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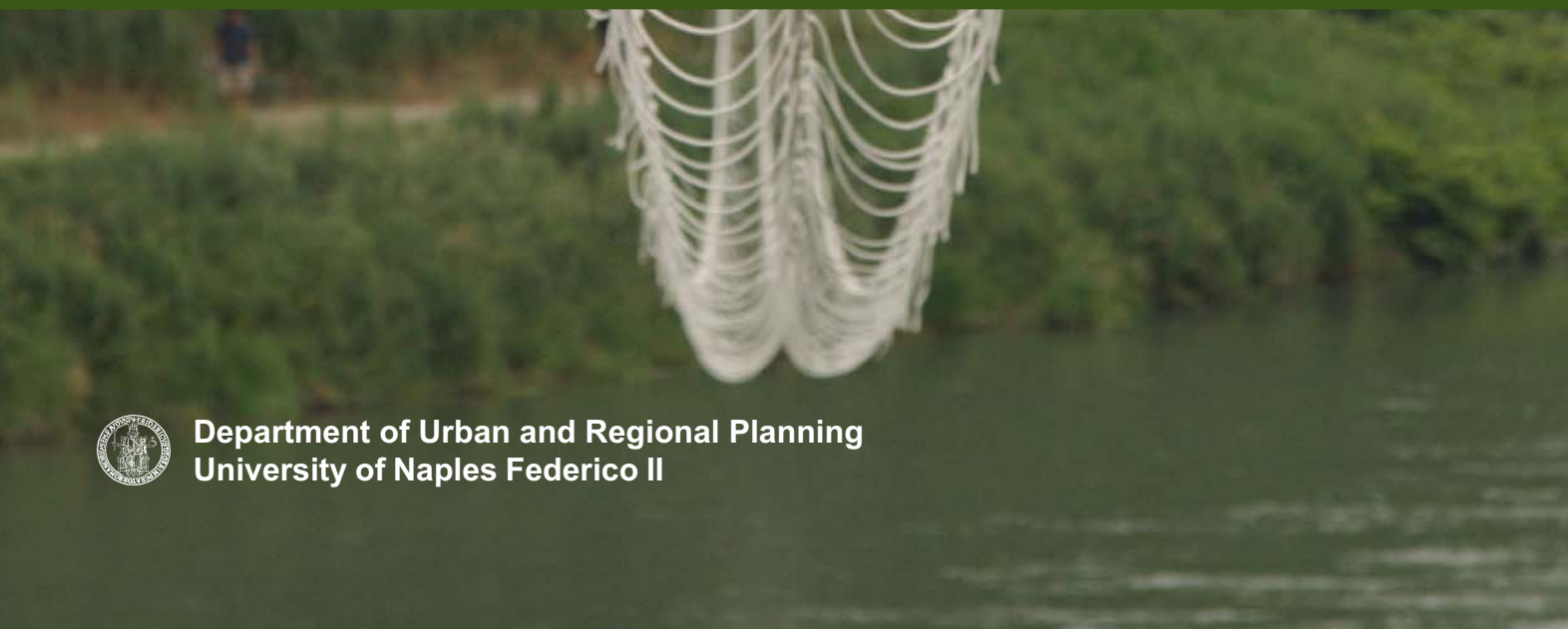

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Are City Logistics Solutions Sustainable? The Case of Cityporto (Italy)

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ABSTRACT

City 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 paper sets out to show how city logistics approaches can meet the goals of Sustainable Development nowadays. In order to define the notion of sustainable city logistics, we define the main aspects of each sphere of sustainable development, respectively economic, environmental and societal, i.e. both social and contextual. The main aspects of each sphere are described in order to unify the concept of sustainability related to city logistics. Then, we present the successful experience of Cityporto, the urban delivery service for the city of Padova (Italy), started in 2004 that uses low-pollution lorries. So, the service is considered as less polluting as a conventional approach, and is allowed to enter the city centre (including the Limited Traffic Zone) without hour limitations.
This is based on the findings from an exploratory qualitative approach, based on first a documentary analysis then a case study research from several interviews that involved three internal stakeholders of Interporto di Padova (the company which manages the intermodal platform of Padova, in charge of Cityporto) and one member of Padova's Municipality (which promote the project).
The results of this case study show that environmental aspect is one of the foundations of the project, but the economic continuity has to be first ensured. Indeed, the preservation of this service on the long term is subjected to its solvency. Moreover, its success is associated to the recognition by employees and customers. With regard to the collected information, it is possible to propose a balanced scorecard, where three axes emerged in connexion with economic, environmental and social dimensions. From this qualitative analysis, a discussion about the sustainability of city logistics solutions is made as conclusion
The paper makes a contribution to the evaluation and measurement of city urban logistics using a success story that has been developed from the practitioner perspective. This experience could provide a basis for further practices in Italy and other European countries. Moreover, the relations between city logistics solutions and sustainability are conceptualised and illustrated by a case study, highlighting the main elements for sustainable performance identification and evaluation in this field.
In conclusion, the proposed case study is presented for its academic, policy and managerial implications. This experience conceptualises city logistics in relation with the Sustainable Development, setting the main objectives and steps of urban planning for freight distribution and logistics issues. But above all, it provides an understanding of the key success factors in a sustainable urban distribution organisation that can become a pivotal position in the upstream supply chain. De facto, the study should facilitate the implementation of sustainable city logistics policies and practical issues taking into account the importance of the project's economic continuity.

From urban freight transportation to city logistics

Before the 80's, the urban traffic due to freight transportation did not had an important impact to road congestion and air pollution in urban areas. Moreover, public authorities' actions in urban freight transportation policy and planning were limited to specific measures to deal with emergencies. With urban traffic increasing, and the raise of congestion not only in big but also in medium cities, some public administrations were confronted with the problem of urban freight distribution, that was managed traditionally only by the transportation carriers. In the 90's and the beginning of the 21th 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 sector. Most of these studies are oriented to support public authorities in decisions related to urban freight transportation planning. However, the urban logistics are mainly related to the last mile of classical supply chains, and the enterprise's strategies have to be confronted to the collective interests related to urban freight transportation and logistics

operations (Visser et al. 1999, Gerardin et al. 2000, Rosini 2005, Patier et al. 2007, Crainic 2008, BESTUFS 2009). These efforts are aimed at better understanding and quantifying these phenomena and represent a first step in the development of City Logistics (Crainic 2008).

The main goals of city logistics measures and projects are related to congestion and pollution reduction without strongly penalising the city centre commercial activities.

This field presents a wide variety of works in scientific literature (Taniguchi and Shimamoto 2004, Ségalou et al. 2004, Munuzuri et al. 2006, Russo and Comi 2006, Anderson et al. 2007, Dablanc 2007, Ambrosini et al. 2008, Crainic 2008, Dablanc 2010, Gonzalez-Feliu et al. 2010). Moreover, in more than 15 years, several projects and application have been developed in order to meet environmental and societal targets. We can cite as key experiences the European pilots of Monte-Carlo (Principate of Monaco), La Rochelle (France), Ferrara, Padova, Parma and Vicenza (Italy), Barcelone (Spain), London (United Kingdom). Also in Japan (with two operational systems), Mexico, Australia and in East Europe and South-East Asia where several city logistics initiatives are becoming to be operative. Moreover, regional and national actions can be found in Italy and France. However, not all the pilots have been successful, which is the case of several experiences in France (the most successful experiences have the support of the local administrations), Germany (most of them started by private initiatives), Japan (only two operational systems with respect to tens of projects), The Netherlands and Switzerland, as stated by Dablanc et al. (2010).

City logistics solutions are in general studied and conceptualised to be developed by the public authorities or with a strong support from this type of stakeholders. However, the main organisational aspects of these solutions are closer to those of many logistics operators, and a city logistics solution needs to be considered in a global supply chain management point of view, integrated in the global chain(s) of the delivered products. For this reason, city logistics solutions have to be part of sustainable and more precisely of green supply chains in order to make a strong link between a city logistics solution and the supply chain(s) it is related to. But, are these systems really sustainable? Many studies show the environmental advantages of the proposed solutions, but few of them take into account the sustainability at the global level. Moreover, most of them are related to one of the two dimensions (supply chain management or urban collective planning) and no studies have shown the relations between them.

The aim of this paper is to start a discussion about the sustainability of city logistics solutions.

To do this, we propose a conceptual framework about sustainable supply chain management, then, via a case study, we present the relations between supply chain management and the collective management of urban areas in order to conclude about the sustainability of the proposed city logistics system.

In section 2 we present the three dimensions of sustainable development and their relation to city logistics.

Section 3 presents the data collection method, and section 4 presents the case study: the urban freight distribution system of Padova (Italy), Cityporto. After that, the sustainability issues are discussed in section 4. Finally, a conclusion about the adaptability and measurability of sustainability is proposed.

Sustainability and city logistics

In the last years, the notion of sustainability is becoming important in many production and distribution fields. The greenhouse gas reduction targets, the pollution issues but also the overall economic sustainability and the social impacts are being taken into account in performance evaluation on many fields, such as production, distribution, logistics, energy or people transportation.

According the importance of sustainable development, we consider that it is important to define clearly sustainable city logistics solution. It becomes so convenient to conceptualize a specific aspect for each one of the three spheres of sustainable development, i.e. economic, environmental and societal.

Economic aspects

One of the main factors in city logistics solutions is their economic continuity. Most solutions have shown interesting results in the pilot and test phases but could not survive once the strong public funding support was stopped (Gonzalez-Feliu 2008, Spinedi 2008). Moreover, we can state that economic performance is seen crucial for a city logistics solution to ensure its durability in time, although it is seldom clearly exposed in the valorisation of the solutions taken into account in this study. To do this, it is important to define and evaluate the system's logistics performance. We can define this performance respect to the two dimensions of city logistics.

The first (enterprise vision) is that of classical logistics performance, more precisely related to the urban part of the supply chain's last mile (Morana et al. 2008, Morana and Gonzalez-Feliu 2010). Several works deal with supply chain management and quality performance.

The second (collective vision, in a system-city point of view) is less relevant for the economic sphere. However, the usage of public subventions, not only for the system development but also to

ensure its operability, is an important element to evaluate a city logistics economic sustainability.

Environmental aspects

The environmental issues of city logistics are related to three main phenomena: greenhouse gas emissions, local pollution and noise emissions.

Analogously to the economic sphere, two dimensions are taken into account. The first defines the environmental performance of the city logistics solution in a Supply Chain Management approach (Morana and Gonzalez-Feliu 2010).

The second shows the environmental gains of the city logistics system. These gains have to be compared to a reference situation. In the following subsections we propose a brief discussion about the environmental issues of city logistics.

Greenhouse gas emissions

One of the main objectives of city logistics solutions is to decrease the greenhouse gas emissions that are the main contribution to global warming, in order to meet the targets of the Kyoto Protocol[1]. Most experiences that show the environmental gains make a direct relation between CO_2 emissions and contribution to global warming. Although this gas, directly related to fuel consumption, is the main greenhouse gas of freight transportation, the other emissions are not negligible to do not include them in the greenhouse gas emission simulation and estimation approaches. These substances are CO and some of the local pollution gases like NO_x and SO_x. In order to estimate the real contribution of freight transportation in urban areas to global warming, a measure unit can be defined, the CO_2 equivalent. To calculate the total emissions, in CO_2 equivalent, each substance emissions can be estimated from the total distance travelled by a vehicle, its number of stops and its average speed, using conversion tables (Routhier et al. 2009).

Local pollution

Local pollution is related to two types of substances: polluting gases and solid particles. The emission rates of these substances depend on both fuel consumption and travel behaviour. For the gas substances, two categories can be distinguished. The first category of polluting substances is the group of Nitrogen oxides, also known as NO_x, which proportions in fuel smokes are variable in the different fuel products. The second is that of sulphur oxides, or SO_x, less important in quantity than NO_x but having not negligible contributions to air pollution and global warming. Other substances that are being reduced with the new generation fuels are less common nowadays, and constitute an example of the contribution of research and development to the pollution decrease.

The last fuel Euro standards (Euro 4) and the new gas fuels, like GPL and GNV, are good examples of this contribution. The solid particles can be of two natures, volatile organic components (VOC) and subtle powders (the particles known as PM10 are the most representative of this category).

The emission quantities are easy to estimate for NO_x and SO_x, since they can be estimated in the greenhouse gas overall emission estimation calculations.

The conversion tables can then give the overall emissions of these gases, aggregated for each category of vehicle. However, the indirect pollution of low polluting emission vehicles is not always easy to estimate. Indeed, the information related to these emissions is not directly available and the estimations are not always accurate.

Social aspects

Other factors that are to be considered, and could be very useful in some situation, are related to restriction and comfort levels for different categories of people. In city centres, where the main problem is the reduced space and the need for many people to accede or pass through, different categories can be involved in freight transportation problem. We present three of them: transportation carriers, involved commercial activities and other citizens. The first category, the transportation carriers, is often the less considered in the organization of urban freight distribution.

However, the transportation operators are one of the main categories of stakeholders involved in city logistics decisions. For this reason, it is important to take into account their needs and opinions, at least to avoid big conflicts between transportation carriers and public administrations, which can produce other diseases. For this category, restrictive normative policies are not considered as a good solution, but they can be open to alternative solutions as incentive measures or a freight distribution organization which will not affect their economy in a considerable way. The second category includes the commercial activities, the most affected by the freight distribution strategies.

For them, freight transportation is necessary to their activity, because their customers will depend on their product offer and availability. They have fewer instruments to block the system in respect to transportation carriers, and in general these activities are small or medium (big commercial activities have their own transportation service which in general can be compatible with the service provided by the public administrations), so their economy cannot survive without the goods they are proposing.

The third group, which is in general the most important for politicians, is the rest of the people, who do not participate directly to the freight transportation but they divide the same transportation network.

Trucks blocking a street, problems to park because of freight transportation, and other situations will be considered negative by the usual drivers of city centres. On the other hand, a system which reduces congestion and produces more parking areas, or only the perception of no big commercial vehicles in the city centre can be seen as good solutions. Note that all these three indicators are not quantifiable in an empirical way, because they are more related to sociological aspects.

A factor that can be considered as both environmental and social aspect is the traffic noise.

At first sight, it seems that noise it's a measurable factor, which can be used to provide objective data.

Actually, what is important for human health and for city comfort is not the absolute value of the noise emission but the perception of that noise. The type of noise (frequency, duration), and the nature of the sound respect to the environmental noise can influence the sensation of disturb in each person.

Also physiological (illness, weariness, etc.), psychological and social (noises in stations, airports, marketplaces are better tolerated than noises in parks, libraries and other socially considered "quiet" places) factors can modify the perception of the noise in each situation. In this case we can consider noise as a factor that can be used to rank the different solutions, from the less disturbing to the most disturbing, or we can create an indicator which considers not only the quantitative but also the qualitative factors of noise. However, the national and local legislation establish maximum noise levels for each zone of the urban area[2].

Those levels are expressed in dBA, which is a standard pondered measure calculated to take into account the noise perception issues. For a detailed survey on noise limits and measures, see Danielis and Rotaris (2001) and Brambilla et al. (2004).

Interview's guide

Taking into account the above elements and having as references the different works presented in the literature review above, we have defined an interview guide that will allow us to discuss the sustainability of city logistics solutions, structured as follows:

Economic aspects

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

Environmental aspects

Description of the city logistics system environmental approach;

Effects on the urban environment.

Societal aspects

- Internal social management;
- Relations with external stakeholders (public authorities, retailers, residents);
- Syndicates and external stakeholders' support (transportation operator's consortiums and associations);
- Attractiveness, reputation and image.

Data collection methodology

The aim of this research is to discuss the sustainability of city logistics solutions via a case study. We have chosen the Cityporto distribution system, more precisely that of Padova (Italy), which is one of the most significant examples of city logistics planning and management not only in Italy but also in Europe (Spinedi 2008).

The data collection has been made by two complementary methods. First of all, a bibliographic research on Cityporto, based on both scientific literature (Marcucci and Danielis 2006, Gonzalez-Feliu 2008, Spinedi 2008, BESTUFS 2009) and technical and operational documentation obtained before the terrain research. The second is based on six interviews to internal and external stakeholders related to Cityporto. The first was a directive interview, based on a detailed information form, to describe the general context and the different phases of the city logistics system's conception and experimentation. This interview has been made by phone. Other two face-to-face interviews have been made, one with the person that ideated and developed Cityporto, and the other with a representing member of Padova's Municipality. A detailed visit of Cityporto allowed us to understand how the daily operations are managed, making an open interview to the logistics advisor in order to obtain complementary information. Finally, two afterwards follow-up open interviews have been made in order to complete and validate the case study analysis.

Moreover, several internal documents have also been consulted during and after the visit when essential or complementary information (mainly key numbers and evaluation results) were required to complete our analysis.

This study is proposed to illustrate the different economical, environmental and social performances for what is defined a sustainable city logistics project that integrate both transportation and distribution logistics elements. These three dimensions are represented to test our central hypothesis of global sustainability that has to be daily verified in a company that is presented as a sustainable logistics provider and/or a contribution to urban sustainable mobility.

The case study: Cityporto Padova

Padova is an Italian medium city (about 250 000 inhabitants) that has a historical city centre recently classified as Human Patrimony by the UNESCO. The main urban transport problems in Padova 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 which are the categories of vehicles (for both people and freight transport) that are authorised to enter the ZTL, as well as the access periods in the week. For most freight transport vehicles, the access hours are from 10:00 to 12:00 only in working days. Out of these periods, only the residents and authorised categories of vehicles are allowed to enter. An electronic tag identification system has been adopted to increase the access control at the "gates" of the zone.

This legislation is accompanied by a city logistics system, Cityporto, proposed by Interporto di Padova S.p.A., the real state and management company related to the intermodal platform situated in Padova's periphery. The main purpose is to reduce the number of trips by maximizing the loading rates of vehicles and the usage of low-pollution urban freight transportation vehicles. 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 21st of April 2004, Cityporto of Padova 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 5th of April 2004 and established, among other things, a four year long contribution. The project forecasted a twelve months long first pilot stage directly managed by Interporto. The model laying on the basis of an urban consolidation centre[3] (UCC) 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_2 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 is 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 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 transportation operations to the final consumer can also take place. The operations related to this service are urban freight transportation, cross-docking, warehousing, and management of rejected freight by the retailer or other non-delivering situations. The platform operations are ensured 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. It is important to highlight that Cityporto's vehicles have free access to the ZTL without the restrictions that apply to the other categories of vehicles. However, it is the only advantage that Cityporto has with respect to other carriers, and the potential customers of this service do no have other incentives or restrictions, so the commercial actions are close to those of classical transportation carriers.

According to Padova's Municipality representative, the only incentives to use cityporto is the free access to the ZTL without being constrained to time limitations. This advantage constitutes neither a break with respect to the concurrence rules nor an unfair favour to Cityporto (Dablanc et al. 2010), and needs to develop intelligent and efficient logistics schemas to make the city logistics solution be financially sustainable (Morana and Gonzalez-Feliu 2010).

Economic dimension

Although the project was developed for environmental reasons, the main involved stakeholders (Interporto di Padova S.p.A. and the Municipality) highlight the importance to ensure its continuity by a strong economic performance. For this reason, an industrial plan was implemented by the stakeholders that signed a collaboration agreement in 2003. This industrial plan is based on the fact that the

benefits of a city logistics system in a small or medium urban area are small, so the economic performance of the conceived system is related to reaching the economic balance in order to do not depend on public funding contributions to maintain it. Moreover, a cost-benefit analysis is carried on each year to monitor Cityporto's economic sustainability. This analysis, based on the methodology proposed by Vaghi and Pastanella (2006) for the yearly evaluation of Cityporto's performance, is made each year by Interporto di Padova S.p.A. with the support of the other partners that signed the collaboration agreement. Performance indicators are also proposed, and related to the number of parcels passing by the UCC monthly, and average loading rates, which usually reach 80%. 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 ¾ of the total income, target confirmed in 2009[4].

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 (tracking functions) and the preparation of the different commands to be delivered to each retailer. The freight tracking is made using a barcode system and EDI[5] tools.

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 6 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 is an incentive to 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 Padova. Most of the transportation operators are engaged for long-term collaborations with Cityporto. Moreover, a soft drinks distribution company operating in Padova has signed a partnership with Cityporto for restaurant and bar deliveries.

Environmental dimension

City logistics solutions like Cityporto are essentially developed for environmental reasons. Moreover, the environmental performance of Cityporto's services has 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). This study derives from a survey of the system's economic and environmental performance during 15 months from September 2004 to December 2005. In this period, Cityporto had 6 vehicles (4 city-freighters and 2 light vehicles). The number of freight distribution vehicles has decreased by 60%. The reduction of polluting emissions is important (see **Errore. L'origine riferimento non è stata trovata.**), but the results are presented in a way that makes difficult to understand the real gains. In consequence, considering the health, noise and other benefits that derive from this congestion and pollution reduction (Vaghi and Pastanella 2006), the environmental gain is quantified in 174.600 €/year. According to these authors, the most beneficial elements in terms of financial weights concern a reduction on (1) the subtle powders, (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, the environmental indicators are calculated yearly on the basis of the methodology proposed by Vaghi and Pastanella (2006). The following table shows the main data for the period April 2004 - September 2009.

These indicators are not showing a clear idea of the gain respect to the global polluting emissions in the urban area. These reductions are estimated to be about 1% of the total polluting emissions in Padova's urban area due to people and freight transportation and logistics operations. However, the main effects are shown in the city centre. For these reason, we estimate the percentage gains respect to the situation in 2003 in the city centre of Padova, following the method proposed by LET et al. (2006). These estimations are then more explicit, and we can state that the gains are near to 30%, a value easy to interpret in terms of life quality improvements (a pollution reduction of more than 2/3 is translated into an improvement of the air quality, a reduction of congestion that is at the origin of the pollution reduction and a reconversion of the city centre into a more pedestrian and proximity retailing area).

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.

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 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 is also ensuring functions such as that of commercial and customer's relations support.

The environmental performance leads to a quality image that is reinforced by the social aspects explained above. Moreover, the good relations with the customers and the operability of the information system have leaded to a transferability of Cityporto to other cities. 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 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. In fact, the positive impact of the partnership management experiences, the collective work and the interpersonal trust (Brulhart 2005). 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. 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.

Conclusion

The sustainable development constitutes, in our opinion, an important investigation key for each stakeholder involved in city logistics. 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 21th century.

The case study shows that a sustainable city logistics system can be conceived only if the economic issues have at least the same importance than the environmental once in the conception phase of the project. Moreover, the enterprise's vision (related to Supply Chain Management) has to meet the vision of the community (related to urban planning and public policy). The three spheres of sustainable development (economical, environmental and social) are observed and strongly connected. Moreover, the social 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. According to Paché (2009), 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 dimensions will be conditioned by the economic one, although they must remain fundamental the development of city logistics solutions that can be seen as overall sustainable.

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Notes

[1] The Kyoto Protocol was adopted in 1997 at the third Conference of the Parties to the UNFCCC (COP 3) in order to achieve a stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system. This protocol established that the countries which had signed it were to reduce the emission of CO2 by 5% in 2010, target not met at a global level.

[2] Regional and local rules result from the application of the European Parliament Directive n. 2002/49/CE related to the assessment and management of environmental noise.

[3] An Urban Consolidation Centre is defined as a logistics facility that is situated relatively close to the area that it serves (be that a city centre, an entire town or a specific site) from which consolidated deliveries are carried out within that area (Allen et al., 2007).

[4] This information was obtained during the last interview (April 2010)

[5] EDI or Electronic Data Interchange is mainly defined as the interchange of information from one company's computer to another company's computer over standard formats of communication circuits.

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