has to be inter-connected. Considering the few studies that analyse the links between logistics and sustainable development, we built an interview guide. The definition of this guide was a long and difficult task, because this guide has to be flexible enough to allow the two actors of the interview (the interviewed vs. the interviewer) to adapt their interventions to each another’s constraints and needs. For example, maximum quantity of responses must be in concordance with the highly restrictive constraint

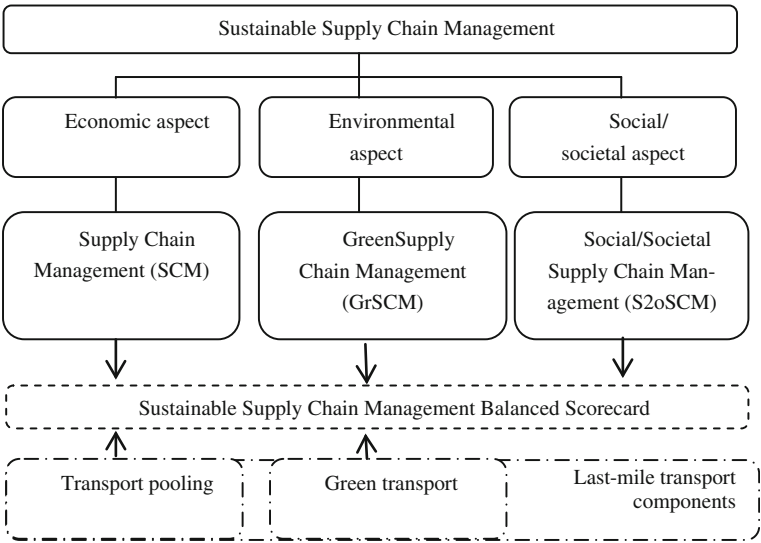


Fig. 3 Main components of the SuSCM (adapted from Morana 2013)

of time availability of the interviewed, which is in general a decisional figure in the enterprise or in the organisation of the public entity.

Taking into account this pre-requisite and having as references the different works presented in the literature review above, we have defined the following interview guide (box 1):

### **Box 1: Interview Guide**

#### Economic variables

- Identification and analysis of each activity included in the enterprise's supply chain (infrastructures, standard procedures)
- Planning methods and technologies (information flows)
- Long term relations (contracts, partnerships) : gain's repartition among actors
- Measuring methodologies and indicators

#### Environmental variables

- Description of the environmental approach:
  - Actors' roles
  - Environmental performance measures
  - Internal waste management
  - Resource's conservation (CO<sub>2</sub>, Energy)
  - Reverse logistics

#### Social variables

- Internal actions:
  - Formation
  - Idea's boxes
  - Management of stress situations
  - Friction reduction
  - Primes
  - Final consumer
- External actions:
  - Actions undertaken on external stakeholders
  - Syndicates and external stakeholders' support (transportation operator's consortiums and associations)
  - Attractiveness
  - Reputation and image

This guide is a support to business case research for the identification of the main SuSCM issues related to urban logistics planning and management.



### 3 An Illustration: Cityporto Padua

Padua is an Italian medium city (about 2,50,000 inhabitants) that has a historical city centre recently classified as Human Patrimony by the UNESCO. The main urban transport problems in Padua are traffic congestion and noise, low air quality and large commercial road traffic into the city centre. Like other medium Italian cities, the municipality has defined a restricted access zone (in Italian, Zona a Traffico Limitato), here noted ZTL (local policy) to deal with this congestion. Further regulations are proposed by the Veneto region (regional policy). These regulations establish a time window within it is possible to enter the ZTL. In the rest of the day, only the residents and other authorised categories are allowed to enter. An electronic tag identification system has been adopted to increase the access control at the “gates” of the zone.

Interporto di Padova S.p.A. is a mixed capital company that operates as both logistics real estate company and platform management operator. This company was created to deal with the management and planning of the intermodal platform of Padua (Italy). This platform hosts nowadays about 80 companies and its inducted activity involves more than 3,000 employees. Its surface is about 2 km<sup>2</sup> and has both a railway infrastructure and terminal facilities, like warehouses and cross-docks. Located in the North East of Italy, Interporto di Padova is connected to the main national and international railways and roads; it is thus a “strategic” logistic hub. Cityporto is an urban logistics service proposed by Interporto di Padova S.p.A. The main purpose is to reduce the number of trips by maximizing the loading rates of vehicles and the usage of low-pollution. Further than that, Cityporto is a new service for freight transport operators destined to enhance the delivery flows of goods as well as to improve the quality of the city life. Operative since the twenty first of April 2004, Cityporto of Padua is one of the few experiences of this kind successfully operating in Italy.

The project, promoted by the Municipality and Interporto di Padova, in collaboration with the Province, the local Chamber of Commerce and A.P.S. Holding S.p.A.—Mobility Division, is the result of more than 18 months of an experience which involved also the transport operators. The Protocol of Agreement which established Cityporto has been signed on the fifth of April 2004 and considered, among other things, a 4 year long contribution. The project forecasted a 12 months long first pilot stage directly managed by Interporto. The model laying on the basis of Padua urban consolidation centre is extremely simple: the transport operators or the self-transporting stakeholders deliver the goods to a logistics platform (a warehouse property of Interporto di Padova S.p.A.) located on the city surrounds where they are temporary stored; from this site depart the low-emission vehicles, i.e., those that have a low environmental impact in terms of CO<sub>2</sub> emissions and other air polluting gazes, which are intended for the distribution of goods in the city centre, i.e., the last mile of the supply chain. Nowadays, Cityporto’s fleet has 9 vehicles: 7 methane small lorries (3, 5 t), one electric small lorry and one methane light commercial vehicle (2, 5 t). In the following analysis, the small lorries will be

called city freighters and the other vehicle light freight-delivery vehicle (LFV). It is important to highlight that Cityporto is not an enterprise but a brand of Interporto di Padova S.p.A. The number of employees working partially on this service are three: two managers and one assistant. The logistics and commercial operations are made by a co-operative enterprise, where 12 people are affected to this service, plus one logistics advisor, who is an external consultant engaged full and long time on Cityporto's operational and commercial management.

The main activities of Interporto di Padova S.p.A. are oriented on two main axes: intermodality and sustainability. The company manages an intermodal terminal, providing logistics and real estate services to providers and operators. The company's logistics department holds a specific know-how to answer all technical and service logistics needs proposing a wide variety of services: consultancy, goods storage and management services, and assistance to national and international transportation, focusing on rail-road intermodal terminal services.

Cityporto is one of the sustainable logistics solutions of Interporto di Padova, more precisely the city logistics solution adopted in five Italian cities, where Padua was the first of them and the place of the project's conception and testing. The main activities of Cityporto are destined to transportation operators, although some self-transportation companies like furniture retailers are also customers of the service. The term customer will be used to define the transportation contractor, i.e. the operator or retailer asking Cityporto's services. The retailer will be the actor receiving the freight, although B2C transportation operations can also take place.

The main activities are related to last mile urban freight transportation, and include transportation, cross-docking, warehousing, and management of rejected freight by the retailer or other non-delivering situations. In this case, Cityporto finds a solution in agreement with its customer to satisfy the main needs as soon as possible. The platform operations are assured by a co-operative enterprise, which are paid proportionally to the quantity of freight that passes through the platform. The tariffs of the service are contracted with each customer, in base of the quantity of freight to be delivered.

### ***3.1 Economic Dimension***

Although the project was developed for environmental reasons, it is important to assure its continuity by a strong economic performance. For this reason, in 2003, after the signature of an agreement between the institutional stakeholders and Interporto di Padova S.p.A. related to Cityporto project initial founding and main guidelines, an industrial plan was developed. This industrial plan is based on the fact that the benefits of a city logistics system in a small or medium urban area has to be to reach the balance in order to do not depend on public funding contributions to maintain it.

As a support to tactical and operational planning, a strong information system has to be developed. Cityporto has developed its own information system in synergy

with Cityporto services. This information system allows to make a follow-up of the freight (traceability functions) and the preparation of the different commands to be delivered to each retailer. The freight traceability is made by the following procedures:

- Each received parcel at the platform is identified. Then, a new tag containing a Cityporto barcode is applied to the parcel. If the customer uses EDI to transfer the command documents, the tags are automatically prepared in advance by the system. Else, an operator prepares them when the parcel arrives.
- The parcel code is activated in the system. A GPS-based tool sends the code and the geographical position to the central server of the system.
- The central server is informed regularly about the position of the freight and which commands have arrived at final destination, in order to make a complete follow-up process.
- The customers (transportation operators, service providers or self-transportation commercial activities) can follow online the vehicle where their freight is on and see the state of their commands.

The basis of Cityporto is its economical sustainability. Each year, an important economical performance analysis is made. The main used indicators are the number of parcels that pass each month through the platform, the monthly average loading factor for the two categories of vehicles (city freighters and light vehicles) and the results of the year's cost-benefit analysis. Cityporto's targets were to achieve a non-negative balance at the end of the fourth year, and they were met in the second. In 2008, the costs were covered by  $\frac{3}{4}$  of the total income.

More specifically, the costs of Cityporto are mainly related to the logistics operations at the platform. The infrastructures and buildings belong to Interporto di Padova S.p.A., so they do not constitute an explicit cost to Cityporto. Moreover, the first six vehicles were bought by the local public transport operator with provincial and municipal subventions, and lent to Cityporto, who become the legal owner in 2007. Another vehicle, the electric one, has been also bought with a subvention of the region and also a municipal financial aid. Finally, the remaining vehicles have been financed with Cityporto's benefits. In conclusion, only the operational and platform management costs have to be met, and the system reaches the balance conditions each year, having also small benefits to reinvest in the development of the city logistics system (as for example more vehicles or material to manage other classes of freight).

The goals of Cityporto involve the companies that follow a global approach. This approach will favourise the development of collaborative agreements and partnerships. At the beginning of the project, the number of customers was near 20. In 2008, considering that Cityporto makes only parcel-logistics services, the number of customers is more than 50, which is big for a city like Padua. Most of the transportation operators are engaged for long-term collaborations with Cityporto. Moreover, a soft drinks distribution company operating in Padua has signed a partnership with Cityporto for restaurant and bar deliveries.

If the environmental performance is a success (as shown below), it is also the case of the financial and economic balance of the urban distribution solution.

### ***3.2 Environmental Dimension***

City logistics solutions like Cityporto are essentially developed for environmental reasons. Moreover, the environmental performance of Cityporto's services have to met several targets, because its connection to legislation and to public entities' environmental actions. For these reasons, a study has been commanded to the Bocconi University of Milan, Italy, to evaluate Cityporto's environmental performance (Vaghi and Pastanella 2006). In that study it is estimated that the environmental and social gains would have a monetary value of about 174.600 €/year. In terms of environmental weights, the most benefic elements concern a reduction on (1) the subtle powders [PM10], (2) the acoustic pollution and (3) the road incidents. This calculation highlights the viability of the project and justifies the investments made by the public entities in the first years. After this survey, environmental indicators are calculated yearly on the basis of the methodology proposed by Vaghi and Pastanella (2006). They are presented as the absolute gains (in tones) respect to the situation in 2003. These results are difficult to understand without a global vision of the emissions in the urban areas. For these reasons, we propose another set of environmental indicators expressed as the percentage gains of pollution emissions respect to those measured before the pilot tests (2003) (Table 1).

Another important aspect is the internal waste management procedures. In a system like Cityporto, the waste is basically empty boxes and packages, most of them recyclable. A specific container in the platform is filled in by Cityporto's operators. Its position in the platform has been chosen by practical rules to improve the time performance of the operations. This container is emptied in the corresponding place for recycling for all the industrial area where the platform is located. The reverse logistics procedures are not very important because the only materials that can follow them are the empty pallets. However, the management of returned freight that has not been able to reach its destination for several reasons is an important question that is daily answered. A special area of the platform is reserved to undelivered commands and the customer is informed immediately, in order to quickly find a solution to deliver it to the retailer or to return it to the customer.

### ***3.3 Social Dimension***

The number of employees in charge of Cityporto is small (only three) makes the system a family structure. For Cityporto's operational planning and management, a co-operative enterprise is contracted. These people are administratively external

**Table 1** Pollution gains of urban transport in Padova's city centre ZTL with respect to 2003 (including Cityporto)

Polluting emission	2006	2007	2008	2009
Greenhouse gas emission gains	−67 %	−67 %	−68 %	−67 %
NOx emission gain	−70 %	−70 %	−71 %	−70 %
Particle emission gains	−60 %	−61 %	−62 %	−61 %
Number of vehicles of Cityporto	9	9	9	9

but they can be considered as internal stakeholders in an organisation point of view. This situation leads to a huge autonomy of the vehicle drivers because the routes are managed manually and the vehicles are loaded by their own drivers. The platform operators are assuring the administrative and warehousing activities. In fact, the relation between the drivers and the retailers is very good. During the visit, a follow-up of a route was made, and four retailers were quickly interviewed. They agree that the service is efficient and the human relations are good. Moreover, the logistics advisor has also commercial and customers' relations functions.

The environmental performance leads to a quality image that is reinforced by the social/societal aspects explained above. Moreover, the good relations with the customers and the operability of the information system have led to a transferability of Cityporto to other cities. So, in 2007, Modena adopted the Cityporto system, and in 2009, Como and Abano Terme, other medium Italian cities, started a city logistics system derived from Cityporto's know-how. Moreover, other two similar cities, Aosta and Rovigo, are in a study phase to integrate what Cityporto expects will become a network of city logistics solutions that follow the same model and the same information system.

As seen above, the social/societal impact can be appreciated not only on the environmental aspects, but also on the economic performance and on standardisation questions (the Cityporto network), which lead to a strong relation between customers and city logistics services. Moreover, a city logistics system is connected to a city, avoiding competition and concurrence questions between the different systems. For these reasons, partnerships not only between city logistics systems and customers but also with other city logistics systems are primordial to develop efficient urban freight solutions. Currently, long-term partnerships with local wine producers and a big drinks distribution company are settled.

Recently, a documentary video of Cityporto has been made by the Centre-Ville en Mouvement association (Stefan 2009). During the making-of, several interviews with the retailers dealing with Cityporto have been undertaken. Most retailers are satisfied of this delivery service, which is more personalised than the classical systems.

## 4 Conclusion

Sustainable SCM constitutes, in our opinion, an important investigation key for each stakeholder of the supply chain. This seems to be more and more urgent since the environment as a whole follows such variations that the actors (enterprises, public entities, customers, retailers, consumers, etc.) have to change their practices in order to improve, or at least to stabilise, the industrial model established in the XIXth century. The SuSCM approaches constitute an important support to this improvement.

The case study shows that a city logistics system can be based on a SuSCM approach. The three dimensions (economical, environmental and social/societal) are observed and strongly connected. Moreover, the social/societal dimension has an important impact on economic and on environmental aspects. We observe however that even when a project is developed with environmental goals, the economic dimension is primordial to assure its continuity. In this sense, the responsible figure of Cityporto's services affirms that without money, the activity cannot sustain. Finally, it is important to observe the impacts of the current economic crisis to the economic rentability in current logistics schemas. In consequence, the environmental and social/societal dimensions will be conditioned by the economic one, although they must remain fundamental for Sustainable SCM as a whole.

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