

ISSN 1970-9870 Volume 4 - SP - March 2011

SP.10

TeMA

SELECTED PAPERS 2010

trimestrale del *Laboratorio Territorio Mobilità e Ambiente - TeMA*Lab



Department of Urban and Regional Planning
University of Naples Federico II

TeMA
SP.10

TeMA

TeMALab Journal of Mobility, Land Use and Environment

Volume 4 | SP | March 2011

SELECTED PAPERS 2010



Department of Urban and Regional Planning
University of Naples Federico II

Editor-in-Chief

Rocco Papa, Department of Urban and Regional Planning, University of Naples Federico II, Italy

International Scientific Board

Luca Bertolini, Universiteit van Amsterdam, The Netherlands
Virgilio Bettini, Università Iuav di Venezia, Italy
Dino Borri, Politecnico di Bari, Italy
Enrique Calderon, E.T.S. de Ingenieros de Caminos, Canales y Puertos, Spain
Roberto Camagni, Politecnico di Milano, Italy
Robert Leonardi, London School of Economics and Political Science, United Kingdom
Raffella Nanetti, College of Urban Planning and Public Affairs, United States of America
Agostino Nuzzolo, Università di Roma Tor Vergata, Società Italiana Docenti di Trasporto, Italy

Scientific Editorial Board

Carmela Gargiulo, Department of Urban and Regional Planning
Adriana Galderisi, Department of Urban and Regional Planning
Romano Fistola, Department of Engineering, University of Sannio
Giuseppe Mazzeo, ISSM CNR - Department of Urban and Regional Planning
Rosaria Battarra, ISSM CNR - Department of Urban and Regional Planning
Cristina Calenda, TeMALab of Mobility, Land Use and Environment
Daniela Cerrone, TeMALab of Mobility, Land Use and Environment
Andrea Ceudech, TeMALab of Mobility, Land Use and Environment
Fiorella de Ciutiis, TeMALab of Mobility, Land Use and Environment
Rosa Anna La Rocca, TeMALab of Mobility, Land Use and Environment
Enrica Papa, TeMALab of Mobility, Land Use and Environment

Journal published by

TeMALab of Mobility, Land Use and Environment
Department of Urban and Regional Planning
University of Naples Federico II

Print ISSN: 1970-9889
Online ISSN: 1970-9870

Issue completed at march 2010

Authorization of the Court of Naples n. 6 del 29 gennaio 2008

Mailing Address

Università degli Studi di Napoli Federico II
Di.Pi.S.T. - Dipartimento di Pianificazione e Scienza del Territorio
Piazzale Tecchio, 80 - 80125 Napoli, Italy

Website: www.tema.unina.it

Contacts: redazione@tema.unina.it; +39 0817682315

Open Access:

This journal provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge. All contents licensed under [Creative Commons - Attribution-Noncommercial-No Derivative Works 3.0 Unported](https://creativecommons.org/licenses/by-nc-nd/3.0/)

EDITORIALE

Selected Papers
Rocco Papa

5

RICERCHE

**Mobilità sostenibile a Lione: dovremmo
impiccare gli automobilisti?**
Thomas Buhler

7

**Qualità urbana vs spostamento individuale: il Personal
Rapid Transit**
Carmela Gargiulo

13

**La risorsa mare per la mobilità di merci e persone nella
Regione Campania**
Giuseppe Mazzeo

19

SPERIMENTAZIONI

**Sono sostenibili le soluzioni di City
Logistics? Il caso di CityPorto (Italia)**
Jesus Gonzalez-Feliu, Joëlle Morana

29

**Verso un sistema di trasporto urbano condiviso per la
coabitazione di passeggeri e merci**
Anna Trentini, Nicolas Mahléné

39

EDITORIAL PREFACE

Selected Papers
Rocco Papa

RESEARCHES

**Sustainable Mobility in Lyon: Should We Hang Private
Car Drivers?**
Thomas Buhler

**Urban Quality vs Single Travel: the Personal Rapid
Transit**
Carmela Gargiulo

**Campania: Territory and City in Front of the
Challenge of Logistics**
Giuseppe Mazzeo

APPLICATIONS

**Are City Logistics Solutions Sustainable? The Case of
Cityporto (Italy)**
Jesus Gonzalez-Feliu, Joëlle Morana

**Toward a Shared Urban Transport System Ensuring
Passengers & Goods Cohabitation**
Anna Trentini, Nicolas Mahléné

CONTRIBUTI

**Andando in giro:
mobilità, destinazione ed esperienza**
Alan Clarke

45

FOCUSES

Going Round in Circles: Mobility, Destination and Experience
Alan Clarke

**Torino Porta Susa, PEC SPINA 2: Stazione
Ferroviaria e Torre Servizi**
Silvio d'Ascia

51

**Turin Porta Susa, PEC SPINA 2 : Gare ferroviaire et
Tour de services**
Silvio d'Ascia

**La città dal filo. Il trasporto a fune per la mobilità
urbana**
Romano Fistola

59

**The City from the Wire the Aerial Cable Transport for
the Urban Mobility**
Romano Fistola

Sustainable Mobility in Lyon: Should We Hang Private Car Drivers?

Thomas Buhler

Equipe de recherche Environnements et Dispositifs Urbains – EDU – Advisor : Jean-Michel Deleuil – Laboratoire Environnement Ville Société [UMR 5600]
Département Génie Civil et Urbanisme; Institut National des Sciences Appliquées, Lyon 8, rue des Sports, 69 621 Villeurbanne Cedex, France
e-mail: thomas.buhler@insa-lyon.fr; web: edu-evs.insa-lyon.fr

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (7 - 12)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Sustainable Cities
Urban Mobility Plans
Mobility Behaviors

ABSTRACT

Incriminated for negative externalities such as both local and global pollution, noise, sealing extension or public space high consumption, private cars have been perceived as a factor of un-sustainable mobility since the early 80's by urban planners and designers. In the new paradigm of the so-called "sustainable city" urban planners and designers target now a modification of social behaviour and particularly social mobility practices. The production of transport alternatives and restrictions to automobiles in city centres through car-parking limitations and fare systems as developed in urban mobility plans (Plans de Déplacements Urbains) are unfortunately too weak to generate a modal shift ripple-effect in French cities. Considering the last issue of the French national institute of statistics and economic studies' survey (Hubert 2009) the modal-share in favour of car-transit remains the same for the period of time between 1994 and 2008 for the biggest French cities, in spite of steady efforts for the development of public transportation alternatives such as the diffusion of the tramway's comeback (from Grenoble 1986, to Dijon 2013). According to a series of relatively recent research papers (Kaufmann 2002, Lefevre & Offner 1990) focused on the "economically irrational" behaviour of the majority of private-car drivers concerning the question of modal shift, a research framework has been developed. This framework specially focuses on the disconnect between the rationalities of resistant car-driver's social mobility practices in the metropolitan space, compared to the rationale of urban mobility masterplans has, assuming that user's "tactics" answer planner's "strategies" (De Certeau 1990). This approach of identifying this disconnect between rationalities in planning and rationalities in social practices in the urban mobility context is aimed to extend to the complex perception of urban environments by car-drivers, to identify new targets of modal-split policies to be structured as new action-levers. This perception will deal with several issues orchestrated through urban design projects such as public spaces, physical distances or parking constraints. The second main issue of this conceptual framework deals with rationalities of user's mobility practices. The axiological rationality (Boudon 1995) seems to be heuristic to question values and practices, searching for the rationale behind the conclusions that users draw when making mobility decisions (for example "the car is faster in my situation"). This justification process needs to be finely analyzed in combination with several concepts, norms and values that "make sense" for the individual. We propose the hypothesis that the combination of perception biases and axiological rationalities could help to explain behaviors defined as "irrational" for urban mobility planners and to delineate the major levers of social acceptance and adoption of so-called sustainable urban environments. The research approach here developed together with the metropolitan Lyon's case is the result of a special partnership between a laboratory of Urban Planning (Environnements & Dispositifs Urbains) of the National Institute of Applied Sciences in Lyon, and a nationwide French company in urban projects and services development (SCET). An urban services development manager (Yannick Maurer) and two urban planning researchers (Jean-Michel Deleuil and Thomas Buhler) lead this research project focused on mobility behaviour in the framework of a general questioning program on the Sustainable-City ("Ville Durable"): from planning issues to usage feedbacks, with both operational and research expectations..

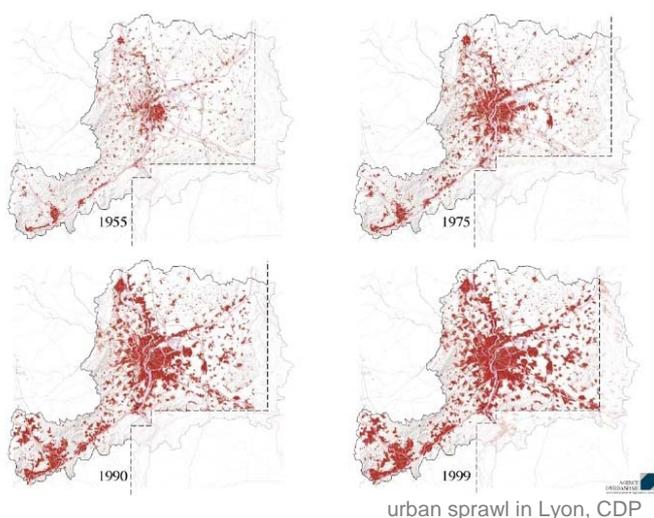
Facing private-car driver's resistance to sustainable mobility policies

Urban mobility cannot historically be taken for granted. Urban land-use conflicts between circulation and dwelling are age-old. For example in the Middle Ages these conflicts were the subject of political struggles between the bourgeoisie and the feudal power.

Its gradual setting up takes part in the emergence of the idea of public space (Haumont 2006). A right-of-way increases thus over the centuries and take effect on ways formerly seized by familial self-organised feudalities. Public space and mobility, and their associated values are social constructions historically linked and built on centuries of power struggles. However they are currently still a controversial issue in certain urban projects such as the

expanding model of the "gated-communities". The debate provoked in France by the opportunity of a congestion charge for Paris and its unconstitutional nature is revealing as well the current relevancy of this issue.

Circulation of goods and people, long thought to be incidental in European cities history, wasn't the purpose of space specialisation until the early seventeenth century¹. Therefore urban mobility isn't just a mean of action but has to be considered as a social and political construction following ideologies. Human mobility has changed during the industrialisation period and has followed the metamorphosis from a mobility-as-transit leaned on a dominant human metabolic energy to a mobility-as-transport relying on heterogeneous forms of energy and objects (Illich 1973a). Nowadays being mobile in metropolitan context in Europe without technical devices and their human organisations has become more and more difficult following what Ivan Illich called a "radical monopole" on mobility (Illich 1973b). For example the increase of mobility in France between the years 60's to the 90's, running from an average of 5 km/day/person to 45 km/day/person (Viard 2006) made possible the land property for a majority of urban households which is a particular pattern of political urban organisation enforcing car-dependency (Héran 2001). These injunctions to mobility and land property in the "landlord society" paradigm were associated to private car transportation possibilities, constituting a real social and technical standard of living and promoting an inflationary process of individual mobility (Kaplan & Marzloff 2009).

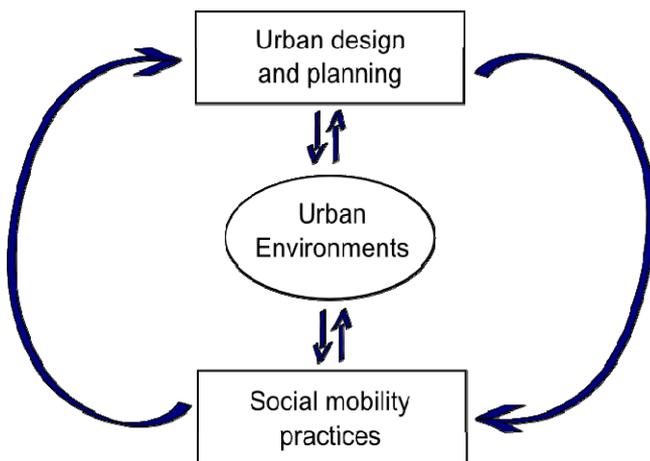


In the new paradigm of the so-called sustainable city, the design of urban environments targets now a modification of social behavior, which is particularly obvious in the field of urban mobility. However urban planners and designers can only prescribe certain uses of the

urban environment created. The development of social mobility practices won't always intersect with the forecasts. Michel De Certeau worked a lot about these questions of the disconnect or the confrontation between the "strategies" of the planners facing the "tactics" of the inhabitant, the passer-by, the weak who tries to make good use of forces that are unknown to him. He combines heterogeneous elements whose synthesis forms the decision and the way to "jump at the chance". These tactics show how far smartness is intertwined with daily fights and pleasures hinged on in this process whereas strategies hide their links with power under objective calculation (De Certeau 1990). It seems heuristic to observe the diffusion of models of sustainable development and particularly sustainable mobility planning in this scientific framework, where urban environments involve two categories of actions, planning and use. Although indiscriminately used by political and economical organizations and stakeholders so that it sounds nowadays like a magic formula or a creed, the notion of "sustainable development" promoted by the Brundtland Report at the UN in 1987, keeps its relevancy as it underlines the difficulty together with the necessity of simultaneously conciliating several targets: economical development, social progress and protection of cultural and nature heritage. These targets can't be reached separately at the risk of putting themselves in question, and they set up a three-equation system whose variables can be linked. It's a complex thought based on three different rationalities: performance (economy), equity (social) and ethics (environment). We understand that its both practical and theoretical handling is difficult but it's exactly through these arbitrations between contradictory issues that the project's stakeholders give their "own" translation for a sustainable city (Ascher 2004). In this way, extensive use of private cars became the target of numerous urban masterplans, projects or local policies promoting both modal shift and a decrease of car-mobility. Functionally-mixed urban forms, improvement of public transportation system both in quantitative and qualitative aspects, short-distance urbanism and accessibility management have been four levers to lower the use of private car.

Although these policies and projects managed to curb the inflationary process of "auto-mobility" (Dupuy 1995) to reach stagnation, car-oriented individual mobility behaviours remain resistant to sustainable mobility planning and injunction to modal shift. These behaviours even generally run counter to economical rationality based on time-money budgets which is one of the major mean of justification and design of transport infrastructure projects. As developed by French-speaking mobility researchers (Kaufmann 2002; Lefevre & Offner 1990) the question of time is particularly relevant to deal with. By a research paper focused on perceived time by individuals and their choice of transportation mode, Vincent

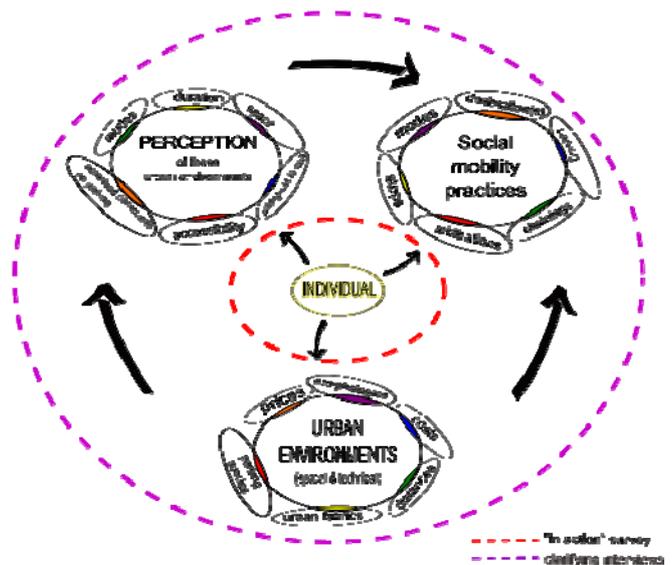
Kaufmann achieved the explanation of non-economically-rational behaviours. For three Swiss and a French cases (Lausanne, Geneva, Bern, Grenoble) he confronted the time-as-perceived (duration) in private-car and public transportation to the "real" time-as-counted (time). He discovers overestimation of time in public transports by their users whereas private car users generally underestimate their travel time in private car. He assumed that comparing "durations" (time-as-perceived instead of time-as-counted) to modal choice bring back behaviour to a mostly economically-rational choice. The value of time is a significant fact throwing light on this phenomenon. The transports systems are developed and justified by "time" whereas individuals behave mainly for "duration" reasons. This discovery allows us to formulate a broader hypothesis on a disconnect between use and design of mobility urban environments. Our first hypothesis refers to the urban environments and their perception by inhabitants. Structured around technical devices leaned on specialized human organizations, urban environments follow logics of ideas (ideo-logy) in its planning, design and operation (Lefebvre, 1968). Even nature in the city (parks, forest, urban ecosystems) became "technical" following the canonic definition assuming that objects are natural as long as their existence remain independent from conservation or maintenance by the human acting (Simondon 1958). We consider here the urban environments as the subject of urban planners and designers practices (broadly referred to as architects, urban planers, elected officials together with engineers) and the frame of social practices (Toussaint 2003).



Design & Practices

The disconnect between sustainable planning's promises and real social mobility practices could settle on a disconnect between environment and its perception that affects more individual choices. Following the approach developed by Kaufmann (idem) we spread

out the research position to the whole diversity of environment's perception. Costs, constraints, distances and time are part of the urban environments planned, designed and negotiated by planners with elected officials and neighbourhood communities. These created environments follow logics of ideas projected on the urban plan and planning rationales. We assume that these "environments-as-perceived" are heuristic to understand the non-economically-rational behaviors of resistance to sustainable mobility plans. A short survey we undertook in spring 2009 around three public parking lots in center Lyon2 showed an interesting fact that people coming out from parking their car and going to their office couldn't estimate as a majority (and among other questions) their time of walking to their destination, answering more about the qualities or shortages of public spaces around the parking lot. We assumed this perception of direct environment affects deeply mobility practices. The second main issue of this conceptual framework deals with rationalities of user's mobility practices. The axiological rationality (Boudon 1995) seems to be heuristic to question values and practices, searching for the rationale behind the conclusions that users draw when making mobility decisions (for example, "the car is faster"). This justification process needs to be finely analyzed in combination with several concepts, norms and values that "make sense" for the individual. We don't trust in embodied values that would drive the individual through his choices. We rather assume that values exist as a collection of ways to justify an action that make sense. We propose the hypothesis that the combination of perception biases and axiological rationalities could helps to explain behaviors defined as "irrational" for urban mobility planners.



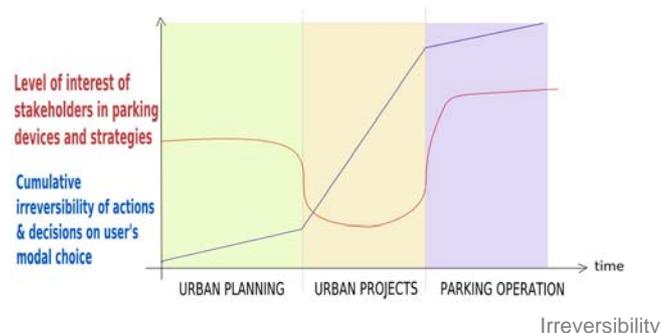
Three circles

In this conceptual framework we will put the focus on parking policies development in French cities case in different levels of urban action to lighten up the historical context sustainable mobility planning is integrated in. Focusing on policy-making helps to understand the logics of ideas that promote certain urban environments. In the early sixties parking planning emerge as a solution to the brand-new issue of congestion on public spaces and road networks (Mathon 2008). The first objectives were the facilitation and the organisation of maximal urban accessibility for private cars while creating supplementary parking spaces following logics of equipment, facing situations of shortage. Successively appeared quotas of minimum number of parking places per housing, and logics of filling empty spaces. Since the emergence of the urban transportation planning, in the late eighties for the French case, parking policies structure themselves as action-lever on modal split and private-car mobility through the planning of parking constraints in some areas following the opportunity to play on private cars immobility, as they remain motionless, twenty three hours per day. As parking planning had to face the real practices, their temporality and their relative regularity, usage becomes the "problem" of parking management. French parking policies followed a division of the public through three general categories to comprehend the future practices. "Commuter", "shopper/visitor" or "resident" are standardized categories which recommend specific needs of service (duration of parking, willingness to pay, willingness to park in off-street garages, importance of proximity to destination). To achieve this differentiated car-accessibility system, stakeholders of parking policies use four special categories of parking devices: on-street parking, public and private off-street parking together with park-and-ride systems. By consensus between major actors of planning through enabling legislation³, commuters are pointed out as people who were more likely to make a modal shift, and parking policies should dissuade them from taking their car to go downtown. Although fare system, time limitation and improvement of payment control have been done to avoid commuters to take regularly their car, a phenomenon of high resistance has been noticed. Except the Parisian case where overcongestion limits the use of private-car, it's significant to underline the relatively high modal share of private-car for daily commuters when those commuters declare not to have any parking availability at destination (Orfeuill, 2000). Of course, special individual access to parking spaces brings higher modal share to the profit of private-car, which emphasize on the emergency of a regulation of private parking spaces. Anyway in all urban contexts except Paris, 45% and more of commuters still take their cars every day, developing tactics ("informal" park-and-ride, forbidden parking,

collective control of payment verbalization) to reach their destination without changing transportation mode.

During a series of half-guiding interviews with several decision makers in parking policies in three major French cities⁴ we asked the polled stakeholders - among other questions - to tell what is problematical, according to them, in the current context of urban private-car parking and what could be done to reach an ideal sustainable parking system. We analyse their answer considering the four main action-levers in parking planning (on-street, off-street, private and park-and-ride), and the place given to each "standardized user" (commuter / shopper / resident) in their "ideal" sustainable parking project. We also underlined the behaviour changes as imagined and the advocated actions to achieve this. Due to a really small sample of actors, summarization of "sustainable strategies" in three action categories (namely operators / local authorities / developers) was relatively simple as ideas were mainly convergent.

The "quintessence" of this strategy lays in the reservation of on-street parking spaces to residents and a gradual reduction of the number of such spaces to promote pedestrian public spaces. Other private-car users have to move to other solutions developed for them (commuters to P+R and visitors to off-streets public parks). For urban developers the ideal sustainable parking system is the exact opposite of the previous one. Gather all the residential demand for parking in a few characterised public (or collective) parks seems to be a satisfactory solution, letting few on-streets parking for short-time needs (shopping or visiting). Some individual parking places for offices seems to be important for the viability of projects and compensate a park-and-ride-oriented solution for commuters. For parking operators (both private and public) the high confidence in off-street parks (they operate) is significant. On-street parking is perceived as a hardly manageable object whereas car-parks offer broader opportunities of monitoring usage and of incitation to modal change. Individual parking places are a serious risk to a global parking management and should be immediately strongly regulate.



This chart in relative and hypothetical values shows the vision of the current situation of parking planning by the actors themselves. The biggest and more irreversible choices are taken during the urban projects' development stage. Throughout this period of time the parking issue seems to be incidental in the broader debate on sustainable urban forms. Contradictory strategies to operators and local authorities can be developed although they do a disservice to a global action on parking. Following the example of commuters, this "planning model" of an ideal sustainable parking system will put a slant on creating irreversible off-street individual (mainly infrastructure) parking places together with special access to on-street parking for residents promoted by local authorities. In this context it's understandable for commuter to get on regularly with private-car as they can easily "squat" residents or colleagues' places. Contradictions in planning lead to opportunity for harder resilient behaviours. Although it brought a complex thought and a new framework for action, the emergence of sustainability and its polysemy allowed contradictory strategies for different stakeholders in the field of parking planning. All of them can be justified by the argument of sustainability (ecological, social or economical). Virtuous circles between stakeholders, their favourite parking objects and selected users can be assembling without ever being in confrontation, creating successive, irreversible and counter-productive contradictions. For example, local authorities could reserve on-street parking to residents who will strengthen them through local elections whereas parking operators will promote off-street public car-parks where high turnover of visitors is needed to complete their business-models and strengthen them. Regarding developers, creation of individual parking will give their project more economic value, in a context of shortage. Sustainability and its flexibility of usage allow such "virtuous circles" to co-exist and do a disservice of the action on parking at a metropolitan scale.

Lessons from metropolitan Lyon's case

Taking advantage on its crossroad location between alpine Europe together with northern and southern Europe (with both main roads and rivers convergence), Lyon has always had a strong relationship with transportation issues. His particular development history based on a relatively high-rate of industrial production together with regional and trans-national commercial linkages lead Louis Pradel's municipality (1957-1976) to plan and build highway network connecting the city-center to the majority of Lyon's build-up area. This policy required high infrastructure investment due to the hilly topography of Lyon's region (Bonnevillie 1997). The current municipal policies targeting on a reduction of car-transit are still tributary of this

period of Lyon's history. The social consensus of promotion of automobiles in Lyon's city centre has started to turn into a consensus for reducing auto travels and car consumption of public space in the late 80's and has started to be accepted in consultation meetings during the 2000's (Vareilles 2006). As this member of the metropolitan Lyon's planning board says, "I remember the time - not so far away - it was almost impossible to make the people accept even a tiny improvement of priority for pedestrians at crossroads. In consultation meeting people said it will slow down the automobiles stream. I'm speaking about situation no older than ten years ago. Nowadays in our project consultation meetings, if somebody shows his reservations on a parking lot lowering policies or a parking ratemaking he will be booed by the majority of people. Just look at the Confluence project. In the consultation for the second phase people are developing projects of almost car-free neighbourhoods". The Confluence neighbourhood, as a former industrial and logistics zone, became last decade a brownfield at the door of the city center, southern to one of the two main train stations, between the two rivers crossing in Lyon, Saône and Rhône. The project has been projected by the municipal planning board to develop a whole neighbourhood in this area following principles of sustainable neighbourhoods. The first phase project currently finishing finally appeared with fewer results in car-use-lowering than expected and social demand is thus stronger for the second phase taking place on the former wholesale market buildings displaced in the south of the metropolis. Although perceived as a consensual issue by planners and neighbourhood communities, sustainable mobility project achievement seems problematic. At the metropolitan Lyon scale these resistances to injunctions to change in social mobility practices remain strong. The last household-transport survey (enquête ménages-déplacements) showed a stabilized phase for the metropolis in terms of modal split and mobility in spite of the steady efforts in land-use and mobility planning (CERTU 2009). Perceived as the "star pupil" of French proactive metropolises (with Grenoble and Nantes), Lyon has developed an ambitious mobility policy in parallel with the public space re-appropriation strategy, launched in 1989. The mobility urban plan from Lyon (PDU, Plans de Déplacements Urbains) dated 1997 and reviewed twice (in 2003 and 2005) give the priority to public transportation through the development of public transportation's strong lines ("lignes fortes") through the development of tramway connections, trolley-buses rolling stock and service renewal to Bus Rapid Transit systems (BRT), development of the first public bicycle rental scheme (public private project developed with the advertising company JC Decaux). In spite of these strong and steady efforts the mobility of the inhabitants of Lyon follow a stagnation line, explainable by the cross effect of a decline of the number of trips combined with a growth of their average length.

Conclusion

In spite of several volunteer policies for car-transit lowering including both incentive and restrictive injunctions to mobility behavior change, metropolitan Lyon still undergo its former policies and plans from the 60's and 70's that generate a certain inertia of practices. Although car-mobility has been curbed for the first time since the 30's, in the year 2006, a massive modal shift in favor of public transportation and cycling still seems unrealistic for planners. We particularly want to focus on individuals with exclusive private-car mobility practices in a daily-life analyze observation as these people are the target of mobility policies and projects. Assuming that the best experts in use are the users themselves, we developed a user-oriented methodology for the most important field-work survey of this research program.

This survey will be organized in three phases and will follow the key-issues and concerns of 50 individuals throughout metropolitan Lyon. An "in action" survey starts the protocol giving hand held recorders to private-car drivers to describe their urban environments and their choices during their mobility practices, following an intention grid presented before the recordings. After the synthesis and analyze of these mobility practices, half-guiding clarifying interviews with drivers will follow, finishing with comparison to "real" environments (price, distances, time...) and their planning rationale.

This survey started in the beginning of March 2010, letting us planning a global presentation of first results during the second semester 2010.

The objective will be to focus on the role of "parking" and "sustainability" in the axiological register of justification by resilient drivers to identify action-levers to modal split and to save them from hanging.

Notes

¹ An example of this constant urban-use diversity is the "Pont-Neuf" which was the first non-inhabited bridge in the history of Paris in 1606 [Choay, 1998]. This long-time high diversity and proximity of urban functions was due to vernacular organisation methods based on strong bonds between humans and their grounds and heavy social fabric, together with the lack of Soil and Labour Market [Polanyi, 1944].

² Namely the St-Georges, Fosse-aux-Ours and Cordeliers operated by LPA the public-private company for parking operation in Lyon

³ Such as the SRU law (literally "solidarity and urban renewal") passed in 2000.

⁴ Namely Lyon, Strasbourg and Montpellier.

References

- Ascher, F. (2004). Les sens du mouvement: modernités et mobilités. In S. Allemand, F. Ascher & J. Levy (Eds.), *Les sens du mouvement* (pp. 19-21). Belin
- Bonneville, M. (1997): Lyon. Métropole régionale ou euro-cité?, Editions Anthropos
- Boudon, R. (1995) Sens et raison: théorie de l'argumentation et sciences sociales, Hermès, pp. 29-43.
- CERTU (2009): Contraintes de stationnement et pratiques modales. Méthodologie et étude des cas de Lille, Lyon et Montpellier.
- Choay, F. (2004): Espacements. L'évolution de l'espace urbain en France.
- De Certeau, M. (1990): L'invention du quotidien, tome 1: Arts de faire. Gallimard.
- Dupuy, G. (1995): Les territoires de l'automobile. Editions Anthropos.
- Haumont, A. (2006). Le droit à la mobilité : vers un cadre contractuel renouvelé?, In M. Bonnet & P. Aubertel (Eds.), *La ville aux limites de la mobilité* (pp. 47-58). Presses Universitaires de France.
- Héran, F. (2001): La réduction de la dépendance automobile. *Cahiers Lillois d'Economie et de Sociologie*, 37, 61-86.
- Hubert, J. (2009) Dans les grandes agglomérations, la mobilité quotidienne des habitants diminue, et elle augmente ailleurs, INSEE Première, issue 1252
- Illich, I. (1973a): *Energie et Equité*. Editions du Seuil.
- Illich, I. (1973b): *La convivialité*. Editions du Seuil.
- Kaplan, D. & Marzloff, B. (2009): Pour une mobilité plus libre et plus durable. FYP éditions.
- Kaufmann, V. (2002) Temps et pratiques modales, le plus court est-il le mieux. Perception of time and modal choice. Is quickest best? *Recherche Transports Sécurité* (75), pp.131-143
- Lefèbvre, H. (1968): *Le droit à la ville*, suivi d'*Espace et Politique*. Ed. Anthropos.
- Lefèbvre, C. & Offner, J. (1990): *Les transports urbains en question: usages, décisions, territoires*. Celce.
- Mathon, S. (2008): *Le stationnement résidentiel sur l'espace public. Etat des lieux, problèmes et perspectives. Une application à l'agglomération lilloise*, 465 p.
- Polanyi, K. (1944): *La grande transformation. Aux origines politiques et économiques de notre temps*. Gallimard.
- Simondon, G. (1958): *Du mode d'existence des objets techniques*. Editions Aubier.
- Toussaint, J-Y. (2003) *Projets et usages urbains. Fabriquer et utiliser les dispositifs techniques et spatiaux de l'urbain*, 248 p.
- Vareilles, S. (2006): *Les dispositifs de concertation des espaces publics lyonnais. Eléments pour une analyse du rôle de la concertation des publics urbains dans la fabrication de la ville.*, Thèse de doctorat, Institut National des Sciences Appliquées, Lyon.
- Viard, J. (2006): *Eloge de la mobilité - Essai sur le capital temps libre et la valeur travail*. Editions de l'Aube

Urban Quality vs Single Travel: the Personal Rapid Transit

Carmela Gargiulo

Department of Urban and Regional Planning, University of Naples Federico II
e-mail: gargiulo@unina.it; web: www.dipist.unina.it

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (13-17)

Dept. of Urban and Regional Planning,
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Environmental Detractors
Urban Accessibility
New Transport Public Systems

ABSTRACT

The great increase in the demand for private mobility with the consequent macroscopic growth of channels to meet it, together with short-sighted policies of transport and urban development spread above all in Italy, has produced pollution, congestion and unlivability in the last fifty years. The hope of assuring the maximum individual freedom of travel to people living in consolidated urban centres, in addition to those living in the outskirts arisen and developed without any reasonable urban logic, still goes on producing congestion of vehicular traffic, considered, by the majority of citizens, the main cause of the deterioration of the quality of life in our cities. Indeed, also the most recent reports on environment in Italian cities show that the pollution levels are increasing in the big cities, although the news are full of very expensive projects, innovative solutions and unexpected goals continuously shown by public administrations. One of the main environmental detractors is car traffic, which has recently gained on public transport. Unlike the previous period. Most of mobility policies implemented in our cities aims at reaching the modal balance by means of measures for controlling and managing the demand for mobility, for mitigating traffic and limiting circulation., such as the road pricing and the parking strategies; for developing and increasing public transport and not polluting means of transport, car sharing and car pooling. All of them have showed modest results both in terms of pollution reduction and vehicular traffic reduction. For over fifty years, mostly in the United States, the Personal Rapid Transit has been tested, a system of public transport trying to join two apparently incompatible factors: the possibility of assuring individual travels and the need for decreasing the levels of acoustic and air pollution as well as the congestion caused by private vehicular traffic. In Italy this system is still not well known despite the versatility of its fields of application.

In the United States and all over the world the most successful applications concern circumscribed mono-functional urban ambits, such as large areas for offices, airports and so on, but the characteristics of this system - such as flexibility, capability of integration with other wide-range systems of public transport, little dimensions of the exchange junctions, quite low cost - can allow to realize it also in different typologies of area. If many people are doubtful about the effectiveness of this system, on the contrary, other people think that its steady implementation and experimentation is necessary to improve urban liveability. These last ones believe, in fact, that the combination of small vehicles similar to private car, the advantage of trips without intermediate stops and changes of car, cost reduction, possibility of a wider accessibility not reachable by traditional means of public transport are the key basic elements to replace car travels with low polluting means of public transport.

The drug of the city is the car

The need for working to improve the levels of sustainability in the urban systems of developed and less developed countries has stressed as main factor of urban entropy the use of private car and the resulting traffic congestion. The great increase in the demand for private mobility with the consequent macroscopic growth of channels to meet it, together with short-sighted policies of transport and urban development spread above all in Italy, has produced pollution, congestion and unlivability in the last fifty years.

The hope of assuring the maximum individual freedom of travel to people living in consolidated urban centres, in addition to those living in the outskirts arisen and developed without any reasonable urban logic, still goes on producing congestion of vehicular traffic, considered, by the majority of citizens, the main cause of the

deterioration of the quality of life in our cities. Indeed, it produces occupancy of urban and road space worsening the city usability, waste of time because of long and stressing permanence into car, air pollution despite the technological progress of fuel and vehicles, high noisiness and many road accidents (ISSI, 2010).

The reports of Legambiente on pollution in the Italian cities show, in fact, that in the big cities year by year the pollution levels are increasing, although the news are full of very expensive and ambitious projects, innovative solutions and unexpected goals continuously shown by public administrations.

The comparison based on 125 environmental parameters among the Italian cities shown a month ago by the 2010 Legambiente Report, carried out with the scientific support of Ambiente Italia and the collaboration of the Sole 24 Ore, places the big cities in the lower positions of the classification.

PZ	CITTÀ	%	'09	DIF	PZ	CITTÀ	%	'09	DIF	PZ	CITTÀ	%	'09	DIF
1	Belluno	71,48%	2 ^a	1	36	Matera	53,23%	42 ^a	6	71	Lecco	46,99%	81 ^a	10
2	Verbania	70,41%	1 ^a	-1	37	Rimini	53,04%	30 ^a	13	72	Ragusa	46,63%	84 ^a	12
3	Biella	67,48%	3 ^a	0	38	Ravenna	52,84%	41 ^a	1	73	Vicenza	46,40%	79 ^a	6
4	Trento	67,32%	6 ^a	2	39	Ancona	52,81%	24 ^a	-15	74	Torino	45,92%	77 ^a	3
5	Bolzano	64,06%	4 ^a	-1	40	Biella	52,62%	31 ^a	-9	75	Roma	45,78%	62 ^a	-13
6	Siena	62,65%	5 ^a	-1	41	Inesle	52,41%	23 ^a	-18	76	L'Aquila	45,70%	63 ^a	-13
7	La Spezia	62,57%	8 ^a	1	42	Avi	52,17%	26 ^a	-16	77	Cosenza	44,75%	55 ^a	-22
8	Pordenone	61,89%	37 ^a	20	43	Loai	51,70%	60 ^a	17	78	Rieti	44,74%	32 ^a	-16
9	Bologna	61,86%	9 ^a	0	44	Vercelli	51,61%	47 ^a	3	79	Lecco	44,69%	30 ^a	-19
10	Livorno	61,38%	12 ^a	2	45	Firenze	51,53%	38 ^a	-7	80	Taranto	44,63%	72 ^a	-8
11	Savona	61,33%	7 ^a	-4	46	Macerata	51,49%	27 ^a	-19	81	Alessandria	43,11%	68 ^a	-13
12	Rovarno	61,03%	18 ^a	6	47	Ascoli P.	51,42%	50 ^a	12	82	Como	42,27%	86 ^a	4
13	Catania	60,22%	10 ^a	3	48	Cagliari	51,22%	29 ^a	-19	83	Benevento	42,14%	71 ^a	-12
14	Ferrara	59,28%	36 ^a	22	49	Pesaro	50,97%	36 ^a	7	84	Viterbo	42,07%	94 ^a	10
15	Venezia	59,14%	14 ^a	-1	50	Varese	50,81%	35 ^a	-13	85	Pistic	41,06%	69 ^a	-10
16	Prato	58,89%	17 ^a	1	51	Brescia	50,69%	48 ^a	3	86	Peggie C.	41,30%	76 ^a	-10
17	Asolo	58,57%	15 ^a	2	52	Isania	50,32%	75 ^a	43	87	Foggia	40,67%	82 ^a	5
18	Reggio E.	58,28%	28 ^a	10	53	Aviano	50,29%	64 ^a	11	88	Catanzaro	40,54%	85 ^a	-3
19	Salerno	58,13%	34 ^a	15	54	Bari	49,80%	61 ^a	7	89	Napoli	38,88%	92 ^a	3
20	Genova	57,81%	13 ^a	-7	55	Cosenza	49,46%	67 ^a	17	90	Napoli	37,57%	93 ^a	3
21	Monza	57,56%	11 ^a	-10	56	Novara	49,20%	53 ^a	-3	91	Collezio	36,70%	90 ^a	8
22	Oristano	57,20%	74 ^a	52	57	Massa	49,02%	57 ^a	0	92	Cinra	36,10%	97 ^a	5
23	Cremona	57,20%	19 ^a	-4	58	Chieti	48,99%	43 ^a	-13	93	Imperia	35,38%	87 ^a	-6
24	Modona	56,64%	44 ^a	20	59	Caserta	48,77%	83 ^a	24	94	Frosinano	35,17%	103 ^a	6
25	Perugia	56,34%	16 ^a	-6	60	Vercina	48,74%	52 ^a	-8	95	Messina	34,74%	96 ^a	-1
26	Palenza	56,20%	40 ^a	14	61	Brescia	48,61%	70 ^a	0	96	Napoli	34,53%	89 ^a	7
27	Terni	55,48%	21 ^a	-6	62	Pavona	48,34%	54 ^a	-8	97	Agigena	32,18%	101 ^a	4
28	Piacenza	55,21%	51 ^a	23	63	Milano	48,18%	40 ^a	-17	98	Trapani	30,70%	98 ^a	0
29	Avellino	55,11%	80 ^a	51	64	Imperia	48,18%	66 ^a	2	99	Viterbo	30,17%	88 ^a	-11
30	Udine	54,90%	33 ^a	3	65	Reggio	48,06%	58 ^a	-7	100	Lecce	29,98%	91 ^a	-9
31	Pisa	54,06%	25 ^a	-6	66	Pescara	47,75%	65 ^a	-1	101	Fulera	29,30%	90 ^a	-11
32	Genova	54,79%	22 ^a	-10	67	Sassari	47,38%	49 ^a	-18	102	Crotone	29,09%	102 ^a	0
33	Trani	54,01%	45 ^a	12	68	Lucera	47,17%	75 ^a	-7	103	Catania	21,57%	103 ^a	0
34	Pavia	54,00%	20 ^a	-14	69	Treviso	47,20%	78 ^a	0					
35	Sondrio	53,41%	79 ^a	38	70	Campobasso	47,04%	30 ^a	31					

Italian cities classification based on environmental indicators by Legambiente 2010.

For example, as regards the ozone concentration in Milan, the threshold has been passed 60 times in 2010 against the 41 times of the previous year.

Belluno, ranked second in 2009, this year has overcome all for air quality, waste separation and number of passengers of local public transport.

The most critical data for big cities concern private car traffic, the difficulty in creating pedestrian precincts, restricted traffic area, sewage disposal, lack of efficiency in public transport and a chronic lack of green areas, as confirmed by the 2010 Isfort Report.

So Genoa shifts to the 32nd position (it was the 22nd in the previous edition); Milan shifts to the 63rd position (but it was the 46th the previous year); Rome to the 75th position (it was the 62nd); Naples to the 96th position (it was the 89th); Palermo to the 101st position (it was the 90th).

Among the big cities, only Turin keeps the same position and this year is the 74th in the ranking while it was the 77th the previous year, because it has shown a little improvement in the Pm10 average and mainly in the ozone one, in such sectors as public transport, water consumption and waste as well as in production and waste separation, which reach 42%.

Again car traffic is one of the most important environmental detractors, a very high number of cars moves, a record in Europe, and it keeps on increasing above the carrying capacity of the Italian

cities. That emergency cannot be solved only by new less polluting cars, but calls for a necessary reduction in the use of cars.

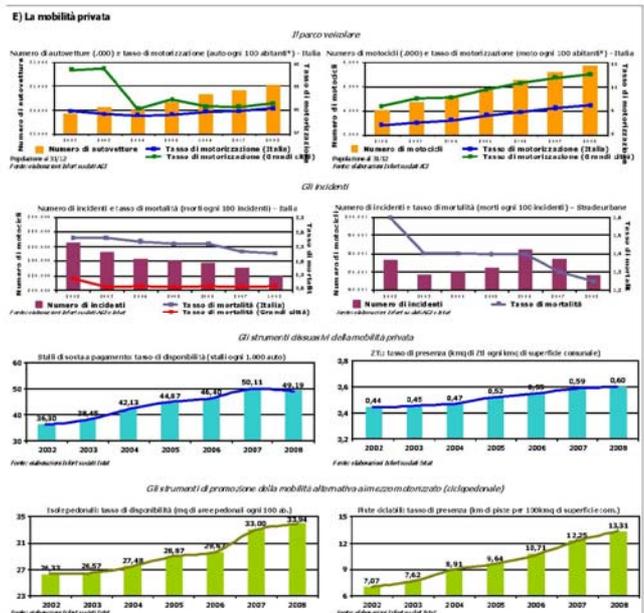
Besides, it should be dealt with a clear, consistent and integrated strategy and not with episodic, extemporaneous and not coordinated measures.

As already said, also the Isfort issued in May 2010, although defining the 2009 as a year of transition because of the world crisis, which has affected massively Italy too, defines cities and urban mobility as central element in the national economic and social dynamics, after a declining trend.

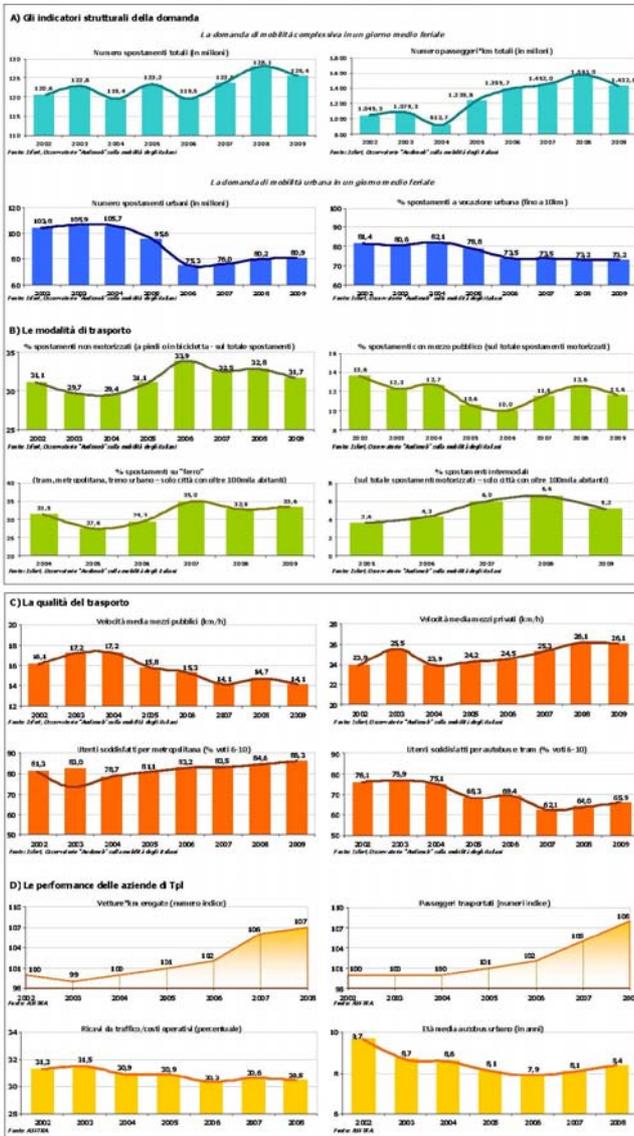
As regards transport, "the collective modalities overturn, in negative way, the most favourable dynamic recorded in 2007 and 2008: in fact public means of transport loose passengers (-5,4% compared with 2008, with less reductions in medium and big sized cities) and modal weight (from 12,6% of car travels in 2008 to 11,6% in 2009), aligning as market share with the (modest) levels reached in 2007" (Isfort, 2010).

Unlike what occurred in the two previous years, then, in 2009 collective transport did not succeed in reaching the additional share of demand and indeed its real presence has decreased in absolute values.

This is a slowdown that can be seen also in the supply monitoring, referring to the passengers registered by the public urban transport companies; the 2009 data, regarding only the provincial capitals, point out a substantial "zero growth" after the strong positive mark in 2007 and 2008.



Progressive trends of urban mobility in Italy: private mobility by Rapporto Isfort 2010.



Progressive trends of urban mobility in Italy: the demand indicators and transport modalities by Rapporto Isfort 2010.

Last year some factors have surely penalized collective mobility and further widened the car modal quota. In particular, the decrease in the fuel average price – in 2009 in comparison to 2008 – and the support to car industry by providing incentives for purchasing less polluting cars have encouraged a further modal shift in behalf of cars. Therefore, there is a sort of fluctuation entirely expectable in the prevailing scenario of uncertainty of the general consumptions curve. For some years, the European Commission has been promoting a strategy of progressive decoupling between economy growth and transport growth and, in view of that, suggests several

measures combining fares, modal re-balance and investments targeted to trans European network. As regards Italy, the E.U. points out the incompatibility of our transport system compared with the three dimensions of sustainable development, i.e. the environmental, social and economic dimensions.

Since 2009, the European Union has supported local, regional and national Authorities by means of the Plan of Action on urban mobility, which suggests medium and short term tangible interventions, to be gradually implemented until 2012, targeted to face specific matters linked to urban mobility in integrated way.

The document of the Plan of Action on urban mobility states as follows: "Developing efficient transport systems in urban areas has become an increasingly complex task because of congested cities and urban sprawling growth. To this end, the role played by Public Authorities is crucial, because it should give the planning and financing framework as well as the normative one. The European Union can stimulate the local, regional and national authorities to adopt long term integrated policies, which are essential in complex environments". Among the six tasks foreseen by the Plan of Action, a great importance is given to non polluting urban transport and to the promotion of research and demonstration projects funded by the 7th Framework Program for research and technological development, in order to help the introduction of low-emission, zero-emission vehicles and alternative fuel ones on the market, in view of reducing the dependence on fossil fuel.

Besides, the plan promotes integrated policies to face the complexity of urban transport systems, the governance and necessary coherence among different policies, for example between the urban mobility one and the cohesion one, the environment one or the welfare one. The decrease in the use of public transport means causes many perplexities and concerns and should urge to look for technological solutions targeted to assure the maximum efficiency and effectiveness in terms of service, low cost and flexibility of public transport and, contextually, to meet the demand and be compatible, in environmental terms, with the possible evolutions of life styles and behaviours, which are more and more difficult to predict in the present socio-economic context.

The Personal Rapid Transit

The most important weak points in the use of road and rail public transport are linked to the travelling time and, above all, to the freedom of travelling. The systems of public transport, in fact, are realized to serve the greatest possible number of users contemporaneously, at the expense of the possibility of freely deciding the route and travelling time (according to the

arrival/departure timetables, the compulsory stops, the eventual delay, and so on).

At present, 25% of the overall travels is on foot or by bicycle and the remaining part is by motor vehicles, of which 6% is by motorcycle, 80,5% is by car and 13,5% by public transport. Besides car is used mainly for quite short daily travels: 60% up to 30Km/day, 75% up to 75Km/day, 90% up to 100Km/day.

On the other hand, it is worldwide known that "urban environment is increasingly affected by the economic and social damages caused by traffic: the freedom of travel allowed by car is more and more translated into a reduction of access to the different urban functions.... Now the aim is to use semi-collective transport systems, by introducing the idea of mobility as service.

It is the third way of urban mobility, joining the positive aspects of both collective and individual transport" (Bettini,2004).

The chimera of the freedom of individual travel promised by car becomes, so, an egoistic act that turns against all people, becoming a strong environmental detractor (producing smog, noise, diseases, and so) and making the accessibility to urban places more complicated.

The majority of the policies implemented in our cities is targeted to modal balance through measures for controlling and managing the demand for mobility, reducing traffic and limiting circulation, such as road pricing, parking strategies; measure for improving public transport and non polluting means of transport, such as car sharing and car pooling.

Until now all of them have got scarce results as regards both pollution reduction and reduction of car-produced traffic congestion. For over fifty years, mainly in the United States, the Personal Rapid Transit has been pursued and tested.

It is a public transport system attempting to join two apparently incompatible factors: the possibility of providing individual travels and the need for helping reduce acoustic and air pollution and congestion caused by private car traffic, which drastically lower the livability in many urban areas, first of all in the big ones.

In Italy this system is almost unknown despite the versatility and flexibility of its applications.

In the United States and worldwide the most successful experimentations affect mono-functional and circumscribed urban ambits, such as wide areas destined to offices, airports, and so on, but the peculiarities of this system, such as flexibility, capacity of integrating with other long-range public transport systems, the small sizes of exchange junctions, the quite low cost, can allow their realization in a wide typology of areas.

This new concept arose in the United States during the Fifties, but its most important evolution took place in the Nineties of last century.

Thanks to the growth of computer potentials, it was possible to plan and simulate all the PRT components and contextually realize the elements of system control and management.

If many people are still skeptic about the effectiveness of the system, which gives the possibility of individual travels by public means of transport (Tegnér, 1998), on the contrary, others think that its continuous experimentation is fundamental in order to improve urban quality.

Actually, these last ones think that the combination of small vehicles similar to private cars, the advantage of no intermediate stops and change of vehicle, cost reduction, possibility of a wider accessibility, which cannot be reached by mass transport vehicles, are the key-characteristics in order to replace car travels with low polluting public means of transport.

In details, the advantages of this system for the users are the following:

- full automation of vehicles;
- the exclusive use for carrying single users or small groups of users
- total freedom from timetables;
- no intermediate stops;
- no change of vehicle;
- high travel comfort
- consequent time saving;
- travel cost more in accordance with the use.

The characteristics representing the advantages for urban sustainability are the following:

- reduced invasiveness of the reserved place;
- reduced size of the stations;
- great freedom of stations placement;
- widespread distribution of exchange junctions;
- system modularity;
- no polluting emissions;
- reduced noise.

Researches and experimentations on Personal Rapid Transit

From 2001 to 2004, The European Union financed, through the Fifth Framework Program a project targeted to make a technical, environmental, social and economic assessment of the Personal Rapid Transit system, also by making a comparative assessment of its implementation in four European cities with different characteristics, and a comparison with their different modalities of public transport.

The main issues of this research project have pointed out that the Personal Rapid Transit assures high accessibility and, at the same

time, gives sustainable solutions in environmental and economic terms.

Therefore, in theory, the Personal Rapid Transit appears more attractive than the traditional systems of public transport, as it issued by the sample cities chosen.

Indeed, the PRT can entail negative risks due to its scarce testing as public mean of transport.

Many other studies have been carried out worldwide on the realization of personal rapid transit systems, in central urban areas and in wider regions, among which the study carried out in 1998 for the Transek Consultants Company - which proposed the PRT in Stockholm - and the project proposal of the University of Princeton in 2005- for the realization of PRT in New Jersey - are very interesting for the in-depth investigation on the demand, the actual possibilities of realization, the realistic reduction of car travels and cost benefits of the project proposal. Most studies reach common conclusions that can be summed up as follows: the Personal Rapid Transit reduces pollution and travel time, mostly the commuter ones, produces economic advantages by cutting down travel time in favor of work time, improves the residents quality of life, cuts the number of road accidents; reduces the congestion due to vehicle traffic and pollution.

The PRT service is very good for residents mainly in their daily travels for work, school, shopping and free time.

One of the most ambitious projects of PRT is connected with the establishment of the new city of Masdar planned by Norman Forster. Masdar city is going to rise on an area of 649ha, of which 600ha will be built; it will accommodate 50.000 inhabitants and will have the characteristics of a sustainable city. Since it has been conceived in view of absolute sustainability and total absence of polluting emissions, Masdar will use no fuel-based mean of transport. Car will be used in a very limited way and made available only as car sharing. To move inside Masdar the residents will rely on a compact network of pedestrian routes, cycle lanes and an efficient and innovative rail-based public transport system, the Personal Rapid Transit (<http://archema.org>).

References

- Bettini V. (2004), *Ecologia urbana*, Utet Libreria, Torino.
- Isfort-ASSTRA (2010), *Nessun dorma. Un futuro da costruire, 7°Rapporto sulla mobilità urbana in Italia*, Roma.
- Gasparini L. (2005), *Descrizione e potenzialità dei Sistemi di Trasporto tipo AGT/PRT-HCPRT*, www.jpods.com.
- ISSI - Istituto Sviluppo Sostenibile Italia, *Manifesto sulla mobilità urbana sostenibile "In Città liberi dall'auto"* www.issi.it.
- Kornhauser A.L. (2005), *Personal Rapid Transit (PRT) for New Jersey*, Orf 467 Transportation Systems Analysis, Princeton University.
- Tegnér G. (1998), *Personal Rapid Transit in Stockholm-Market Demand and Economic Appraisal*, TRANSEK Consultants Company, Solna, Sweden.
- UE (2009), *Piano d'azione sulla mobilità urbana. Che cosa può fare l'Unione Europea?*, MEMO/09/424, Bruxelles, 30 settembre 2009.

Campania: Territory and City in Front of the Challenge of the Logistics

Giuseppe Mazzeo

Laboratorio Territorio Mobilità e Ambiente - TeMALab
ISSM, CNR - Dipartimento di Pianificazione e Scienza del Territorio
Università degli Studi di Napoli Federico II
e-mail: gimazzeo@unina.it; web: www.dipist.unina.it

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (19-28)

Dept. of Urban and Regional Planning (DiPist),
University of Naples "Federico II"

© Copyright TeMA. All rights reserved.

Keywords:

Logistics
Campania
Territorial planning

ABSTRACT

Logistics can be defined as the process of planning, organization and control of all the activities of transport and storage of goods and informations; it interests all the productive phases, from the acquisition of raw materials, to the production process in the factories, up to the delivery of the finished products to the final customers. In this way the logistics intersects the territory at different stages of its activity: when the raw materials are brought to the factory, when the factory sends semi-production units to other factories, where products are stored in equipped areas, and when the final goods are brought to terminal sales. Inside the Southern territorial system the Campania is an important hub in the transport and sorting of goods. This role has made stronger after the carrying out of new logistics infrastructures, related to other support infrastructures, as railways and motorways.

The regional system presents nationwide excellence's peaks that could encourage its role in this sector, but there are also negative factors that may to slow the take-off of the sector. The reference is to the infrastructures and operating bottlenecks interfering its efficiency, but also to the weakness of the regional production's system that doesn't ensures a local critical mass to the logistics.

A third aspect is the lack of a clear structure of programming investment and of a greater transparency in the roles assigned to various initiatives, arising mainly on local, uncoordinated pushes.

The paper analyzes the situation of logistics and of its spatial interrelationships in Campania, identifying strengths, weaknesses, and potential evolutionary factors. The discussion faces up aspects of territorial logistics: it differs from the urban logistics for the amount of handled commodities and for the concentration in strategic poles, because these logistics platforms require specialized equipments and wide spaces for movement and deposit.

The first part of the paper analyses the relationships between territory and logistics and identifies either the main elements of interconnection or crisis in the use of physical space, due to the diverging objectives between territorial government and economic actors.

The second part considers the condition of good's movement in relation to the Mediterranean port facilities, to the state of the regional logistics system, and to the economic and territorial Campanian situation.

To this purpose, the paper also explores the evolution of territorial planning in Campania, highlighting how a series of choices, including those related to the location of logistics facilities, have been made outside of existing planning tools.

Need of a deepening

Inside the Southern territorial system the Campania is an important hub in the transport and sorting of goods. This role has made stronger after the carrying out of new infrastructures dedicated to the logistics, related to other support infrastructures, as railways and motorways.

The regional system presents nationwide excellence's peaks that could encourage its role in this sector, but there are also negative factors slowing the take-off of the sector. The reference is to infrastructural and managerial bottlenecks interfering the efficiency, but also to the weakness of the regional production's system that doesn't ensures a local critical mass to the regional logistics. A third aspect is the lack of a clear structure of investment's planning and a greater precision of the roles assigned to the several initiatives, arising mainly on local, uncoordinated pushes.

The paper analyzes the situation of territorial logistics and of its spatial interrelationships in Campania, identifying strengths, weaknesses, and potential evolutionary factors. The discussion faces up aspects of territorial logistics: it differs from the urban logistics for the amount of handled commodities and for the concentration in a few strategic poles, because these logistics platforms require specialized equipments and wide spaces for movement and deposit.

The first part of the paper analyses the relationships between territory and logistics and identifies either the main elements of interconnection or, often, of crisis in the use of physical space, due to the diverging objectives between the territorial management and the action of the economic subjects.

The second part considers the condition of good's movement in relation to the Mediterranean port facilities, to the state of the logistics system of Campania, and to the economic and territorial

state of the region. To this purpose, the paper also explores the evolution of Campanian territorial planning, underlining how a series of choices, including those related to the location of logistics facilities, have been made outside of existing planning tools.

Economy and territory

The planning of a regional system requires the full identification of the elements and of the interrelationships among the factors; for this aim the system's analysis is one of the most used methods to determine and measure causes and effects of human actions on the territory. This assumption undertakes a particular importance for the study of the land's use in an economic perspective.

The freight is a key component of an economic system and its importance (in terms of contribution to the wealth's growth) descends from three factors, namely: the economic growth, the demand for transport and the impact on urban congestion and environment (Taniguchi *et al.* 2000). In this perspective, the analysis of the impacts (true and potential) of the good's movement is part of the systemic connections inherent the relationships between territory and economy.

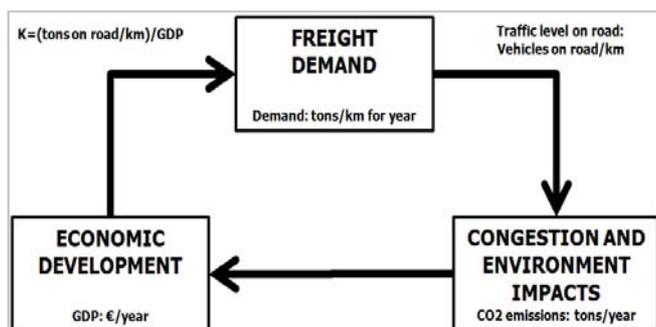


Table 1 - Freight transport is a key element of an efficient economic system; its contribution to the growth of wealth is recognized, as well as its negative impacts in terms of congestion and pollution (Source: Taniguchi 2000)

Three are the reasons for this assumption:

- the distinctive features of the economic factor in the territorial transformations, because the monetary currency is the main incentive for the space's adjustment and adaptation;
- the impact of the good's movement on the territory, in relation to the use of the space for the construction of storage and transportation facilities (ports, railway stations, freight terminals, airports) and in relation to the congestion of wide tracts of transport network for allow the freight's movement;
- the impact of the good's movement on the pollution of soil, air,

water, and noise and, consequently, on the quality of the human life and of natural ecosystems.

According to Perroux (1950), the economic space is defined by the relationships among a series of different economic factors. It follows that the spatial location of each economic element, in relation to others, assumes a specific value: this value is different if located in another place and connected with other elements.

In a territorial space in which there are several infrastructure systems the relations among economical actors create a lattice space that it locally born and develops; afterwards, this space can become more extended, if given boundary conditions rise. This transformation to larger dimension and to prevailing hierarchical positions becomes possible only if given infrastructures equip the territory, if we reduce the transportation's costs – thanks to the appliance of the logistics principles –, and if the spatial constraints become weaker reducing the friction's effects due to the physical space and low fluidity of the socio-economic actors.

Logistics and territory

Logistics can be defined as the «process of planning, organization and control of all the activities of transport and storage of goods and informations; it interests all the productive phases, from the acquisition of raw materials, to the production process in the factories, up to the delivery of the finished products to the final customers» (Luceri s.d.).

The specific trend of the production's process due to the logistics involves the flows and storage of goods, from raw materials to semi-finished goods to finished products, so they are available to consumers.

In this way the logistics intersects the territory at different stages of its activity: when the raw materials are brought to the factory, when the factory sends to other factories semi-production units, where the products are stored in equipped areas, and when the final goods are brought to terminal sales.

The intersection between logistics and territory, therefore, occurs at various times of the production process and produces physical (space for storage, networks for the movement) and socio-economic impacts (jobs, environmental quality, ...).

It follows that in many situations the logistics intersects other urban functions positioned in the area and influences their quality and importance.

Logistics is a tool to make efficiency to production and distribution; this is the leading meaning, but in this paper it interests to deepen the aspect of the conflict of an economic entity with the territory, ie when raw materials are transported to the place of production or

when the final product is distributed to customers.

To this end, it is clear that to one side there is a private company, on the other there are the different subjects managing the territory with different plans. These two parts have different objectives, often in conflict.

In fact, the basic goal of any private logistics company is to contribute to the profit's creation bringing to the customers the goods at the lowest total price; the storage (both upstream and downstream of production) and the goods transport takes part in the achievement of this goal. Aim of the territorial governance, however, is to make possible this operation at the lowest social cost, creating an effective monitoring and prefiguring a rational use of the space.

Logistics is a purely economic process and its recent development derives from the deep changes in the production processes, which have seen more and more the development of fragmentation's phenomena in the distribution and, then, an increasing role of transportation and handling phases.

A second factor to take into account is that the production system has extended the range of steps bringing the product to the consumer: activities such as storage, movement, handling, packaging, and distribution were once prerogative of the manufacturing company; today they tend to be "outsourced" if not strategic and functional to the specific society core business (Borghesi, Buffa, Canteri 1997).

Fundamental components of a logistics system are:

- number, size and geographical distribution of plants;
- cost of service in terms of speed and reliability, also in relation to the quality of the transport network.

These components are interrelated to each other, and their optimization can be achieved through a systemic approach and can lead to different operating configurations. In relation to the range of offered services and to the number of specialized operators, the logistics districts may distinguish itself in different categories: in particular, polarized districts, multi-specialized districts, logistic platforms and wide range districts (Vona 2001).

Another link with the territory is to found in the remark that logistics is a district phenomenon (Becattini 1999). A manufacturing district formed in a territory, because of the outsourcing of specific phases of the process, creates in the same area a system of companies offering spin-off services, in particular related to logistics; in this process the economic development due to the territorial contiguity takes a great importance, and this is a factor that affects both on mutual control among enterprises and on the creating of service's activities with a "condominium" nature.

The creation of industrial districts stands on the size of the established firms even; so the presence of a weak economic system

reduces the possibility of setting up of logistics systems; it follows that the productive districts are preferably located in developed and self-consistent economic areas.

A logistics district represents a value-added in a territory, because it creates a number of positive benefits in economic and infrastructural field; among they it is possible to remember:

- growth and innovation of the system, with positive effects on incomes and jobs;
- location's advantages of the territory compared to other territories;
- specialized and competitive emulation among enterprises located in the area;
- construction of new infrastructures working to area's advantage;
- quantitative and qualitative development of services.
- Besides, are to consider the mobility's external costs (Boscacci 2004), namely:
 - the environmental costs endured by the citizens who inhabit and live in contact with the various activities related to transport;
 - the environmental costs of natural resources from impairment nicked;
 - the congestion's costs related to the travel time and to the safety.

A logistics system manages the transportation and distribution of two categories of goods: first, the goods produced in the area and distributed both in the same territory and outside it; second, the goods produced outside the area and distributed in it or in transit through it. The significance of the system of local production affects the size of the first tranche, while the latter becomes more prominent when the territory is only a place of consumption or transit to other destinations.

The processes of construction of poles for logistics can't be triggered without the presence of appropriate infrastructure resources, such as road, rail links, and installation for logistics and intermodality (open space, trucks bundles, electrified railways, information and telecommunication systems, high value-added activities, handling in refrigerated environment or in controlled atmosphere).

The realization of these infrastructures derives, for the most part, from public investments because not many private investor would have the ability to make infrastructural investments of this dimension, for their size and for their social character. «For this reason, therefore, and for the fact that the freight's activity can be, in some ways, assimilated to a public utility service, the national and local governments, and the European Union itself have increased the funds allocated to the upgrading of infrastructure networks for the exchange of agricultural and industrial products, financing specific investment programs» (Vona 2001, 213).

The ports of Campania and the state of the Mediterranean trades

Speaking of logistics and freight transport means paying special attention to the most used freight's vehicle, that is the maritime. In 2008, the Italian port system has handled 343,996,013 tons of goods; the most important, Genoa, handled 55,666,701 tons. The three main European ports (Rotterdam, Antwerp, and Hamburg) have moved, respectively, 406,032,000, 181,500,000 and 140,381,000 tons.

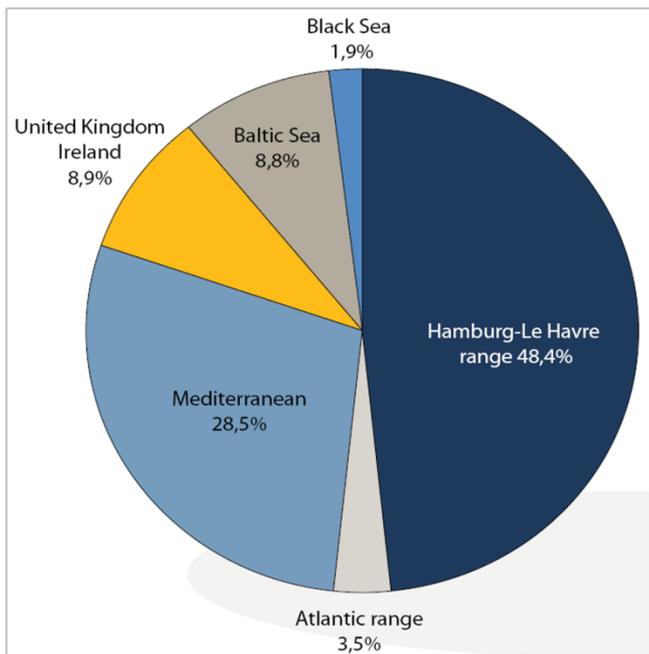


Table 2 - The movement of containers in European ports is estimated amounted to 90.7 million TEUs (1) (2008). Of these, 28.5% (about 25.85 million TEUs) transits in the Mediterranean Sea, along the main East-West route

The economic and financial crisis that began in 2008 has started a series of reactions in the international freight. The structures involved in handling and transport of goods, primarily the commercial ports, are responding to the crisis in different ways with the aim of achieving better international positioning when the economic recovery will feel its effects also on the goods traffic.

In the Mediterranean Sea, the main course followed by the freight traffic goes from Suez to Gibraltar. Along this course are located a series of port facilities absorbing a share of total tonnage, while the remaining flow of goods pass through.

The Mediterranean ports have different characteristics. Some allow the Ro-Ro handling of goods, others are specialized in the docking

of large container ships and in the subsequent boarding of the goods in smaller container ships (transshipment); others, finally, allow loading and unloading of unpacked goods. Often in the same port are present different specializations in different areas.

At the entry in the Mediterranean Sea through the Suez Canal, a product packed up in a container destined to Northern Europe can choose different paths. The main ones are:

1. to cross the Mediterranean Sea from East to West, to pass Gibraltar and to sail the Atlantic to North;
2. to unload the container in a transshipment port, to load it on a smaller ship and to continue by boat to destination;
3. to unload the container in transshipment port, to load it on a ship up to a port in the North of Mediterranean Sea, to load it into freight train and to bring it to destination;
4. to unload the container in a transshipment port, to load it on a freight train and to bring it to destination.

The choose of the best travel alternative results from various factors which are essentially based on the service's efficiency in terms of handling's cost and of time required to reach the final destination. You consider, for example, that if a container unloaded in a port in the northern Mediterranean could go on smoothly to Rotterdam, and arrives 8 days in advance compared to the same containers that goes on by sea, with a significant reduction in travel time and, at the same time, in CO₂ emission (45 kg for each moved container, according to Minella 2010).

Compared to these general considerations which are the moves that Mediterranean ports are carrying out?

In the Mediterranean Sea there are historic ports with a continental importance (Genoa, Marseilles, Venice, Barcelona, ...) and old structures recently developed (Valencia, Gioia Tauro, Cagliari, Taranto, ...). There are also new realities that are gearing up and that will play an important role in the flow's redistribution of cargo handling; the hint is, in particular, to the ports of Mediterranean Africa, as Tangier in Morocco, New Damietta and Port Said in Egypt, Endifha in Tunisia, Oran in Algeria. According to some estimates, in 2015 the handling capacity of these African ports may reach 5 million of containers (for comparison, Naples in 2008 has handled about 481,000 containers) putting in new competitors in the challenge on the attractiveness of the goods flows.

With regard to the Italian port there is a general repositioning tracing new alliance's systems. Gioia Tauro, Taranto, and Cagliari, which together handles about 4.5 million TEUs, decided to create an association, known as IMETA, with the aim to implement agreed actions for the inward of container's flows; one of the first actions was the cancellation of the port dues.

A second alliance is among the ports of the northern Adriatic: Trieste, Venice, Ravenna, and Koper agreed joint measures to make

this port system as the main entrance to the Central Europe markets (Trupac, Kolenc 2002).

The association, called NEPA (North Adriatic Port Association), plans in the coming years investments for 3.4 billion €, of which 2.2 come from private societies. Investments in the ports are intended to improve the provision of infrastructures. In Trieste there is the foresight of creating a logistic platform and restructuring of the piers (642 million euro); in Venice the foresight is the construction of sea's motorways and container terminals (850 million); in Koper a new pier and a container terminal (500 million); and in Ravenna the digging of canals and a new railway terminal (470 million).

	Teu 2008	Δ% 2005-2008
European ports	90.700.000	23,0
Mediterranean ports	25.850.000	=
Gioia Tauro	3.467.772	9,7
Genoa	1.766.605	8,7
La Spezia	1.246.000	21,6
Taranto	786.655	9,7
Livorno	780.000	18,4
Neaples	481.521	21,9
Venice	379.072	29,4
Trieste	335.943	66,9
Cagliari	256.564	-60,6
Savona	252.837	15,1
Ravenna	203.702	20,8
Italian ports	9.956.671	=

Table 3 - The container's movement in the main Italian ports in 2008. It is evident that they animate about 30% of containers moved in the Mediterranean ports. This percentage has wide margin for improvement

A more fluid situation is that of the ports of the North Tyrrhenian Sea (Genoa, Savona, La Spezia, and Livorno). In this case, the individual ports are working for the strengthening of their position, as is the case of Genoa, which has formed an alliance with the port of Tangier.

To consider the contribution of a large bank like Unicredit Bank, which provided investments for 1 billion €, split between Trieste and Genoa. In this description, the Campanian port are characterized by a great historical and economic role in the region, but also for the problems they face and which are related to their intrinsic characteristics (Mazzeo 2009). In particular:

1. the main ports of Campania (Naples and Salerno) are universal port facilities, then the goods are handled with different and, often, non-specialized technologies;
2. the two main ports are at a national level with regard to the competitive scale and size of freight;
3. the ports are the main loading and unloading goods door in the region, but doesn't seem to have a big role outside of the Campania Region;

4. the ports are undersized because they are close along the coastline from a very dense urbanization which limits their growth's potential;
5. among the main issues is to mention the lack of ground facilities serving as distribution centers outside the ports. These structures may play an important role when there are clearly defined in their functional mission and well composed in the physical structure, in particular in the ability of intermodal and freight handling. To partially remedy this deficiency a direct shuttle has recently opened a connection between the port of Naples and Campania Freight Village of Nola.

The hidden role of spatial planning in Campania

The location of strategic infrastructures, as those related to logistics, is set up as a typical example of territorial level forecasting, in connection with parallel forecastings contained in the development's economic planning.

This interrelationship substantiates a process of ordered territorial transformation and it is the basis of the assumptions of the economic programming from the Sixties on.

In Campania, as in other regions, such convergence has not been implemented, mainly because the territorial planning assumptions are hardly ever become an official guide tool for the changes, although the assumptions of territorial organization and the trends in it provided have been deeply affected into the operational policies implemented in the region.

The localization of the areas for industrial development identified in the first phase of the extraordinary action for the South of Italy (Cassa del Mezzogiorno, 1951-1992) (Cafiero 2000), the realization of North-South and East-West motorways, the choice of the polarities of territorial development are a not complete set of programming actions that have set up and added alterations in the evolutionary trends of the territory.

The Territorial Regional Plan (Regione Campania 2008) states that «retracing the events related to the territorial order and the development of the Campania Region through the key documents and plans produced by the late 1950s, it shows how land use planning has been little operative and often only a statement of general or address proposals for instruments to be drawn up at different times, though often based on studies of considerable dimensions and on a large body of statistical data. The planning documents are not accidentally often referred to as 'studies', 'addresses' or 'schemes' and not 'plans'».

Common characteristic of the proposals is the problem of the territorial rebalancing. This recurring objective is tackled in different

ways over the past 60 years; the used models foresee spatial patterns that are classifiable in two ways: by strips (from the coast to the interior the territories delineate different spaces with different allocation of resources and services) or by development axes (preferential lines for the spreading of the development to the interior spaces reducing the congestion of the costs).

One of the first territorial plans, the Plan of the Naples District (Piano del Comprensorio, Comune di Napoli 1964), was extended to 96 Municipalities in the Provinces of Naples, Caserta and Salerno, and foresaw the decompression and the functional rehabilitation of the coastal strip, the development of an industrial system outside Naples and the building of a real metropolitan system. One of the main forecast was the lightening of the historical development axis (Pozzuoli-Castellammare di Stabia) by a cross axis devoted to the productive development (from Villa Literno to Nola) and by the development of two rebalancing poles positioned near Mondragone (Caserta) and Battipaglia (Salerno).

The Territorial Order Scheme (Schema di Assetto Territoriale, CRPEC 1968), adopted by the Regional Committee in 1971, wanted to guide the development process towards the interior of the Region reversing the effects of concentration along the coast.

After ten years was prepared another plan, the Territorial Order Addresses (Indirizzi di Assetto Territoriale, Regione Campania 1981). This plan follows of one year the earthquake of 1980 and contains a specific attention to the problem of the rebuilding and of the development of the internal areas. It raises once again the image of Campania formed by strips, an assumption that was proposed for the first time at the end of 1950s in the economical studies of Nino Novacco and Manlio Rossi Doria (Sbriziolo De Felice 1972); each strip had different endowments in terms of resources. On this territorial model the plan proposes operations of re-establishment of the urban, economical and mobility systems.

The plan foresees a splitting of the regional territory into three strips: the first included the metropolitan area of Naples and was extended between the Volturno and Sele, with areas of high concentration around Caserta and Salerno; the second included the internal system that goes from the upper Calore River to the Ofanto River valley, to the upper valley of the Tammaro River and of Sele River, containing the cities of Benevento, Ariano Irpino and Lioni; the third included the middle area with Avellino, its area, and the area of National Park of Cilento and Vallo di Diano.

The issue of the economical and territorial re-balancing is present also in the following development plan (Piano di Assetto Territoriale – PAT, Regione Campania 1986).

The plan proposes the strengthening of the intermediate area of the Region, formed along the axis connecting Caserta, Benevento, Avellino, and Salerno, in order to reduce the pressure on Naples

permitting the building of a real metropolitan area.

The PAT identifies a system of 8 “program areas”, that are: the metropolitan area of Naples and Salerno; the rebalancing area including the cities of Caserta, Benevento, and Avellino; the two hinge areas of the Lower Volturno and Aurunci and of Lower Sele and Tusciano; the interior area of Alifana zone and Matese Mountains; the interior area of Upper Sannio, Arianese area and Picentini Mountains; the coastal and inland area of Cilento and Vallo di Diano. Each area presents specific development's processes, but with the common aim to overcome two types of imbalances: 1. between the cost and the inland; 2. in the organization of the single program areas.

Also the Regional Development Plan (Piano Regionale di Sviluppo, Regione Campania 1990) is based on the concept of dualism between a coastal regional metropolis and other territorial units, mostly internal, made up of urban areas, axis and environmental connection's units.

The last plan is the Regional Plan (Piano Territoriale Regionale – PTR, Regione Campania 2008) at present in force. It is a typical strategic plan and designs a system of territories fixing types of strategic actions at different scales without to come down into specific implementation's details.

The Regional Plan of the Campania, approved by regional law on October 2008, represents a typical planning tool without plan (Mazzeo 2006); to it is assigned a highly procedural and strategic character that turns the plan into an instrument of “generation of image change” (Belli 2003). The logical construction of PTR is based on three “strategic images” from which derive seven thematic areas and sixteen strategic addresses. The effort to give a territorial reading of the plan lies in the construction of four “territorial reference frameworks”, one with a reticular character and three with an spatial character (settlement spaces, territorial development systems and complex territorial fields). Among they the most important are the “territorial development systems”, characterized as micro-regions – intermediate territorial units for which are traceable development trajectories identified as shared strategies for the use of land resources –, and “complex territorial fields” – areas of intersection of dynamic processes and interrelated actions.

The value gained by these territorial subdivisions is really poor: the PTR, in fact, acts as composition and synthesis of strategic behaviors leaded by all the local actors, but not as a real definition of actions and localized operations.

This indeterminacy is also present in subsequent programming instruments for the regional development. The considerations on this point derives from the crossing of single strategical projects and of the main planning sources, as the Regional Plan (PTR) and the Regional Operative Plan 2007-2013.

The crossing of the two series of forecasts could be coherent for the declared strict relation between the two plans and it could create a grid of interventions that, if realized, can create new poles towards to direct the evolution of the territorial system of Campania.

Actually you can verify that only some of the interventions are simultaneously provided by the two mentioned instruments; some are mentioned in one of the instruments, while some of them are not even clearly localized.

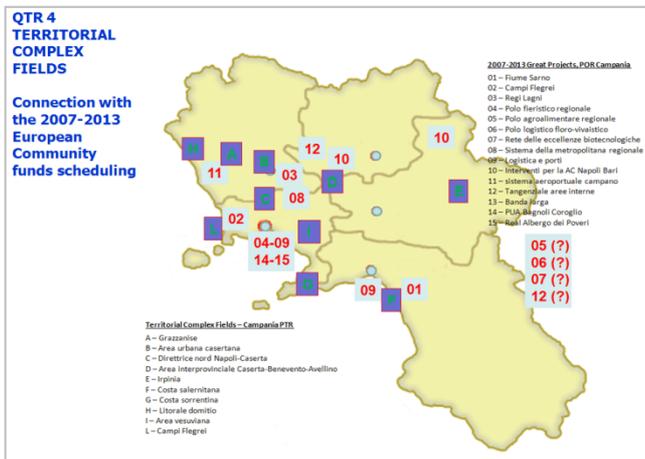


Table 4 - The Regional Territorial Plan (PTR) was conceived as an instrument closely related to the development's planning. In reality the hint of PTR and those of the POR Campania 2007-2013 does not appear completely consistent

This is evident, in particular, linking the "Territorial Complex Fields" of PTR with the "Big Projects" contained in the POR (Regional Operative Programm) of Campania. The big projects, contained in the Campania POR - FESR 2007-2013 and defined in EU Council Regulation No 1083/2006 (article 39), are systems of actions including a series of projects, activities or services interesting investment over € 25 million in the case of the environment and € 50 million in other sectors. The Campania Region has identified 16 big projects on the basis of the strategic priorities set out in the Regional Strategic Document. At least 5 big projects (regional food hub, plant life and nursery logistics hub, logistics and ports; Napoli-Bari high-capacity railway, Campania airport system) are directly or indirectly related to the logistics.

Logistics in Campania

The regional system for the logistics is focused on three commercial ports, Naples and Salerno, national level port, and Torre Annunziata, of regional level; on two freight villages (Nola and

Marcianise-Maddaloni) (2); and on an under construction subsidiary plant, the supply center of Battipaglia, partially autonomous. Within this system it is possible to include also the airport of Capodichino.

The two main freight villages of Campania constitute poles with a high development capability for their location and structure. Made in two of the major decongestion areas of the coast (Marcianise and Nola) they are interconnected to the rail network and serve as a node in the goods handling from North to South and from East to West. Their location (with that of Battipaglia) is another example of public investment in absence of territorial planning.

The Southern Europe Freight Village of Marcianise-Maddaloni is located near the homonymous railway marshalling yard and is equipped with 1 bundle of collection and delivery (each of 3 tracks), 1 intermodal terminal with 2 tracks of 640 meters, able to handle both domestic and foreign traffics (with cars or combined), 1 arrivals bundle formed by 20 tracks and 1 departures bundle consisting of 32 tracks.

In the freight village are presents different types of operators (logistics, freight forwarders, couriers, and managers), as well as activities related to goods handling destined to the wide retailing chain.

The village provides administration services and fringe activities such as custom offices, computer and telecommunication services, building maintenance services, banks and insurance, security service, personal services, dining, vehicles services, areas for maneuvers and approaching both to the terminal and to the warehouses, structures used for the maintenance and repair of trucks and rolling stocks.

The railway station of Marcianise Maddaloni handles about 150 trains by day, automatically separated and reordered. It is a transit hub for rail traffic from North to South and from East to West, and allows to economically operate with dedicated trains or with single wagons.

The freight village's warehouses cover a total area of 180,000 square meters and are available in various sizes; they also can be "tailor-made" and organized according to the needs of operators. Each warehouse, autonomous in the freight village area, is supplied with large maneuvers areas with a dimension equal to the covered area.

In the East side of the freight village is located the main custom house of Caserta. The building hosts both the offices of the new custom and the local command of the Guardia di Finanza, the military corps dealing with customs, with expertise in the customs department and on the shipping offices.

The Freight Village "Campano", located near Nola, extends on an area of 3 million square meters, of which about 500,000 covered; it has first category customs offices, 180,000 cubic meters of cold

storage warehouses, multipurpose cells with temperature from 0° to 30°C, an inner train station (named Nola Interporto) with 13 pairs of electrified tracks and 1 intermodal terminal with 6 tracks of 750 meters each.

Through the RFI-Trenitalia network, the freight village is connected with the ports of Naples, Taranto, Bari, Gioia Tauro and has an intermodal terminal of about 225,000 square meters. In the village are present 175 companies with approximately 2,500 employees, 236,000 square meters of areas which allow the simultaneous parking of about 3,000 TIR, and has in service 24 Km of roads and bridges. It is projected for moving over 30 millions of tonnes at full capacity.

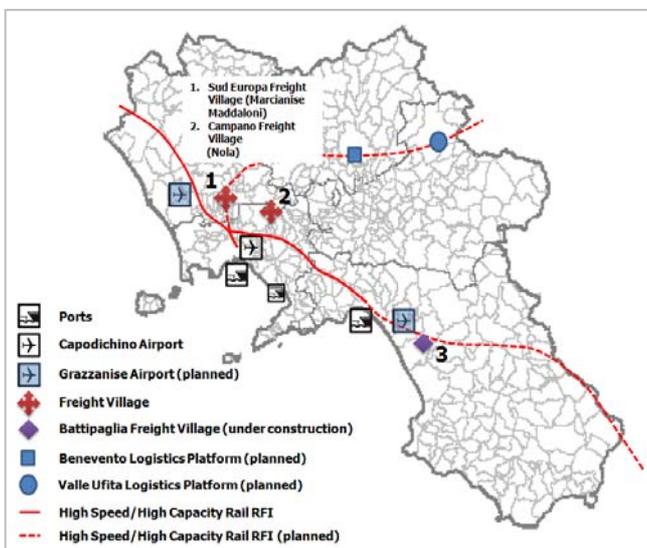


Table 5 - The logistics system of Campania is structured on the ports of Naples and Salerno, on the airport of Capodichino and on the freight villages of Marclanise and Nola. Under construction is the supply center of Battipaglia. The development forecasts of the sector foresee two new airports (Grazzanise and Battipaglia) and a logistics platform along the future high-capacity line from Neaples and Bari

The freight village has development's projects that foresee the completion of the inner areas, the construction of other 50,000 square meters of buildings assigned to management and services activities, and its extension on an area of 1,200,000 square meters, for the realization of 400,000 square meter of latest generation sheds set aside of advanced technologies and assigned to national and international specialists in logistics. There will be also the extension of the tracks and the doubling of the intermodal terminal. A part of the enlargement will be devoted to the repair shops of NTV society (New Passenger Transport), the new railway company that will begin its passenger activities with high speed trains in 2011.

The Freight Village "Campano" has recently signed an agreement with the Bologna Freight Village in order to offer intermodal logistics services between the two structures, connected by a link that is part of Corridor 1 (Berlin-Palermo) of the TEN-T (Trans-European Transport Networks).

Another little freight village will be built near Battipaglia, one of the most active industrial and commercial center in Campania, located in the North of the Sele Plain; the area is also close to the port of Salerno, the A3 highway (Salerno-Reggio Calabria) and the RFI railway network.

The logistics center will extend for 167,444 square meters with a covered area of 92,644 square meters; will be present facilities dedicated to the sorting and handling of long and short range loads. Two large warehouses will built, for the settlement of logistics operators that can perform, on behalf of other societies, storage and processing of the goods after the production phase.

The intermodal rail terminal of Battipaglia will cover an area of 35,244 square meters, with three tracks for the modal change, yards for operating of the trucks and for the temporary storage of cargo units, direct connection to the railway station of Battipaglia and 1 crossing line with the warehouses. The location of the terminal seems to be very favorable for the development of combined transport, because it is next to two national railway lines, the Naples-Reggio Calabria line (affected also by the deployment of high capacity) and the Battipaglia-Potenza-Taranto line.

This freight village will have an area of 127,117 square meters, of which 14,259 square meters covered, for the management offices of the area, workshops, petrol stations, parking areas for temporary and permanent trucks, cars, and loading units, and roads connections with the national roads.

Apart from these logistics structures, existing or under construction, other poles are in programming or designing. These poles (in particular the logistics platform of Benevento and the logistics platform of Ufita Valley) are planned at a short distance one from another, along the new future high-capacity rail line Napoli-Bari.

The fate of the two projects is, for now, different; while for Benevento the Regional Council has given the green light to the feasibility study (March 2010), because consistent with regional development planning of logistics and intermodality, for Irpinia the situation is stalemate.

It is clear that the new high-capacity line, along with the highway Napoli-Bari and the proposed construction of the North-South road from Grottaminarda and Contursi, represent potential development's flywheels for the inland areas of Irpinia and Sannio. For this the infrastructure's assumptions consequent to it (as the logistics platform) are to be welcomed.

Less obvious is how two logistics platforms can live a few miles of

each other and how their implementation can proceed also if the new networks (high-capacity connection from Bari to Naples and the Apennines North-South road) does not exist, even as concept design.

It is also to consider that the mentioned logistics platform, for the size of the local economy, will be primarily a transit platform, which makes the structure strongly linked to external economic factors.

Conclusions

The development of infrastructure related to logistics has a strong public service characterization. The private companies operating in the field use public utilities realized by regional, national, and EU funds and provided to the companies. This is particularly true for the Campania Region; furthermore, the logistic system of Campania, a public system, is based on logistics centers not yet defined in their global form or in their final configuration.

The economic system of Campania is dimensionally weak compared to that of Central and Northern Italy. The moved flows of goods are, for large part, of transit and have poor effects on the socio-economic situation of the area.

More relevant seem to be, on the other hand, the negative impacts due to the heavy traffic's increasing spatial volumes, to the poor capacity of the rail network to handle significant volumes of goods, to the occupancy of high quality agricultural land, and to the spread of pollutants.

The Campania system consists spatially of a territory in which are present two very distinguished main areas. The first (near the coast) is characterized by an extreme concentration of infrastructures, while the second (the inland areas) are characterized by low concentration and strong dilution of the same infrastructures.

In the first area are currently located all the Campanian logistics infrastructures, due to the presence of the handling's key junctions (the ports of Naples and Salerno) and to the largest part of the rail and road mobility system, even if this system could be more efficient with a more greater economic strength of the surrounding area and with a more relevant quality of the infrastructure system.

A specific speech interests the inland areas of the Region.

These areas appear to be aspects of strong weakness in terms of population, infrastructure (especially rail) and relevance of the production system, for which the construction of logistics infrastructure in these areas is essentially a bet with a high percentage of risk.

This risk could be reduced if it comes true two conditions, namely the strengthening of the inland areas economies and the building of

modern transport infrastructure, in order to create a critical mass making sustainable a dedicated logistics infrastructure.

Remains strong, however, the doubt about the sustainability of two logistic centers within short-distance in an area characterized by low concentration of activity, because of the clear duplications in investment's costs (easy to define as a waste) and of the uncertainty of the investment's returns.

Notes

¹ TEU (Twenty-Foot Equivalent Unit) is the standard measure of container transport. A container of 20 feet of length is equivalent to 1 TEU. Another standard measure is that of 2 TEU (40 feet). Is to remember that 1 foot is equal to 0.296 meters, so 20 feet are equal to 5.92 meters.

² The Italian Law nr. 240/90 defines the freight village as "an organic unit of structures and integrated services finalized to the exchange of goods among different transport types; it includes a railway station able of forming or receive complete trains and connected with ports, airports and great communication roads".

Acknowledgement

- Becattini G. (1999) "La fioritura della piccola impresa e il ritorno dei distretti industriali", in *Economia e Politica Industriale*, 103.
- Boscacci F. (2004) "Perché occuparsi di logistica urbana", in F. Boscacci, E. Maggi (eds.), *La logistica urbana. Gli elementi conoscitivi per una governance del processo*, Polipress, Milano.
- Belli A. (2003) "Verso il piano territoriale", *areaVasta*, 6-7, 140-145.
- Borghesi A., Buffa A., Canteri R. (1997) *Manuale di logistica. I trasporti*, Cedam, Padova.
- Cafiero S. (2000) *Storia dell'intervento straordinario nel Mezzogiorno (1950-1993)*, Lacaita, Bari.
- Comune di Napoli (1964) *Piano del Comune e del Comprensorio di Napoli, Relazione generale della Commissione per il Piano regolatore di Napoli e relazione sul piano zonale per l'applicazione della legge 18-4-1962 n. 167*.
- CRPEC, Comitato Regionale per la Programmazione Economica della Campania (1968) *Schema di sviluppo economico della Campania (1966-1970)*, Napoli, 15 febbraio 1968.
- European Sea Port Organization (2009) *ESPO Annual Report 2008-2009*.
- Luceri B. (s.d.) *La logistica integrate*, Slide, Dipartimento di

Economia, Università degli Studi di Parma.

- Mazzeo G. (2006) *L.R. 16/2004. La nuova legge urbanistica regionale della Campania*, Dipartimento di Pianificazione e Scienza del Territorio, Elio De Rosa Editore, Napoli.
- Mazzeo G. (2009) "La risorsa mare per la mobilità di merci e persone nella Regione Campania", *TeMA Trimestrale del Laboratorio Territorio Mobilità Ambiente*, 2:3, 17-26.
- Perroux F. (1950) "Economic Space: Theory and Application", *Quarterly Journal of Economics*, 89-104.
- Regione Campania (1981) *Approvazione degli "Indirizzi di assetto territoriale" Proposta di Consiglio*, 24 agosto 1981.
- Regione Campania (1986) *Disegno di legge. Oggetto: Normativa di attuazione del Piano di Assetto Territoriale*.
- Regione Campania (1990) *Proposta per il Piano Regionale di Sviluppo*, 1 marzo 1990.
- Regione Campania (2008) *Legge regionale n. 13 del 13/10/2008, Piano Territoriale Regionale*.
- Sbriziolo De Felice E. (1972) *La pianificazione territoriale in Campania dal 1952 al 1972*, L'Arte Tipografica, Napoli.
- Taniguchi E., van der Heijden R. (2000) "An Evaluation Methodology for City Logistics", *Transport Reviews*, 20:1, 65-90.
- Trupak I., Kolench J. (2002) "The Northern Adriatic ports – joint approach to the European transport market", *International Association of Maritime Economists, Panama 2002 Conference*.

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

Jesus Gonzalez-Feliu, Joëlle Morana

Laboratoire d'Economie des Transports – ISH, Université Lumière Lyon 2, 14 Avenue Berthelot 69007 Lyon, France
e-mail: jesus.gonzales-feliu@let.ish-lyon.cnrs.fr; e-mail: joelle.morana@let.ish-lyon.cnrs.fr

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (29-37)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Freight Distribution
City logistics
Sustainable Development

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 Protocol¹. Most experiences that show the environmental gains make a direct relation between CO₂ 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 CO₂ equivalent. To calculate the total emissions, in CO₂ 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 area².

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 centre³ (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 CO₂ 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 not 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 $\frac{3}{4}$ of the total income, target confirmed in 2009⁴.

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 EDI⁵ 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 meet 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 $\frac{2}{3}$ 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 led 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 21st 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 (economic, 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.

Acknowledgements

The authors should like to acknowledge Mr. Paolo Pandolfo and Ms. Federica Frigato from Interporto di Padova S.p.A. for their help during the interviewing and the post-treatment processes, as well as anonymous referees for their comments that improved the quality of the paper.

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.

References

- Allen J., Thorne G., Browne M., (2007), Good Practice Guide on Urban Freight, Bestuvs, Rijswijk, Pays-Bas.
- Ambrosini C., Meimbresse B., Routhier J.L., Sonntag H. (2008) "Urban freight policy-oriented modelling in Europe". In Taniguchi E. and Thomson R.G., *Innovations in City Logistics*, Nova Science 197-212.
- Anderson S., Allen J., Browne M. (2005) "Urban logistics. How can it meet policy makers' sustainability objectives?", *Journal of Transport Geography* 13, 71-81.
- BESTUFS (2009), BESTUFS II Bibliographic Overview, Final DVD-Rom, BESTUFS, The Netherlands.
- Crainic, T.G. (2008) "City Logistics", in Chen Z.L., Raghavan S. (eds.), *Tutorials in Operations Research 2008. State-of-the-Art Decision Making Tools in the Information-Intensive Age*, INFORMS, e-book, pp. 181-212.
- Dablanc L. (2007) "Goods transport in large European cities: Difficult to organize, difficult to modernize", *Transportation Research part A*, v. 41, 280-285.
- Dablanc L. (2010) "Freight transport, a key for urban economics. Guidelines for practitioners", *Proceedings of the Transportation Research Board 2010 annual meeting*, Washington, USA.
- Dablanc L., Gonzalez-Feliu J., Ville S. (2010) "Los límites de las políticas públicas en el ámbito de la logística urbana: el caso de la ciudad de Vicenza", *Actas del IV Congreso Internacional de Transporte: soluciones en un entorno económico incierto*, Castellón de la Plana (Spain), 26-28 May.
- Danielis R., Rotaris L. (2001) *Rassegna critica delle stime dei costi esterni dei trasporti*, Università di Trieste and ISTIEE, Trieste, Italy.
- Gerardin B., Patier D., Routhier J. L., Segalou E. (2000) *Diagnostic du Transport de marchandises dans une agglomération*, Programme national Marchandises en ville, DRAST
- Gonzalez-Feliu J. (2008) *Models and methods for the City Logistics. The Two-Echelon Vehicle Routing Problem*, PhD. thesis, Politecnico di Torino, Turin, Italy.
- LET, Aria Technologies, Systems Consult (2006) *Mise en place d'une méthodologie pour un bilan environnemental physique du transport de marchandises en ville*, ADEME, Paris, France
- Marcucci E., Danielis R., (2006) "Centri urbani di distribuzione delle merci e politiche del traffico: una valutazione empirica tramite le preferenze dichiarate", *Atti della XXVII Conferenza Scientifica Annuale dell' AISRe*, Scuola Superiore Sant'Anna di Pisa
- Morana J., Van Hoorebeke D., Pire-Lechalard P. (2008) "Supply chain management, Green SCM, Social SCM : La Logistique Globale au cœur au Développement Durable", *Actes des 3èmes journées Neptune*, Toulon, 13-14 novembre.
- Morana J., Gonzalez-Feliu J. (2010) "Sustainable supply chain management in city logistics solutions: an experience's comeback from Cityporto Padua (Italy)", *Proceeding of the 3rd International Conference on Logistics and Information Systems, ILS 2010*, Casablanca (Morocco), 14-16 April.
- Munuzuri J., Larraneta J., Onieva L., Cortes P. (2005) "Solutions Applicable by Local Administrations for Urban Logistics Improvement", *Cities*, v. 22 n. 1, 15-28.
- Paché G. (2009) "Quels impacts de la crise sur la logistique ?", *Revue Française de Gestion*, v. 5, 51-57.
- Patier D., Dufour J. G., Routhier J.L. (2007) "Du transport de marchandises en ville à la logistique urbaine", *Techniques de l'Ingénieur n° AG 8 210*.
- Rogers D., Tibben-Lembke R. (1999), "Reverse logistics: stratégies et techniques", *Logistique & Management*, v. 7 n. 2, 15-25.
- Rosini R., ed. (2005) *City Ports Project. Intermediary report. Quaderni del servizio Pianificazione dei Trasporti e Logistica*, Regione Emilia Romagna, Bologna, Italy.
- Routhier J.L., Traisnel J.P., Gonzalez-Feliu J., Henriot F., Raux C. (2009) *ETHEL-II. Energie, Transport, Habitat, Environnement et Localisation. Rapport final. Contrat ADEME (in French)*.
- Russo F., Comi A. (2006) "Demand models for city logistics : a state of the art and a proposed integrated system". In Taniguchi E., Thomson R.G.(ed.), *Recent Advances in City Logistics*, Elsevier, Amsterdam, 91-105.
- Ségalou E., Ambrosini C., Routhier J.L. (2004) "The environmental assessment of urban goods movement". In Taniguchi E., Thomson R.G. (eds.), *Logistics Systems for Sustainable Cities*, Elsevier, Amsterdam, 207-220.

- Spinedi M., ed. (2008), *Logistica urbana: dagli aspetti teorici alle applicazioni pratiche. Esperienze italiane e straniere a confronto*, Emilia Romagna Region, City Logistics Expo, Bologna, Italy.
- Taniguchi E., Shimamoto H. (2004) "Intelligent transportation system based dynamic vehicle routing and scheduling with variable travel times", *Transportation Research Part C*, v. 12 n. 3-4, 235-250.
- Vaghi C., Pastanella M. (2006) *Analisi costi/benefici di Cityporto*. Technical Report, Interporto di Padova and Bocconi University, Milan, Italy.
- Visser J., van Binsbergen A., Nemoto T. (1999) "Urban freight transportation and policy", in Taniguchi E., Thomson, R. G., *City Logistics I*, Institute for City Logistics, Kyoto, Japan.

Toward a Shared Urban Transport System Ensuring Passengers & Goods Cohabitation

Anna Trentini*, Nicolas Mahléne**

*Ecole Nationale Supérieure des Mines de Paris EIGSI-Ecole d'Ingénieurs en Génie des Systèmes Industriels

e-mail: anna.trentini@ensmp.fr

**EIGSI-Ecole d'Ingénieurs en Génie des Systèmes Industriels

e-mail: nicolas.mahlene@eigsi.fr

ARTICLE INFO

TeMALab journal

www.tema.unina.it

ISSN 1970-9870

Vol 4 - SP - March 2011 (39-44)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Sustainable development
New urban transportation system concept
French C-Goods project

ABSTRACT

Nowadays, cities are looking for instruments and policies to ensure an efficient and effective urban mobility for both passengers and goods, from a sustainable development point of view.

The optimization of the flow of passengers and goods in the urban area, with the aim of reducing the direct and external costs related to the increasing mobility, is assuming growing importance.

Goods transport, long excluded from the city's problems, seems now to attract renewed interest both from the traditional players such as institutional or professionals of road transport, but also from the new players such as operators of public transport.

Urban communities of all sizes, in Europe, are wondering how to enter further into this issue: to design and manage of combined urban transport solutions, could be a real opportunity to extend urban transport services, allowing a smooth sharing of passengers and goods.

Examples of urban communities' involvement in urban logistics are increasing but we do not dispose of much knowledge on how these innovative solutions can be deeply integrated into a global urban mobility strategy. The aim of this paper is to explore this issue.

It presents radical new urban transportation system concepts, potentially allowing changing the economic and environmental costs of passenger and freight transportation.

It focuses on the concept of sharing, which means to make a joint use of transport resources, between passengers and goods flows. At first, the concept of shared passenger & good urban transport is defined and existing solutions are described, carried out on an international survey. From a field observation of several existing solutions, an inductive reasoning enables us to move from a set of specific facts to establish an archetype for a radical new urban transportation system. Once the archetype defined, it is translated in real life through the example of the On Route proposal for London. The named proposal was submitted to Transport for London (TfL)'s 'A New Bus for London' competition, launched in 2008. The New Bus for London is a planned 21st Century replacement of the iconic Routemaster as a bus built specifically for use in London. A prototype is expected to be on the road by late 2011, with the first buses due to enter service in early 2012, in time for the 2012 Summer Olympics to be held in London.

The research frame of this paper is the French C-Goods project (City Goods Operation Optimization using Decision support System), financed by the French research agency.

Started in February 2009 the project involves four partners, the multi-disciplinary French engineer school EIGSI (Ecole d'Ingénieurs en Génie des Systèmes Industriels), the French university ENMP (Ecole Nationale Supérieure des Mines de Paris), the Poitiers Urban Community (CAP), and the consulting service Interface Transport, specialized in transport economy. The project will end on 2012.

Problem Statement

Both people and goods move in the urban environment, the ones transported by their individual vehicles and collective transports, the others by freight carriers, shippers, craftsmen, people

An efficient and effective transport for passengers and goods is an essential element for cities life and development. As passengers need to resort to efficient transport solutions, allowing reaching their destinations at scheduled time, similarly, goods must be handled quickly to avoid creating excessive stocks and to minimize

warehouses size and related operating costs. As urban space is a limited resource, it is commonly argued that the movement of passengers and goods inter-act each other strongly. Consequently, the global level of urban accessibility decreases for both: according to this trend, congestion problems result and the travel time increases for all. One of the key factors to reverse this trend could consist, for cities, to adopt a different way to manage the transport network, ensuring a smooth sharing of passengers and freights.

"Urban freight distribution could be better integrated within local policy-making and institutional settings. Public passenger transport

is usually supervised by the competent administrative body while freight transport distribution is normally a task for the private sector. Local authorities need to consider all urban logistics related to passenger and freight transport together as a single logistics system". (European Commission 2007).

To be coherent with this European recommendation, cities could lean three axes of development:

1. Improve the sharing of road space between private&public motorised road transport passengers flows and private motorised road transport goods flows;
2. Shift passengers and goods flows from private motorised road transport to others urban transport modes – i.e. public transport like buses, tramways, subways, car&bike sharing systems – . An increased use of public means could release cities from congestion while increasing revenues to public transport, making it less subsidy dependent.
3. Introduce distribution facilities – like consolidated centres, urban delivery stations and storage equipments - in urban areas already devoted to passengers hanging on – i.e. car park areas, public transport stations, etc.–.This could be useful to avoid empty runs or unnecessary driving and parking.

Actually, these axes of development are not really explored, because of several reasons (cultural, historical, and economical). Sustainable urban mobility plans still adopt approaches taking into account passengers and goods flows separately, even if encouraging measures for both sides; this situation leads sometimes to antagonist solutions and introduces perverse effects which limit the efficiency of global mobility in the city.

Existing shared solutions

Nevertheless, for each of the three identified axes, several experiments have been implemented in cities leading to a large range of results, showing in many cases the difficulty to set up solutions or compromises which can be accepted by both stakeholders. The detected solutions are detailed in the next part, and summarized in the Table 1.

Axe 1: To improve the sharing of road space

Multiuse lanes: this solution aims to use lanes as priority bus lanes, during the peak hours and to convert on-street parking spaces into unloading spaces during the prescribed hours. Web-based information services give bus priority regulations, through variable message signs. Multi-use lanes have been implemented in Barcelona, as an implementation of the CIVITAS I MIRACLES project (202-206) (www.civitas.eu).

Night deliveries: this solution aims to manage vehicle traffic in high density central business districts of urban areas, delivering to retailers and shops in the inner city area during the night hours

when the city is usually quiet and inactive. Typical times are between 10.00 p.m. and 7.00 a.m. In several cities such as Barcelona or Dublin, successful experiences with trials on night delivery are made replacing a higher number of vehicles operating during day time by a fewer number of vehicles operating during night time (www.bestufs.net).

Shared Bus&lorry lanes: this solution aims at recognising lorries, along with buses, as essential components of urban traffic, assuring a prioritise treatment where possible (e.g. shared lorry and bus lanes).

At present, in Europe, there is only limited experience from this type of prioritisation initiative. The introduction of shared bus&lorry lanes has taken place in London and Newcastle-upon-Tyne (Browne, 1997). Recently, the Smartfreight project (www.smartfreight.info) aims to specify, implement and evaluate Information and Communication Technology (ICT) solutions that integrate urban traffic management systems with the management of freight and logistics in urban areas.

Axe 2: To shift passengers and goods flows from private motorised road transport to others urban transport modes.

Shared buses: this solution aims to combine a door-to-door service for passengers and a transport service of goods (parcels and small packets), in order to develop a public transport service oriented to users needs in time of little demand. This solution has been implemented in Germany, in the framework of MULI project (1996 - 1999).

The project had the aim to propose buses able to carry not only passengers, but also small goods. The project takes place in three German municipalities, Gangelt, Selfkant and Waldfeucht (district of Heinsberg) located at the border to the Netherlands, about 20 kilometres north to Aachen. The region is characterized by disperse settlements.

Usually, the transport of small goods was carried out in an uncoordinated way by different service providers. Multibus aimed at bundling up these transportation trips (Shaefer, 2003).

Shared subway: within urban areas there are only limited opportunities to enhance physical capacity of road infrastructure at surface level.

This solution aims to reserve access to underground infrastructures, during specific periods, for goods vehicles. Some Japanese, American and Dutch cities have considered such option. (Van Binsbergen and Visser 1999), (Chiron-Augereau 2009).

Shared tramway network: In Zurich, Cargo tram and E Tram assure free services to collect large and heavy rubbish and electrical items, such as hairdryers, keyboards, etc.. This offer is reserved for pedestrians, cyclists and passengers using public transport, at stated times and stops on the line. In Dresden, supplies to the Volkswagen factory are delivered by tram. In Vienna, there are plans to introduce a freight tram service.

Various Dutch cities are planning freight tram services. Of these, the plans of Amsterdam are most advanced (Chiron-Augereau 2009).

Car sharing: this solution aims to enlarge the urban use of the sharing vehicles systems, to the good distribution, to answer a demand for goods transportation by craftsmen, shopkeepers and even citizens. In Osaka, a new co-operative system of electric vehicles started, in 1999. In Genoa, a car-sharing service dedicated to goods transport (Van-Sharing service), has been introduced in the framework of the Civitas Caravel (www.civitas.eu) project, (2005 - 2009), to rationalize the vehicles use, by the traders who transport goods to the shops with their own cars. In La Rochelle, a van sharing service has been introduced too, since 2008, in the framework of the Civitas Success (www.civitas.eu) project (2005 - 2009).

Axe 3: To introduce distribution facilities in urban areas

Shared delivery bays: this solution aims to increase of parking areas in cities, allowing all vehicles parking in loading/unloading bays, during the night and the bank holiday. They should only be restricted to goods vehicles if absolutely necessary. A recent implementation of this solution has been done in Paris, often characterized by a lack of parking areas (Maire de Paris 2009).

Automatic goods lockers in car parks : this solution aims to offer to the small shops and the costumer service professionals to receive during night- time on its dedicated urban logistic automats their spare-parts delivered by the freight company of their choice.

One of the advantages of the system is to reduce the traffic by avoiding workers from the small shops and technicians make daily return trips to their providers located in the suburbs. An implementation of this solution has been done in Paris, where the Consignity Company settled up the first Parisian network of eight logistic relays located in car parks of the city (Atlassy 2006).

Lockers in underground stations: this solution aims to settle up lockers to be used to facilitate consumer deliveries, i.e. those times when it is more convenient to collect a parcel from a locker in a chosen location than wait somewhere for it to be delivered – This service is becoming increasingly popular in Europe. In Paris, Coliposte, the parcel division of LaPoste, launched a postal lockers service, Cityssimo, during 2006 (Chiron-Augereau 2009).

Urban delivery stations in car parks: this solution aims to settle up services and infrastructures to urban distribution in urban areas, already devote to the passengers hanging up.

Experimentation has been done by Chronopost International, in Paris. The company started a program to gain ISO 14001 certification at its sites. For this reason, an Urban Delivery Station has been placed, in the underground park of La Concorde, to deliver the Champs Elysées quarter.

This experimentation, managed in cooperation with the city of Paris, has seen interesting results, achieving reductions in greenhouse gas emissions. (Chiron-Augereau 2009).

Toward a shared urban transport system

After a field observation of several real cases of implemented solutions, an inductive reasoning enables us to move from a set of specific facts to establish some concepts and principles in order to ensure a smooth movement of passengers and goods in urban transport network.

We firstly characterise urban mobility as a complex system.

A systemic approach allows us to decompose urban mobility into different components strongly linked and in interaction. These components refer to passengers and goods' flows. From the statement that the local improvement of one component of urban mobility does not ensure the improvement of the global system, the necessity to plan and to control their coexistence comes.

Once urban mobility characterised, we introduce a whole concept for city transport system, in order to ensure a smooth cohabitation of passengers and goods in urban transport.

Two principles define the concept:

- The first principle prefigures that urban transports are shared between passengers and goods, through the access for both to the largest modes available in the network (i.e: bus, tramway, subway, car sharing, bike sharing).
- The second principle prefigures that cities are equipped of shared gates ensuring a smooth trans-shipment for passengers and goods, arriving from various sources, and having various destinations.

Through the coupling of those principles, we propose an archetype for a radical new urban transportation system.

The Urban mobility as a system: characterisation

"The essential characteristic of a system is the interaction of its parts. Consequently the individual improvement in the performance of its parts taken separately, although necessary, does not assure the overall improvement of its performance. A determinant factor of this performance is how well the different parts of the system fit together." (Macario 2005). Urban mobility, designed as a system, can be decomposed as follows: a piloted system and a control system which heads the piloted system (Doumeingts and Vallespir, 1994). The control system can be decomposed into two subsystems: the information system and decision system. The piloted system can be decomposed into two subsystems, as well:

- The system of passengers urban transport;
- The system of goods urban transport.

Elements characterizing the urban mobility piloted system are:

- Physical flows, including passengers and goods.
- Urban transport operators, companies that provide public transport, operating a fleet of vehicles. They may or may not be regulated or subsidized by authorities. The infrastructure used may be exclusive, or shared with private vehicles.

- Equipments, including drivers, vectors and maintenance workers, assuring passengers and goods movement.
- Transport infrastructures, including the circulation network, parking areas, delivery bays and waiting zones – bus shelters, railway stations, underground stations, etc.
- Information flow, it groups initiatives in the field of traffic telematics, to help keep up-to-date on traffic conditions along routes. They warn drivers of specific traffic incidents, including accidents and construction, to adjust route and avoid getting stuck in jams.

Sketching an archetype for a radical new urban transportation system

In a sustainable urban development point of view, it should be necessary to plan a transport network ensuring:

- The circulation of both passengers and goods, through the largest number of transport modes that cities can offer. Transport planners have to design urban transport systems equipped to satisfy not only the movement of people's flow, but also goods flow.
- The modal change for both passengers and goods. Efficient interfaces between long-haul transport and short distance distribution to the final destination, should be settled. An integrated network of urban gates able to shift passengers and goods urban commutes to cleaner and environmentally friendly modes. The urban replenishment should be ensured through smaller, efficient and clean vehicles, replacing the conventional commercial vehicles trips and ensuring a capillary distribution of goods. This alternative scheme could reduce not only the total number of city kilometres, but also the CO2 emissions per city kilometre.

Coupling the previous requirements, it is possible to outline the archetype of a whole shared urban transport system. The sketch of this archetype is drafted in the scheme below.

From archetype to real life: the On Route proposal for London¹

A multi-disciplined design specialist has come up with a radical urban transport proposal, called On-Route, which he believes tackles the two biggest problems caused by city-centre transport today; congestion and pollution. Frost's proposal was submitted to Transport for London (TfL)'s 'A New Bus for London' competition, which Mayor of London Boris Johnson launched from July to September 2008.

A real 'step change' in city transportation logistics, On Route proposal marks the integration of passenger and freight transportation, providing increased passenger and freight capacity,

improved convenience and service, whilst reducing congestion, pollution and real costs. It covers with:

1. A new iconic design of double-decker bus, Freight*BUS™, that combines a passenger-carrying bus with that of freight haulage with the minimum of disruption to either service. It can be reconfigured in seconds by the conductor or driver to carry freight and passengers. Furthermore, passenger space & freight space can be easily adjusted to match demand. The new city bus is a full car length shorter than the "bendy bus". In maximum seated mode it will seat a whopping 43 more passengers than the bendy bus. At night time when not carrying passengers it can deliver up to 34 pallets when fully loaded.
2. Consolidation centres and cross-docks for freight movement and hubs for passenger and freight delivery and collection.
3. Hubs located at major bus stops, and concentrations of retail, commercial & light industrial units.

It is evident that this avant-garde concept requires a whole new way of thinking about urban transportation systems and it will have a profound impact on city infrastructure. But then, it is possible to observe that many of these elements already exist and can be linked into existing infrastructure such as bus/rail stations & depots; haulage/sorting depots etc.

To bear out this thesis, Frost points to studies which have already been carried out in London showing that the implementation of alternative freight systems, including the use of 'Consolidation Centres' in city areas can give exceptional results. One such study found a 68% reduction in construction vehicles entering the City of London for the project, an average journey time reduction of 2 hours, a circa 75% reduction of CO2 emissions, and a 10% reduction in local distribution journey times. The On-Route Bus supports the existing aims of the London Freight Plan as set out of in the Mayor of London's existing Transport Strategy.

When looking at the idea of consolidation in relation to bus routes and passenger transport, Frost quickly realized that not only were there opportunities to improve bus routing & linking with other transport services and types using consolidation principals, but that there is an even bigger opportunity to use the buses for freight as well as passenger movement that would reduce the numbers of goods vehicles on city roads (especially light goods vans which are responsible for 15% of all UK carbon emissions from all forms of transportation) by as much as 50%.

He remarks: "We looked at passenger & freight systems end to end and concluded that there is sufficient overlap to be able to build on and integrate existing infrastructure of both passenger & freight systems". Taking London as an example, Frost leans on low bus occupancy statistics, and says that "the most optimistic proposals put the average occupancy of its buses at 25%. However, our calculations show that for around four hours a day, their utilisation drops to as low as 20%.

Despite this, city authorities are tasked with increasing the numbers of vehicles, routes and service frequency to supposedly reduce congestion and improve services. My idea is to put our cities' buses to good use by using them to provide an alternative city freight system at times of low passenger capacity utilisation. This could reduce the numbers of freight vehicles on city roads by as much as 30%. By using the buses to carry freight in the evening and overnight, the utilisation of these vehicles would be maximised, offering maximum return on investment (ROI) and substantially increased revenue from the vehicles. However, in order to fulfil this dual role, the entire concept of buses, as we know them today, needs to be re-visualised." The design of Freight*BUS will readily accommodate battery or fuel cell technology. The 200mm deep space in the main floor of the bus will house batteries or fuel cells and the accompanying hydrogen storage tanks (if required).

Indeed, it is envisaged that when fuel cell technology is affordable, that the fleet could be easily switched to this propulsion system, while keeping the drive motors and control systems in place. Similarly, its re-configurable interior design could even be broadly applied to existing vehicles built with combustion engines. However, it is the designer's view that the latest and emerging advances in battery technology will make the re-fit and the use of hydrogen and fuel cells unnecessary. Freight*BUS would also feature the very latest in other emission-saving technology, such as distributed wheel motors which can be as much as 50% more efficient than central motors.

Conclusion

Improving urban mobility: which challenge for urban transformations governance? The ambition of this paper is to provide relevant thinking, ideas and examples in order to improve urban mobility. We conclude addressing some recommendations on the subject of the governance of urban transformations. We are conscious that to shape the competitive city of the future, equipped of a radical new urban transportation system, it is necessary to ensure a thorough governance of urban transformations.

Our statement lies on the assumption that "a key input for the Urban Mobility System is the interaction between policies, namely between land-use, environment and socioeconomic development of the urban area, since these aspects are upstream the generation of mobility requirements (through land-use) and the choices made by the citizens (through the pricing system, regulation on environmental protection, fiscal incentives, etc)" (Macario 2005, pg. 233).

At the same time, we are aware that, while designing the physical system and considering all the options for the optimization of the mobility chains, the really hard task consists in taking into

consideration the concerns about the social, economic and functional impact of each configuration.

Indeed, as Macario stated, "the demands falling over an urban mobility system are very diverse and require the system to continuously adjust to the urban changes. Besides, clients are divided in segments that represent different preferences which are sometimes in conflict.

This means that the activities that add value to a specific segment of clients might well subtract value to other segments (Macario 2005, pg. 231).

From this rationale comes out the evidence that a management model is needed. This management model should serve as a basic framework for the planning and control urban transformations. The starting point of the model building process should be the adoption of a systemic approach toward urban mobility. To manage the whole urban mobility system, the model should distinguish three decisional levels associated to different temporal horizons: the strategic level, the tactical level and the operational level. Each level should ensure the integration of both flows. The definition of a clear and well structured regulatory and organisational framework, assuring an effective interaction between the different parts of the system, will be a determinant factor for a coherent structure of the model.

Finally, we are aware that it necessary to focus on a costs-benefits analysis of the impacts of the proposed archetypes on the different urban mobility stakeholders, increasing political momentum around issues such as resource scarcity, climate change, security and new regulations.

Until now, the most important parameters for supply chain designs have been related to cost efficiency and on-shelf availability. As a result of the growing importance of these emerging issues, new factors are becoming increasingly critical, such as traffic congestion in urban areas, energy consumption, CO2 emissions and the permanent rise in transportation costs.

Further research directions

Starting from these conclusions, this research work will be further developed, with the aim to find useful results leading local transport authorities' managers to improve the integration of freight and passengers transport. The research objective is to pursue the following axes:

- To assess a priori the effects of the adoption of the identified new solutions in French medium size cities like Poitiers and La Rochelle.
- To built a management model adapted to local authorities managers to guide them in the process of optimizing the whole passengers & goods transport activities.
- To propose some scenarios for the Milan's urban mobility system, in order to derive general conclusion on the transferability of the model.

Notes

¹ Text extract from the website <http://www.onroutebus.co.uk>.

² www.tfl.gov.uk/tfl/corporate/projectsandschemes/technologyanquipment/aneubusforlondon

References

- Atlassy M. (2006) Urban Freight: Strategies, actions and experimentations in London and Paris, Short-Term Scientific Mission - Scientific report for the COST 355 working group, March.
- Boscacci F., Maggi E. (2004) La logistica urbana. Gli elementi conoscitivi per una governance del processo, Polipress, Milano
- Browne M. (1997) United Kingdom introductory report, in Freight transport and the city, Round Table 109, ECMT
- Civitas Success (2009) Improving Mobility in Medium Size Cities, final project report, edited by Breuil D. Blackledge D.
- Chiron-Augereau V. (2009) Du transport de marchandises en ville à la logistique urbaine, quels rôles pour un opérateur de transports publics urbains? L'exemple de la RATP, thèse de doctorat, Ecole Doctorale Ville et Environnement, Discipline : transport, Université Paris-Est.
- Delaitre, L. (2008) Méthodologie pour optimiser le transport de marchandises en ville. Application aux villes moyennes et dans le cadre de l'agglomération de La Rochelle, Thèse de doctorat, Ecole Nationale Supérieure des Mines de Paris.
- Doumeingts G., Vallespir B. (1994) Gestion de la production: principes, collections techniques de l'ingénieur.
- European Commission (2007) Green Paper - Towards a new culture for urban mobility {SEC(2007) 1209}/* COM/2007/0551 final */
- Frost H., (2008) Freight*Bus, The bus that Delivers!, available on www.onroutebus.co.uk.
- Macario R. (2005) Quality Management in Urban Mobility Systems: an integrated approach, PhD dissertation at IST.
- Maire de Paris (2009) Les zones de livraison ouvertes au stationnement la nuit, les dimanches et les jours fériés, Expérimentation dans le 3e arrondissement et trois quartiers du 17e, www.paris.fr.
- Malhéné N., Breuil D. (2009) Decision making tool for the selection of Urban Freight Transport project, proceedings of the APMS International Conference, Bordeaux, France, 19-23 September.
- Roque M., Delaitre L. (2009) Vers une interopérabilité de la modélisation des flux de passagers et de Marchandises en milieu urbain, 8eme Congrès International de Génie Industriel, Bagnères de Bigorre, France, 10 -12 juin.
- Shafer C. (2003), A new and innovative approach for bus systems in rural areas, Association for European Transport
- Trentini A., Delaitre L., Malhene N. (2009) How to improve citizen's welfare implementing integrated sustainable urban transport strategies: the La Rochelle Urban Community experience in the Success Project framework, Colloque international "Gouvernement et gouvernance des espaces urbains", Rouen, France, 13 – 15 Mai.
- Trentini A., Malhéné N. (2010) Maitriser la coexistence des flux, usagers et marchandises, Revue française de gestion industrielle, N.29, vol 2
- Van Binsbergen A, Visser J. (1999) New urban goods distribution systems, paper for: Conference on Urban Transport Systems, June, Lund, Sweden.
- Whiteing A. E., Edwards S. J. (1996) Urban freight trans-shipment facilities: a European comparative study, Department of Transport and Logistics, The University of Huddersfield.

Going Round in Circles: Mobility, Destination and Experience

Alan Clarke

University of Pannonia, Tourism Department, Faculty of Economy
e-mail: alanhungary@hotmail.com; web: <http://www.gtk.uni-pannon.hu>

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (45-50)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Tourism transport
Accessibility
Urban Tourism

ABSTRACT

This paper addresses the changing approaches to transport in urban tourism as seen through the move from functional sectoral accounts towards a perspective informed by the experience economy. By reviewing the traditional service offers, it is possible to unpack what lies within the service dominant logics that lead to co-creation of value and the realisation of quality tourism experiences. The paper then considers the adoption and adaptation of traditional forms of transport within the value proposition in urban tourism.

Mobility in tourism is a strangely new focus of attention, strangely because without it there would be no tourism to speak of. However mobility requires a framework of civil and legal entitlements that allow people to move and a transport infrastructure that allows those rights to be realised in both working and leisure time situations. This article will address the construction of the tourism transport infrastructure by examining the ways in which the transportation elements in mobility have been re-thought within tourism.

The first part of the paper will re-construct an account of transport and mobility which deals with it in terms of the functions and logistics of delivery, both between points of origin and destinations, and within destinations. These perspectives can be seen in the texts which shape the basic tourism curriculum (Cooper et al, 2008; Page, 2009) and explain how tourism and transport have developed over the years by integrating the opportunities provided by the new technologies – motorised vehicles (both cars and coaches), trains, ships and aeroplanes – to allow for the development of a range of destinations. Lumsdon and Page (2004) introduced a new approach to transport and tourism by distinguishing between transport for tourism and transport as tourism, which provides a linkage between the first and second parts of this article.

The second part will develop an account of mobility in tourism that demonstrates how their uniqueness derives from what the 'Service-dominant (S-D) logic' (Vargo and Lush, 2004; Vargo and Morgan, 2005; Vargo and Lush 2006) would call value co-creation.

Hyde and Laesser (2008) emphasised the important role of transport in the tourist decision-making process associated with destination choice behaviour but it is necessary to move beyond this construction of the interconnections (Andersson, 2007). These elements of transport were generally considered to be "goods" or "products" including both tangible and intangible factors. Physical goods become one element among others in a total service offering, from an exhibition to a living performance or a concert and transportation has become an integral part of that experience if not of the offer.

Going round in circles: mobility, destination and experience

The industrial revolution brought the first major changes in transportation that is seen as among the first milestones in the development of modern tourism.

The introduction of railways and their use for tourism is still seen as one of the first step in the development of mass tourism. It is also possible to make the general claim that every technological innovation, from the steam engine to aeroplanes or modern railways have all contributed to providing faster and wider spatial linkages between the ever growing generating and receiving areas (destinations) (Hodgson, 1987).

These changes have also transformed the character of tourism, moving it from the privilege of the 'elite' to the pastime of the masses.

Transport is an integral part of tourism as in a simplistic view transport connects the supply elements of tourism, linking them into a product customers can purchase (Page, 2003).

If we consider the idea of tourism packages the two services that are usually elements of those packages are accommodation and transport. Although with the changing nature of (mass) tourism, packages not including travel have been introduced; the proportion of these compared to the traditional packages including transport is minimal.

(Nevertheless, it must be noted that packages not including travel are popular mostly in the case of destinations that are accessible by car within a reasonably short period (24-36 hours). In the case of holiday destinations that are most easily accessible by plane, it is still – despite the growth of online bookings – a much less frequent occurrence for leisure tourists to purchase their own accom-

modation and organise their transport arrangements by themselves.) With dynamic packaging and micro packaging becoming more widespread in the 21st century tour operators are even more focussed on adapting to the changing needs of tourists, also by offering a wider choice of transport options.

It should also be recognised that the transport may not only be part of the tourism package but the tourism attraction as well. Cruise liners may be taken as providing a useful example of this, as being on board these luxury liners is itself one of the key motivating factors, the voyage is the attraction itself and not simply the means of getting from one point to another. This was especially true when the first cruise liners started their operation, when people opted for spending their holiday in one of these floating hotels with all the services that usually only landlocked pleasure centres could offer. However, it must be noted that the nature of the cruise holiday has also been changing as a reaction to changing consumer needs. As the offer matured, tourists started to look for more and sought added value from their cruises, which resulted in the development of a diversification of cruise routes and the emergence of themed packages for cruise passengers. Themes (like the Baltic Cruises, World of the Norwegian Fjords, etc), may be based on the similar character of the seascapes or on the activities offered onboard (such as cookery courses with famous chefs). At the other extreme, the emergence of easycruise should be noted offering the cruise experience to those on a more limited budget.

The world famous Orient Express provides one of the best examples of a train journey as an attraction, since it began in 1883 it has epitomised luxury train travel with only two short periods of interruption: during World War II and in the 1960s when it operated with standard sleeper carriages only (Page, 2009). Other examples where the journey itself is the focus of the experience can be found in the initiatives in the United Kingdom and Austria to bring back steam locomotives and offer 2-3 hour train rides and now, in the UK, new steam locomotives are being built especially for tourism use. The Hungarian Railways also offer nostalgia train rides with steam trains, very often giving the offer a special theme to the journey such as the Moonlight Express on St Martin's Days, the Moonlight Express with culinary delights and so on.

The discussion about the linkages of transport and tourism cannot ignore the impacts of transport on the destinations, as means of transport have played and continue to play an important role in shaping the image and growth of tourism destinations. The gondolas of the Italian city of Venice provide an excellent example, as with the mention of gondolas the image of the canals or lagoons of Venice immediately presents itself.

The role of technological changes impacts on the destination level as well. Most destinations want to be accessible as quickly, as conveniently and with as many means of transport as possible. However, the price of that is that highways and motorways are built

bypassing some (smaller) settlements to connect the more important destinations with the generating regions. Equally, higher speed trains may operate on routes considered to lead to important destinations, which then will not call at the smaller stops. Therefore the process of making access faster and more convenient will produce winners and losers at the same time, as some settlements, potential destinations, will be left out of the main streams of transport. The impacts of technological changes could also be observed in the small fishing villages of Spain that have been transformed into tourism destinations. Here the small fishing boats were replaced by larger vessels able to carry more passengers, which in turn required the redevelopment of the marinas and ports so that they could accommodate these larger boats. As a result, areas were taken over from beaches, changing the coastline and with that the nature of the destination.

It is also demonstrable that the competition in transport also influences both the development of and the competitiveness of destinations. The best current example of this is provided by the competition between the low-cost carriers since the beginning of the 21st century in Europe (Ács, 2007). The impact of the low-cost competition was first felt in Hungary in 2004; the year Hungary joined the European Union with the first no-frills flights. The introduction of these cheap flights to Budapest resulted in the rising popularity of the destination, as the low-cost carriers flew tens of thousands of tourists from the Western parts of Europe to the capital city – a phenomenon that Prague experienced and enjoyed for many years before Budapest. (Magyar Turisztikai Hivatal Hírlevele, 13.05.2005) The emergence of Budapest as a major destination in the Central European tourism market has also resulted in the arrival of tourists with lower propensity to spend, which in turn impacted on the image of the destination. Due to the wide choice of cheap flights several young tourists arrived from the United Kingdom for example to hold their stag or hen nights in Budapest, putting the capital on the party-map of Europe but questioning its significance to other markets.

Accessibility, affordability and amenity

The continuous development of transport routes and the ever more advanced means of transport make certain areas available for tourism. Besides ensuring physical accessibility, transport plays an important role in making destinations affordable for tourists, more precisely in making destinations affordable for a wider audience. The competition in air travel started in the 1980s with the deregulation of the air space, which opened up one of the key elements of competition in the area of pricing between the various airlines. As a result of deregulation and liberalisation, new airlines were established which used lower prices as a tool to enter the

market, and the already established airlines had to keep up with them if they did not want to lose out in the competition. The same process was enhanced by the diminishing role of the state in ticket pricing, and air passengers were seen to be the clear winners in this context (Evans, 2003). This process started in Northern America and Europe first felt a similar experience towards the end of the 1990s when a similarly spectacular process started with the introduction of no-frills carriers. These cheap airlines have also become major competitors of railways and other transport companies where in the case of several routes it became cheaper to travel the same distance by air than by road or rail. According to Polgár (2008), leisure tourists are more likely to prefer rail travel to air travel if the journey by train is no more than 6 hours.

The development of transport was originally driven by the aim to conquer distances, later it changed to cover distances faster and being able to transport large numbers of passengers. One issue has always been present during the development of transport technologies: amenity/comfort. Our ancestors used animals to pull carts and carriages so that they did not have to walk long distances and/or carry heavy loads. The same reason was behind the introduction of overnight carriages on trains and cabins on ships just to name a few examples where people's comfort motivated the development of new techniques and means of transport. This tendency met with the growing and at the same time changing customer needs, as a result of which various means of transport were transformed and new ones were designed to meet the changed and enhanced needs of tourists.

Pine and Gilmore (1999: 11) identified the central roles of the customer in experience and experience creation but also observed that "Experiences occur whenever a company intentionally uses services as the stage and goods as props to engage the individual". Darmer and Sundbo (2008: 6) recognised that "The engagement of the customer in the experience also means that customers rarely have the same experience, even though it is the same experience they are experiencing. The reasoning behind this is that the experience of the customer derives from the customer's personal interaction with the experience, as she or he is engaged in it, and all customers engage differently, depending on their background, emotions, interpretations and associations."

Tourism offers create values for the users. Traditionally, it has been argued that social, economic or educational values emerge. There are embedded values bringing about social or educational benefits as value-added services where the users are the recipients. This "exchange-value" perspective, in which the "producer" determines value, hinders a full appreciation of the role of services to diagnose a cultural situation in a territory and to manage a tourism policy. Furthermore, that may partially block a complete understanding of what is the very nature of tourism supply and demand. These

embedded values suggest that tourism practices produce an exchange of intangibles, specialized skills, knowledge and processes. This definition points towards a prevailing view of tourism actions that is reinforced from the marketing perspective (Sheth and Parvatiyar, 2000) that tourism offers have been traditionally, above all, a supply rather than a demand output. This view is supportive of the specifics of service exchanges as a co-production. Co-production, in this service-centred view, is a continuous social and economic process in which intangibility, exchange processes and relationships are central. In tourism activities, the users do not use things but are constructed as seeking need or want fulfilment. This integrative view suggests that tourism offers are not a residual something offered to enhance a good, as with older notions of value added services (Vargo and Lusch 2004). Tourism resources come to be viewed not only as 'goods', with value added services, but also as intangible and dynamic functions of human ingenuity and appraisal, and consequently they cannot be regarded as static or fixed.

The shift in focus to tourism in a Service dominant logic is a shift from the means and the producer perspective to the utilization and the user perspective. Since it is inherently both user-centric and relational (Vargo and Lusch 2004), the S-D logic provides a better foundation to examine tourism activities in a destination. The societal purpose of S-D logic implies that service is the fundamental basis of exchange (Vargo and Lusch 2008).

This purpose highlights the interactive and the networked nature of value creation and exchange and is extending this value creation to a value co-creation.

Thus, the idea that 'the user is always a co-creator of value' has become a fundamental premise of S-D logic, for the tourism area, this means that tourism suppliers cannot deliver value, but can only make value propositions (Macbeth, Carson and Northcote, 2004). According to this premise, the value in use takes place within the exchange-value and requires new metrics of the user's perceptions of this value. The Value Experience can be presented in three phases (Tynan and McKechnie, 2009) which outline the significance of seeing the experience as a process or set of processes. Transport operates within every phase of this model both as an activity and value source but also as a significant element in the value of the outcomes.

The following factors can be seen to influence the spatial links:

1. The complementary character – we usually travel for an experience that we cannot have in our usual environment. We want to see and do things that we lack at home.
2. The transferability of the experience – whether it is possible to transport the experience, (to transfer it spatially) which motivates us to travel. Transferability depends mostly on the time and costs necessary for this transfer (Ullman, 1973).

The paper will now explore the role of innovation in tourism transport in contributing to value creation within tourism. Both complementarity and transferability will be considered in looking at the ways in which the value propositions have been impacted on by the adoption and adaptations of transport means within the tourism experience.

To start with one of the most traditional means of transport that serves tourism purposes as well we can recall the use of animals to transport people or goods from one location to another or back to the same place. Camels have been used for taking tourists out to the desert for decades, just like elephants have long been used to transport tourists on the Asian continent. We could name (and shame) several seaside resorts, which offer donkey rides for tourists, in the best case only for young ones, but sometimes even fully-grown people are allowed to mount the poor animals, fortunately only for short trips. On the Greek island of Hydra donkeys are used to transport the tourists' luggage to their accommodation, as some of the narrow streets are not wide enough for cars. In terms of co-creation, the experience is taken differently by all of the users and can generate different meanings and different value for every one of the users. There are many examples of ground transport that have been converted from vehicles that had served public transport functions before and therefore come with associations and memories that also influence the value creation of the experience. Open-top buses are a good example as they have gained their current form by transforming the 'ordinary' functions of buses according to the (assumed or surveyed) needs of sightseeing tourists. These buses are ideal for taking pictures from, not only because of the slower speed they maintain but also because the roof or reflected window panels cannot get in the way of the tourists wishing to take shots of the attractions as they drive past.

Another example of converted public transport vehicles can be found in Vienna, where sightseeing trams started operating from April 2009. The new tram route is a modified version of a previous one that had proved quite popular with tourists, taking in most of the attractions along the Ring. The trams are equipped with LCD monitors so that tourists can get a closer picture of the attractions along the route and they can also listen to information about them in 7 different languages. This again offers an incentive to value creation as the meaning of the tour can be more fully explored. Another change to the original Vienna tram is the price of tickets, which is higher than the average transport tickets in Vienna, which is justified by the extra services passengers are offered and the promise of greater satisfaction. These examples serve the travel of smaller or larger groups of people, but transport also needs to reflect on the growing individualisation of tourists. As a result, more and more new means are introduced that are recommended for small groups, even as small as individuals or families. Besides

cycling sightseeing tours, Segway or push-scooter tours are also organised in some destinations, where groups of 10 to 15 people visit the various sights by use of the two-wheel vehicles. Tourists seeking ease and convenience usually prefer Segways as these are motorized while riding scooters still requires some effort from the tourists, even though it may still be faster and more convenient than walking. These new offers provide an opportunity to tailor the experience to the users' own particular interests and motivations, thus inviting a greater sense of participation and involvement in the creation and experience of tourism.

Tourists who can find even a group of ten as a crowd are offered various individual solutions in a number of urban destinations. In Paris, for example, we can go sightseeing on a scooter driven by a professional driver/guide, where the driver and the passenger can communicate via a headset, and the passenger is provided with a leg cover so that their clothes do not get dirty when splashed with water. Besides allowing the individual use of these vehicles, another advantage of using scooters for sightseeing is undoubtedly their size which makes it possible to get through big queues of car in traffic jams.

Also the French capital offers the certainly – at the moment – unique means of transport in the form of the so-called cyclobulle. This three-wheel partly covered vehicle is ideal for families of three or four for getting around in the destination.

We could list several other means of ground transport adaptations offered to the individual tourists in the destinations, such as the horse-drawn carriages of Vienna or the different types of rickshaws which originated in the Far East but are now found in the cities of Europe and North America. There are also some innovative solutions that have been introduced within the urban tourism offer. One of these unique inventions is the bicycle lift introduced in Trondheim in Norway, which is used by most to help to reach the top of the steep street by bike. However, creative people can use it to help in other circumstances, such as pushing a baby buggy uphill, or even just using it to push you to the top by standing on the foot holder of the lift. The other example of the specialist means of surface transport is the street escalator in the Spanish city of Toledo, which makes accessing the historic city centre very easy for the pedestrians. The escalator carved into rock connects one of the large underground car parks with the most frequented tourist attraction of the historic city. The transition between surface transport and water transport can be found in the amphibious vehicle offering sightseeing tours on the streets of Budapest as well as in the River Danube.

The RiverRide service was first introduced to Europe in Budapest in the summer of 2009. The vehicle is designed to be suitable for road

transport and for river use as well, and it offers sightseeing tours on land and water. When the service was launched the spokesperson of the Hungarian National Tourist Office explained the idea was to give Budapest a competitive edge in Europe by offering something special and something which is, so far, unique.

Water transport offers a narrower range but no less spectacular means of transport for tourism use. The first part of the paper mentioned cruise lines and gondolas, this section wishes to discuss other special means of water transport that have gained their current form by the conversion of vessels based on the needs of the tourist. Hydrofoils, operating on seas, lakes as well as rivers provide a good example of a means of transport where the attraction is not only the speed with which we can get to a destination but the travel itself. The hydrofoil service between Budapest and Vienna is certainly the slowest mode of transport between the two destinations but probably the most spectacular as well. The hydrofoils operating on this stretch of the Danube are equipped not only with proper comfortable seats but also with LCD monitors to bring the panorama along the route a bit closer to the passengers.

The last example of special (or rather interesting) use of water transport for tourism offers great contrast to the specially designed boats described earlier. There are some cargo ships that will take 'live freight' or as we would call them a few tourists on board presumably to bring some changes to the monotonous long journeys at sea. Contrary to popular belief, travelling this way is not necessarily cheaper than travelling by air but the price of the ticket includes accommodation and meals as well, but mostly it includes the experience and adventures for the passengers.

Helicopters have been adapted for sightseeing tours in a wide range of destinations but only a few of them would offer sightseeing by hot air balloon. Examples from Paris have been used before and here is another one, hot air balloon tours are organised for tourists at regular intervals. Although the claim has been made before that the special means of transport are often developed for the individual tourists, the hot air balloons operating in or rather above Paris can take up to 30 people at a time. Given the urban congestion problems, these trips have to be cancelled or postponed if air pollution reaches a certain level.

Conclusion

This paper has attempted to move the consideration of transport in urban tourism beyond the functional role that transport plays in mobility to a deeper understanding of the ways in which the transport element can be used in the co-creation of value within the development of tourism. The innovative reinterpretation of transport forms has to be considered as a value proposition which is

either accepted or rejected by the tourists. Only where there is recognition and acceptance can the offer be seen as valid and valued. This requires a presentation, a staging, which draws attention to the offer and a context in which participation is invited in ways that are meaningful to the tourists. In urban settings, tourists are not necessarily looking to travel in one direction; most tourist routes are circular, bringing the tourists back to where they started from. However the co-creation of value should ensure that the tourists return in a different state than they left – there should be an experience of satisfaction and fulfilment that informs the continued journeys of the user and shapes their further touristic experiences. By engaging the tourists, as well as the suppliers, in the process of experience creation and consumption, transport can be seen as more than a functional resource in the tourist offer and become a source of value creation. Urban tourism requires complex transport infrastructures that are recognised and valued by the tourists that may exist within or outside the local transport provisions as tourist requirements are often different to that of the local populations. The argument emphasises the contributions of both the supply and demand sides in the provision of a touristic offer and suggests that only when there is a coming together of the resources that both sides can bring to the experience can value be truly recognised and realised.

References

- Ács, G. (2007) *Fapados forradalom*. Budapest Alinea Kiadó,
- Andersson, T. D. (2007) "The tourist in the Experience Economy" *Scandinavian Journal of Hospitality and Tourism*, 7 (1) 46-58
- Cooper, C., Fletcher, J. Fyall, A., Gilbert, D., Wanhill, S. (2008) *Tourism: Principles and Practice (4th Edition)* Harlow, Pearson,
- Darmer, P., Sundbo, J. (2008) Introduction to experience creation in Sundbo, J. and Darmer, P. (eds) (2008) *Creating Experiences in the Experience Economy* Cheltenham, Edward Elgar
- Evans, N. (2003) Strategic alliances in the airline industry. In Evans, N., Campbell, D. and Stonehouse, G. *Strategic Management for Travel and Tourism*. Oxford: Butterworth-Heinemann
- Hodgson, A. (1987) The Travel Industry – Its History pp.1-19. In Hodgson, A. (ed) *The Travel and Tourism Industry: Strategies For The Future*, Oxford: Pergamon Press,
- Hyde, K., Laesser, C. (2008) "A structural theory of the vacation" *Tourism Management* 30 (2) 240-248
- Lumsdon, L., Page, S.J. (2004) Progress in transport and tourism research: Reformulating the transport-tourism interface and future research agendas in Lumsdon, L. and Page, S.J. (eds) *Tourism and Transport: Issues and Agenda for the New Millennium*. Oxford: Elsevier
- Macbeth, J., Carson, D., Northcote, J. (2004) "Social capital, tourism and regional development: SPCC as a basis for innovation and sustainability" *Current Issues in Tourism*, 7 (6), 502-522.
- Magyar Turisztikai Hivatal Hírlevele, 2005. május 13

- Page, S. J. (2003) *Tourism Management: Managing for Change*.
Oxford: Butterworth Heinemann
- Page, S.J. (2009) *Transport and Tourism: Global Perspectives*. 3rd
edition. Harlow: Prentice Hall,
- Pine, J. B., Gilmore, J. H. (1999) *The Experience Economy* Boston,
Harvard Business School Press
- Polgár, J. (2008) Vasúti közlekedés Európában in *Turizmus Bulletin*
XII/2.
- Percival, J (1987) Railways pp.20-37. In Hodgson, A. (ed) *The*
Travel and Tourism Industry: Strategies For The Future.
Oxford: Pergamon Press
- Sheth, J., Parvatiyar, A. (2000) "Relationship Marketing in Consumer
Markets: antecedents and consequences" in Sheth, J. and
Parvatiyar, A. (eds) *Handbook of Relationship Marketing*
Thousand oak, CA, Sage Publications.
- Tynan, C., McKechnie, S. (2009) "Experience Marketing: a review
and reassessment" *Journal of Marketing Management - Special*
25th anniversary edition, 25(5/6): 501-517.
- Ullman, E L. (1973) *Cities and Society: The Revised Reader in Urban*
Sociology. New York: Harper and Row
- Vargo S.L., Lusch R.F (2004) "Evolving to a New Dominant Logic for
Marketing, *Journal of Marketing*, 68, 1-17.
- Vargo S.L., Morgan F.W (2005) "Services in society and academic
thought: an historical analysis" *Journal of Macro-Marketing*, 68,
42-53 (june)
- Vargo S.L., Lusch R.F (2008) "Service-Dominant Logic: continuing
the evolution" *Journal of the Academy of Marketing Science* 36:
1-10.

Turin Porta Susa, PEC SPINA 2: Gare ferroviaire et Tour de services

Silvio d'Ascia

Architetto – 35, rue Washington, Parigi

e-mail: contact@dascia.com; web: www.dascia.com

ARTICLE INFO

TeMA^{Lab} journal

www.tema.unina.it

ISSN 1970-9870

Vol 4 - SP - March 2011 (51-57)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Torino Porta Susa
Accessibility
huge urban public space

ABSTRACT

The project of the new station of Torino Porta Susa is the project of a huge urban public space, where the station, conceived as an urban gallery, becomes a real street, a "passage", a new kind of urbanity shape for the future city. The railway station's transparent volume - a 385 m (the length of the TGV) long steel and glass tunnel, 30 m. width, with a variable height compared to the outdoor street level (between 12 and 3 m at the height of the cover) - is proposed as a modern reinterpretation of the nineteenth century's urban galleries and the great historical station's halles, as well as a kind of symbolic building. Symbol of movement, of the travel universe and the presence of the transportation universe in the contemporary city, urban simulacrum of the object train disappeared from the urban scene below the future Central Spine.

The sinuous movement of the tunnel follows the flows of urban pedestrians from the city towards the different transportation modes presents at various levels (national and international lines AV, regional lines, subways, taxis ...) emphasizing with its lowering the presence of the big void inside of the underground subway station, about 20 meters deep.

The gallery, oriented north-south, folds with its internal pedestrian paths to bring natural light and the sky of Turin, to the quays of trains (at an altitude of -10 m) and the Subway (which share -20), transformed so' in a sort of urban sidewalks.

The fast rhythm of the structure of arches with step 360 cm. is marked by the presence of numerous openings along the longitudinal development of the gallery, which is crossed by three transversal passages inside the gallery and is bounded by two others on the north and south of the lot, connecting the city from east to west at street level in continuity with pre-existing axes.

The presence of these transversal passages accentuates the urban value of the Spina which was to re-connect the two sides of the city until now shared by the ancient railways lines. In that way the city comes inside the station and the station becomes a real part of the city, permeable to pedestrian flows crossed in all directions and at different levels. The internal distribution of the different functional areas is based on a balance program with approximately 10.000 m² of services to travellers and the city (ticket offices, shops, restaurants, bars, terraces), approximately 10.000 m² of hall and public paths and still about 10.000 m² of technical areas, parking and service areas, ... The glass roof (surface of 15.000 m²) will be equipped with a photovoltaic system (installed power = 765 kW peak) 2300 arranged on the panels that make up 3600 (surface approximately 9.000 m²) capable of producing 680,000 KWH's year of electricity consumed in the public network and corresponding to approximately 35% of domestic needs of future PV, which we hope will become a new symbol for Turin.

Les villes sont des organismes complexes, aboutissement d'un accroissement historique et d'une mutation lente mais continue, qui d'une manière plus ou moins consciente, plus ou moins structurée et volontaire, sont en mesure de changer et de modifier radicalement les aménagements antérieurs, en supprimant ce qui est à l'origine de leur formation, voire parfois, déformation jusqu'à une certaine époque.

Cadre général du projet de la Spina 2

En 1995 est approuvé le Nouveau Plan Régulateur de la ville de Turin, œuvre des architectes urbanistes Gregotti et Cagnardi, qui réussit enfin à concrétiser et activer l'idée d'un processus intégré de

transformation de la ville à partir de l'infrastructure, ou mieux de sa mutation par "négation" via un événement urbain souhaité depuis bien longtemps : l'enterrement du chemin de fer et sa substitution sur la scène urbaine par un grand boulevard, appelé la Spina Centrale.

L'enterrement du chemin de fer, - à l'instar de bien d'autres villes -, est un thème aujourd'hui souvent récurrent comme une nécessité ressentie et une priorité de programmation d'un processus de requalification urbaine et de reconquête de parties importantes de la ville, souvent divisée en deux par le faisceau des voies ferrées au niveau de la rue. La présence de la gare et de son front principal se signale en effet souvent en front urbain en reléguant la façade arrière à un rôle de "back" urbain pur et simple que les Américains définissent comme "the wrong side of the rail".

Dans le cas de Turin, le thème récurrent de l'enterrement du chemin de fer et du rapprochement (rattachement) urbain était déjà présent dans les précédents plans d'aménagement à partir de la fin de la seconde guerre, avec le Plan d'Astengo et Bianco de 1949, et présenté comme objectif stratégique du développement de la ville du XXème siècle. Ce n'est qu'après la moitié du siècle environ que les intentions premières de la planification urbaine d'après la seconde guerre mondiale ont été formalisées et approuvées avec le Plan de 1995 qui a permis finalement que l'enterrement du chemin de fer devienne réalité au seuil du troisième millénaire.

Il s'agit de raccorder la cité historique d'avant le chemin de fer, qui s'est développée librement jusqu'à la fin du XIXème siècle, à celle d'après le chemin de fer du XXème siècle, en recréant les conditions physiques de traversée de la ville dans le sens nord-sud. Pendant un siècle, et ce jusqu'à aujourd'hui, il était impossible de traverser la ville en raison de la présence du chemin de fer en lisière de la cité historique et de l'aire d'installation du tracé ferroviaire sur quelque 12 km, libérée définitivement grâce à l'abaissement d'une dizaine de mètres du niveau supérieur du rail et à la création de la Spina au-dessus de la galerie souterraine du passage ferroviaire.



Pour Turin, il s'agit de la condition sine qua non pour pouvoir raccorder des tissus urbains séparés par l'axe ferroviaire qui touchent aussi bien le centre historique que les agrandissements du XXème siècle au nord-ouest de la ville mais c'est aussi l'occasion de redessiner, avec l'idée du grand boulevard de la Spina centrale, un secteur de la ville objet de transformations profondes situées dans l'enceinte de l'octroi.

En réalité, la nouvelle gare de Porta Susa met en jeu des événements historiques renforcés par l'urbanisation de la ville dans un processus sans solution de continuité d'un dessin de soudure et de 'couture' entre les tissus anciens et ceux étendus à l'ouest au-delà de la barrière ferroviaire.

Il convient de préciser que l'ancienne gare de Porta Susa fut conçue par l'ingénieur de l'époque de la ville de Turin, Edoardo Pecco, dans les années 1856-1857, comme gare de passage et non de tête et comme nœud de polarisation du nouveau tracé urbain à arcades, défini par l'ouverture de la Via Cernaia dont il en

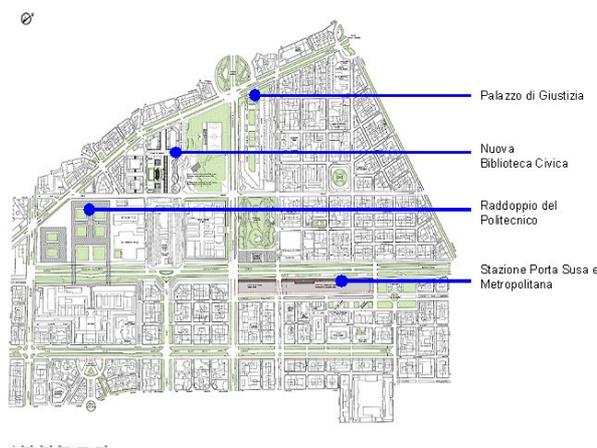
représenta et représente aujourd'hui encore la toile de fond perspective nord-ouest.

De fait, la Via Cernaia, redessinant la trame des précédentes voies Santa Teresa et Maria Vittoria, représenta à la fin du XIXème siècle un nouvel axe de première importance de la ville avec des arcades continues qui touchent aux anciennes places San Carlo et Carlo Emanuele, en raccordant par une voie piétonnière protégée la gare historique de Porta Susa et, par conséquent la nouvelle infrastructure ferroviaire, au fleuve Po en limite sud de la Piazza Carlo Emanuele. Ainsi a été concrétisée la proposition précédente de Carlo Promis du "Plan d'Aggrandissement de la Capitale" (1850-1852) qui préfigurait la nécessité de consolider le lien structurel des zones de nouvelle expansion par des artères importantes de la cité préexistante, par exemple le système d'arcades entre Porta Nuova et Piazza Statuto.

La situation axiale de la Via Cernaia sur la Gare historique de Porta Susa et l'aboutement de la place à arcades, partie intégrante du système à arcades de la cité historique de la fin du XVIIIème, représente une condition nécessaire pour saisir le sens de l'intervention de projet contemporaine et sa stratégie en continuité avec le système de voies piétonnières de la ville.

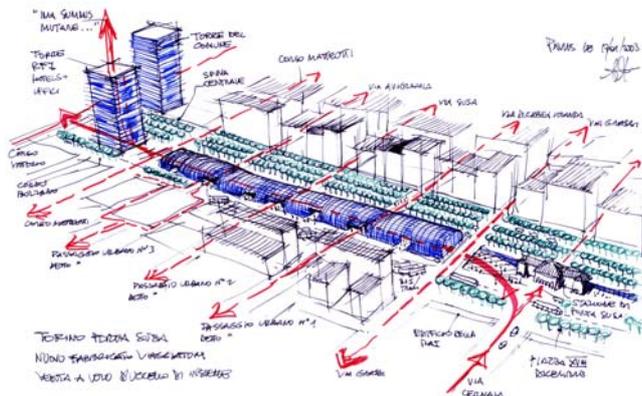
La Stratégie Urbaine de l'intervention de Porta Susa aujourd'hui

En effet, comme il y a plus d'un siècle, aujourd'hui encore Porta Susa avec son nouvel environnement urbain élargi de Spina 2, assume le rôle de centre de gravité du processus de couture urbaine, amorcé par l'enterrement du chemin de fer et la création de la Spina



Le projet de "Porta Susa" complète et symbolise la nouvelle liaison programmée entre la cité historique à l'est et la cité du XIXème -

XXème siècle à l'ouest, en réalisant par la conception de la gare ferroviaire comme galerie urbaine longitudinale en acier et en verre - parallèle à la Spina - une continuité physique ultérieure avec les artères à arcades protégées, typiques du vieux Turin et de l'urbanisme italien du XIXème siècle. Inspiré de la spécificité des lieux avec lesquels il s'associe, le projet du nouveau bâtiment voyageurs et de la tour de services annexe réalise un objectif fondamental, celui de créer un espace public nouveau et moderne de la ville en continuité avec les artères et les espaces publics propres à la cité historique, les arcades, les places, les galeries urbaines. La longue galerie en verrière se laisse traverser transversalement au niveau rue par les axes existants est-ouest (Via Grassi, Via Susa, Via Duchessa Iolanda, Via Avigliana, Corso Matteotti) en mettant en liaison piétonnière - perpendiculairement aux axes mentionnés ci-dessus -, Via Cernaia à l'est et Corso Vittorio à l'ouest. La gare avec sa tour de services définit ainsi une sorte de nouveau périmètre 'actif' entre le Turin du futur et celui du passé, unis en une nouvelle dimension contemporaine, là où par contemporanéité on entend la coexistence du passé et du futur dans le présent.



L'opération de Porta Susa peut représenter une sorte de pont entre le passé et l'avenir de la ville en mettant en réseau une série d'événements spatiaux liés, d'axes et de places diversifiés par la forme et les fonctions.

Le contexte existant et ses transformations programmées

La transformation urbaine programmée dans l'intervention de la Spina 2, c'est ainsi qu'est nommée la portion de la Spina centrale qui se développe autour de la gare ferroviaire de Porta Susa, s'appuie sur une série d'éléments urbains majeurs.

Ces éléments caractérisent le site de la Spina 2 et sont en dialogue actif avec le projet du nouveau bâtiment voyageurs de la gare ferroviaire, - véritable "cœur urbain" du nouveau quartier en voie de formation, il s'agit de:

1. La gare historique de Porta Susa en tant que nœud de polarisation d'un axe urbain qui relie la vieille ville avec la vieille gare libérée des ajouts successifs, dont on suggère une restauration minutieuse et une connexion piétonnière avec le nouveau bâtiment voyageurs via un plan incliné mettant en relation les différents niveaux de déplacement piétonnier. La démolition du pont construit dans les années cinquante et la construction de plain-pied avec un axe routier en continuité avec le réseau routier de la voie Grassi, suggèrent l'image ouverte de la Piazza XVIII Dicembre sur le nouveau Bâtiment Voyageurs et le Corso Bolzano, transformé en nœud échangeur multimodal de transports urbains (tram, autobus, taxis, pistes, bicyclettes, métro) et d'accès au nouvel ensemble d'infrastructures de la gare.
2. La Spina Centrale dans son rôle urbain d'axe de la Grande Dimension, Bigness, structurant le schéma futur de la ville. En effet, sur ce grand boulevard se trouvent présents des événements importants à partir des futures tours jumelles (la Tour del Banco San Paolo et la Tour de services de FS Sistemi Urbani), situées au croisement de la Spina Centrale avec le Corso Vittorio Emanuele. D'autres événements caractérisent et caractériseront encore plus à l'avenir la nouvelle ville qui sera marquée par des édifices de haute qualité architecturale, certains d'entre eux déjà présents et remarquables sur le site : le bâtiment de la Telecom et de la Rai, les précieux bâtiments industriels des Officine Grandi Riparazioni (les O.G.R. transformées en Museo dell'Unità d'Italia, 2009-2010), le siège universitaire du Nouveau Centre Polytechnique de Turin, la Citadelle Judiciaire, la future Bibliothèque Centrale avec le Nouveau Théâtre et le bel édifice panoptique des Nouvelles Prisons. Dans ce nouveau cadre s'insère la nouvelle gare le long de la Spina Centrale dans la fonction renouvelée de galerie urbaine à l'échelle du nouvel axe d'infrastructures ;
3. La place historique du XVIII Dicembre, dans le prolongement de l'axe du Corso San Martino, partie intégrante du système à arcades décrit ci-dessus, juste en face de l'ancienne gare de Porta Susa, prolonge avec le Bâtiment Voyageurs de la nouvelle gare le parcours à arcades urbain jusqu'au Corso Vittorio, confirmant ainsi la dimension urbaine rénovée de la Gare. La place étendue sur le Corso Bolzano, avec les constructions qui lui font face, définit le vide urbain de la citadelle des grands Services Administratifs (Offices des Finances, régionaux, Permanence Centrale de Police et Bureaux gouvernementaux) jusqu'à la limite du Corso Vinzaglio. Les rues transversales jouent un rôle important de continuité urbaine, en délimitant les îlots en continuité avec les tissus urbains à l'est et à l'ouest.
4. Le Corso Matteotti, dans la vision urbaine rénovée, joue le rôle de traversée de la circulation des véhicules au sud, de service à

la nouvelle gare et de charnière entre le nouveau Bâtiment Voyageurs et la future Tour de services. Sur ce Corso Matteotti, on trouve actuellement des édifices résidentiels de valeur, des bureaux, des magasins et des marchés dans la partie centrale. De nature surtout résidentielle, bien que considérable dans sa dimension transversale, il n'assume pas le même caractère que le Corso Vittorio contemporain, artère fondamentale de traversée est-ouest. Les deux cours marquent sur les 200 mètres qui les séparent le futur événement urbain majeur de la Tour de la Gare.

5. La Nouvelle Gare du Métro, insérée à l'intérieur du bâtiment voyageurs, offre la possibilité de créer une véritable intermodalité programmée de différents moyens de transport, liés aux précédentes initiatives, comme le parking souterrain du Corso Bolzano. Un second arrêt en correspondance avec la Piazza XVIII dicembre confirme l'importance stratégique de Spina 2 dans le réseau des transports urbains.

Le Bâtiment Voyageurs de la Nouvelle Gare de Porta Susa

La gare est elle-même lieu de voyage et de rêve... Un lieu de vie et de passage. Un lieu urbain, en continuité directe avec la ville et ses différents itinéraires, qui, en même temps, fait voyager notre imagination au-delà de son environnement purement physique pour suggérer la présence dans la ville d'un "autre" lieu, d'autres lieux, dont l'inspiration fait référence à l'essence même de l'idée de voyage. Le monde du voyage au travers des divers moyens de transport (le train, la voiture, l'avion, le bateau, le métro, le paquebot) ; les grandes halles historiques des gares du XVIIIème siècle et les célèbres galeries urbaines des cités italiennes du XIXème siècle (lieu du mouvement piétonnier et de la vie sociale dans la cité historique...) deviennent l'univers linguistique de référence en apportant à notre imaginaire toute une kyrielle d'idées et de schémas formels et structurels.

L'édifice de la gare, une galerie sinueuse d'acier et de verre composée de 106 arches toutes différentes l'une de l'autre, devient une sorte d'édifice symbole, symbole du mouvement, du voyage et de la présence du monde des transports dans la cité contemporaine, simulacre urbain de l'objet train, disparu sous le nouveau boulevard de la Spina Centrale.

Le projet de la gare de Turin Porta Susa est ainsi le projet d'un espace public où la gare, véritable galerie couverte, devient passage, rue, lieu d'une nouvelle urbanité. Le projet dans son ensemble se fixe pour objectif de relier différents niveaux de la ville en continuité de parcours urbains. La gare est le dispositif architectural en mesure de transformer en niveau urbain, et donc

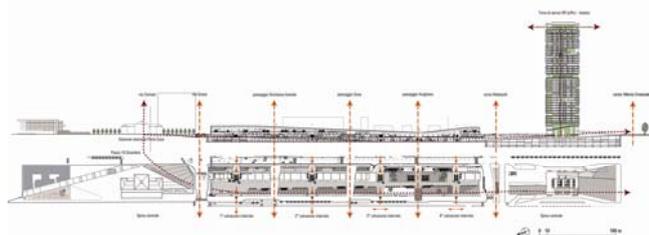
en espace public et lieu urbain, l'intégralité du programme en "continuum" spatial et événement collectif.

Le volume transparent de la gare, rappel moderne de la galerie urbaine du dix-huitième siècle et des grandes halles des gares historiques, est traversé transversalement par un système d'artères aménagées entre la partie est et la partie ouest qui en réduisent l'impact en transformant la galerie en un espace piétonnier perméable au niveau de la rue tout comme au niveau hall (niveau -1), ouvert aux flux piétonniers de la ville, indépendamment aussi des activités elles-mêmes de la gare. La cité qui s'est toujours construite avec ses espaces vides, ses lieux publics de rencontre, d'échange et d'interaction entre les individus, trouve dans l'idée de nouvelle gare de Porta Susa et dans l'idée de pôle d'échange horizontal, autrement dit de voie urbaine de service aux voyageurs et à la vie de la cité, sa nouvelle expression.

La ville entre en gare... et la gare devient elle-même ville.

Lieu d'une nouvelle urbanité, le bâtiment voyageurs est donc pensé comme une galerie couverte en acier et en verre sur une longueur de 385 mètres (celle du TGV), large de 30 mètres et d'une hauteur variable entre 12 et 3 mètres au faite de la couverture.

La galerie en verrière permet d'amener la lumière naturelle jusqu'au niveau des trains, à -10 m, du passage ferroviaire, séparé de la voie ferrée par une nappe d'eau longitudinale (sur la distance des 400 mètres de la gare), pour assurer la continuité entre le grand volume souterrain de la zone des quais et la galerie elle-même, s'exprimant ainsi comme un continuum spatial, fonctionnel et urbain.

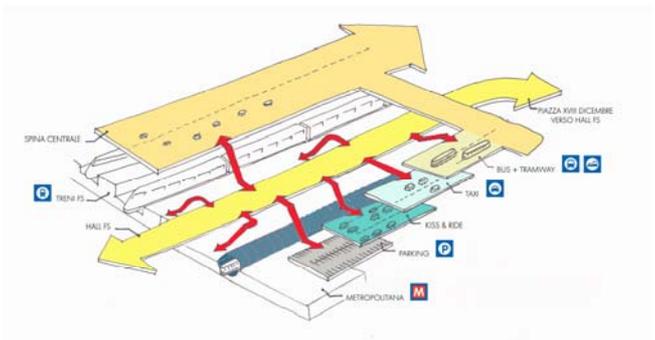


Le quai d'accès aux trains a été conçu en effet comme un trottoir de la ville, sous le même ciel ...

La gare devient de fait dans son ensemble une artère urbaine, ouverte et perméable tant dans le sens longitudinal avec l'axe incliné du hall qui relie la Via Cernaia au Corso Matteotti au niveau -1 puis remonte vers le Corso Vittorio, que dans le sens transversal avec le système de passages urbains perpendiculaires à la Spina et au Corso Bolzano dans le prolongement des axes préexistants.

La distribution intérieure des différentes aires fonctionnelles et des flux des mouvements intermodaux s'articule à partir du système des

accès urbains au bâtiment lui-même et de la configuration planimétrique de l'aire sur laquelle débouche la nouvelle structure, caractérisée par un développement extrêmement allongé du lot d'intervention : un rectangle de 40 mètres de largeur sur environ 400 mètres de longueur. L'implantation longitudinale du Bâtiment Voyageurs, marquée par le système régulier des accès aux trains avec les quatre escaliers d'accès sous la Spina Centrale espacés par les trois passages urbains, compose comme pôle d'échange horizontal à plusieurs niveaux l'organisation générale de ses voies internes, des flux intermodaux et des services, en transformant la gare en machine fonctionnelle et urbaine.



En continuité avec les axes urbains existants, un système de passages urbains traverse la gare de plain-pied, d'est en ouest, en direction transversale, en la transformant en un espace piétonnier perméable et traversable. Les trois passages deviennent les portails d'entrée dans la gare sur la Spina Centrale et permettent, en plus de la traversée transversale, d'accéder directement au niveau inférieur du hall piétonnier de la gare.

Le long du Corso Bolzano, sur le front sud-est de la galerie - outre les trois passages urbains évoqués ci-dessus - un système de 4 portes d'entrée, espacées entre elles d'une centaine de mètres, permet d'accéder rapidement, au niveau -1, aux 4 escaliers d'accès au volume souterrain du passage ferroviaire et à la zone des quais, grâce à une traversée en largeur de la gare d'à peine 30 mètres. Les entrées frontales, en revanche, sont situées au niveau du hall (c'est-à-dire au premier niveau souterrain appelé "niveau -1", environ 3,50 mètres sous le niveau de la rue), aux deux extrémités de l'axe longitudinal aménagé qui s'étend le long de l'axe nord-sud de la Piazza XVIII Dicembre jusqu'au Corso Vittorio.

Le projet prévoit un accès piétonnier principal le long de l'artère urbaine inclinée venant de la Piazza XVIII Dicembre, qui, en pente, rejoint le niveau du hall (image 14), alors qu'à l'extrémité opposée, un système d'escaliers et de marches relie le premier niveau souterrain de la gare au Corso Matteotti. Cet accès communique ensuite avec le grand portail d'entrée situé sous la future tour de la gare et donnant sur le Corso Vittorio.

Le volume de la galerie est conçu comme un système de "blocs fonctionnels" avec structure en acier et verre, posés sur un socle en béton armé à deux niveaux, occupé en majeure partie par les locaux techniques, les locaux de service et par le parking, et interrompu par le vide central de la gare de métro.

La distribution intérieure des différentes aires fonctionnelles est basée sur un équilibre-programme dimensionnel avec quelque 10.000 m² de services aux voyageurs et à la ville, environ 10.000 m² de hall et de voies publiques et encore 10.000 m² de locaux techniques, parkings, espaces de service...

Les volumes fonctionnels qui occupent près de la moitié de la largeur de la structure intérieure, définissent le réseau interne de la voie couverte depuis la galerie, comme une façade urbaine.

Le hall est conçu comme une voie couverte, dissymétrique, délimitée à l'est par les façades intérieures des volumes fonctionnels destinés à accueillir les services aux voyageurs et au quartier lui-même (le centre voyageurs, les billetteries, les services commerciaux, les services bancaires et de la sécurité publique, le centre vip et les espaces pour la restauration), et à l'ouest par le système d'accès aux escaliers du passage ferroviaire.

Le projet prend le niveau 243.00 du hall (déjà défini comme niveau -1) comme niveau de référence générale pour les accès depuis l'extérieur, la circulation intérieure et les implantations le long de toute son étendue linéaire, l'intégralité du programme de services aux voyageurs et d'espaces commerciaux, ainsi que pour la restauration à l'intérieur des différents volumes sur deux niveaux interrompus par les entrées sur le Corso Bolzano et par les passages urbains. De cette manière, on garantit le meilleur fonctionnement des activités complémentaires en les alimentant par le flux des voyageurs au départ et à l'arrivée.

Dans la même logique de gestion et d'optimisation des flux, on a conçu l'extension du hall avec une rampe piétonnière intérieure (d'une pente d'environ 3%) permettant d'accueillir les flux venant du métro et se dirigeant vers le métro ainsi que du "kiss and ride" (arrêt-minute) (niveau -2) au départ et à l'arrivée.

Cette rampe, animée d'une foule d'activités et de services, devient alors une sorte de collecteur des flux intérieurs en harmonie avec l'idée d'une voie urbaine de la galerie, en reliant les deux niveaux principaux de l'accès aux unités (243.00) et de la voie 1 des trains à grande vitesse (237.10), correspondant à la sortie du Métro (237.50) avec un arrêt intermédiaire de raccordement avec le niveau -2 du kiss and ride.

La rampe arrive donc au nœud intermodal entre la gare ferroviaire et la gare du métro pour repartir ensuite vers la tour à l'autre extrémité du lot : le nœud intermodal est alors l'occasion de définir le cœur du projet avec une place pratiquement à ciel ouvert.

Le raccordement intermodal se transforme alors en place, véritable centre de gravité fonctionnel de l'intermodalité, lieu où se rencontrent la ville, la gare, les trains et le métro.

Le caractère exceptionnel d'un tel nœud est souligné par le point de flexion de la silhouette de la galerie en verrière et par la courbe du passage urbain le long de la Via Avigliana à l'intérieur de la gare, pour atteindre le niveau hall sans solution de continuité des deux côtés (Corso Bolzano et Spina), en faisant communiquer la ville et la gare avec deux plans inclinés.

Grâce à l'intégration de la nouvelle gare ferroviaire et de l'ensemble des modes de transport (métro intégré, gare routière et tramway sur le Corso Bolzano, station de taxis, à l'arrivée à l'intérieur et au départ sur le trottoir à l'extérieur de la gare, parking autos, motos et bicyclettes...), la gare de Porta Susa est un exemple remarquable de pôle d'échange contemporain, de lieu public où l'intermodalité génère une nouvelle forme d'Urbanité pour la cité du futur.



La silhouette sinueuse de la toiture en verrière (de quelque 15.000 m²) sera dotée d'une installation de cellules photovoltaïques (puissance installée de 765 kW pic) disposée sur 2.300 des 3.600 panneaux qui la composent (surface d'environ 9.000 m²). Les 680.000 kWh d'énergie électrique produits chaque année seront mis dans le réseau public. Cela correspond à près de 35 % des besoins internes de la gare ferroviaire qui, nous l'espérons, deviendra un nouveau symbole de la ville de Turin.

Un projet urbain intégré : La Gare avec sa Tour et les deux Tours Jumelles

L'idée de base de l'intervention de Porta Susa, depuis le début de sa conception (cf. projet retenu au terme du concours international 2001 "Ima Summis : gare + tour"), a consisté à imaginer que le nouveau bâtiment voyageurs de la gare de Porta Susa et sa tour de services annexe puissent représenter en réalité un continuum urbain, tant à l'horizontale qu'à la verticale, d'espaces publics à différent niveau de la ville : la gare, avec le "dessous" de la liaison ferroviaire et de la gare du métro, et la tour avec le "dessus" de ses quelque 40 niveaux...! La cité doit vivre dans l'espace

tridimensionnel et non bidimensionnel des seules coordonnées planimétriques x et y : le dessus et le dessous appartiennent tous les deux à l'espace urbain et comme tels, ils doivent être et contenir des lieux de la ville, véritables espaces publics, d'un accès aisé et évident en continuité avec les artères urbaines de surface.

De fait, si la gare permet à la ville et au ciel de Turin de descendre jusqu'au niveau des voies en transformant les quais en trottoirs urbains et le hall/galerie en une rue couverte (au niveau - 1) qui s'adapte pour favoriser les flux internes des voyageurs, la Tour de services, quant à elle, se raccorde au hall grâce à l'extension, à l'intérieur de son lot, de l'artère continue piétonnière de la gare qui se développe sans solution de continuité, même à la verticale, en reliant entre eux différents niveaux urbains et en créant un ensemble d'espaces publics à différents niveaux, du bas vers le haut...

L'objectif principal du projet de la Tour de la gare a été, dès le départ, de prévoir une liaison directe naturelle avec les flux de la gare du niveau -3 (niveau quais) au niveau -1 (niveau hall gare), et de la ville par le biais du hall proprement dit de la tour, et de programmer via le développement vertical total du volume, à partir du hall à triple hauteur (aux niveaux -1,0 et +1), un ensemble d'espaces "semi-publics" (médiathèque, salles de réunions et de conférences, espaces de repos, fitness center et centre spa, restaurants et lobby panoramiques, terrasses bar...) capables de donner un caractère "urbain" à la tour elle-même.

Les deux tours jumelles

Si le rapport gare-tour représente une spécificité propre au projet de Porta Susa et à ses connexions urbaines du dessous au dessus et viceversa, la relation entre la Tour de la Gare avec sa jumelle de la banque Banco Intesa San Paolo, - projetée par Renzo Piano -, constitue quant à elle un clin d'oeil à d'autres réalités urbaines contemporaines en projetant l'ensemble du cadre en une dimension métropolitaine aux références multiples



Prévues dans le plan d'aménagement urbain de Gregotti et Cagnardi, les deux tours jumelles de Gregotti et Cagnardi de Spina 2, - la Tour de la banque Banco San Paolo et la Tour de la Gare RFI -hautes chacune de 160 mètres - sont positionnées symétriquement par rapport à l'axe central de la Spina et en position frontale légèrement désaxée.

En effet, la tour de la gare est légèrement décalée en plan vers le sud-ouest par rapport à sa jumelle, assurant ainsi la perméabilité visuelle depuis ce même axe vers la Tour San Paolo sur l'arrière-plan de la Spina

Ce léger déport permet ainsi aux deux tours jumelles de se faire face, contredisant de manière très subtile le principe monumental de la symétrie frontale rigide et permettant ainsi aux deux de dialoguer entre elles et avec les autres éléments de l'environnement urbain de manière plus autonome, plus dynamique, plus changeante.

Les deux tours en effet se définissent comme jumelles au niveau de la typologie de composition, de la densité des volumes, de l'image architecturale et des choix linguistiques et technologiques, en se proposant en "couple" comme nouveaux éléments primaires de la ville.

Les tours se proposent comme des figures actives de la scène urbaine du Turin du futur, racontant leur vie de configuration urbaine verticale dans le skyline rénové de la ville, et définissant de manière spécifique leur rapport respectif avec la ville au niveau de la Spina Centrale.

Le principe typologique de la Tour comme figure de Nouvelle Urbanité

La tour de la gare se fixe l'objectif ambitieux d'être URBAINE, forme d'une Nouvelle Urbanité Verticale pour le Turin du futur.

L'implantation permet l'introduction au sein d'un schéma typologique simple d'une série d'espaces et de volumes particuliers (ASPI et espaces communs à l'hôtel et aux bureaux), typiques de l'urbanité de la cité historique au niveau de la rue, qui se distinguent nettement des fonctions de base du programme des bureaux ou des chambres d'hôtel grâce à une différenciation de traitement des surfaces de façade. (image 23)

L'implantation planimétrique en "H" (deux lames latérales saillantes par rapport à un noyau central des circulations verticales légèrement reculé sur deux côtés courts) s'articule en un système de configuration régulier de pleins et de vides modulables à partir du module rectangulaire de base.

A partir d'une telle implantation de base, c'est aux deux extrémités du noyau central que s'intègrent, uniquement de manière ponctuelle, certains volumes transparents d'un ou deux niveaux qui animent les grands vides verticaux définis au nord et au sud par les deux lames de la tour et revêtus de jardins verticaux.

Ces volumes fonctionnels qui s'étendent latéralement à l'intérieur des deux ailes de la tour, sont destinés aux fonctions semi-publiques mentionnées ci-dessus (salles de réunions, fitness center, médiathèque, bars /restaurants, centre de spa, espaces d'exposition, espaces de repos...). (image 24)

Le concept de la tour en tant que lieu d'urbanité et de voie urbaine équipée verticale est accentué aussi par le choix de positionner sur les deux faces extérieures courtes (nord et sud) le dispositif d'ascenseurs panoramiques qui desservent en express les volumes publics au nord et la lobby panoramique de l'hôtel et en superposition au sud les fonctions plus privées du programme tertiaire de base (bureaux et hôtels).

La définition d'une stéréométrie simple, un rectangle de 32,40 m x 43,20 m de base et de 160 mètres de hauteur, à l'intérieur duquel se trouvent une multiplicité d'espaces définis par l'articulation libre des pleins et des vides, traduit en vertical un principe typomorphologique de la cité historique où l'îlot rectangulaire dissimule souvent en son sein une géométrie d'espaces vides tout à fait surprenante.

La magie des images nocturnes des tours animées par la présence irrégulière et aléatoire des très nombreuses lumières intérieures qui dessinent des géométries sans aucun sens sur les stéréométries muettes de la "ville sans qualité", est dans ce projet traduite en principe de composition et principe fonctionnel d'organisation typologique des espaces, afin de pouvoir transférer, sur un plan de lisibilité programmatique, la vie intérieure des tours et leur dynamique quotidienne

The City from the Wire the Aerial Cable Transport for the Urban Mobility

Romano Fistola

Dipartimento di Ingegneria, Università degli Studi del Sannio
e-mail: fistola@unina.it; web: www.romanofistola.it

ARTICLE INFO

TeMALab journal

www.tema.unina.it
ISSN 1970-9870
Vol 4 - SP - March 2011 (59-65)

Department of Urban and Regional Planning
University of Naples Federico II

© Copyright TeMA. All rights reserved.

Keywords:

Urban Ropeway
Cable Car
Sustainable Mobility

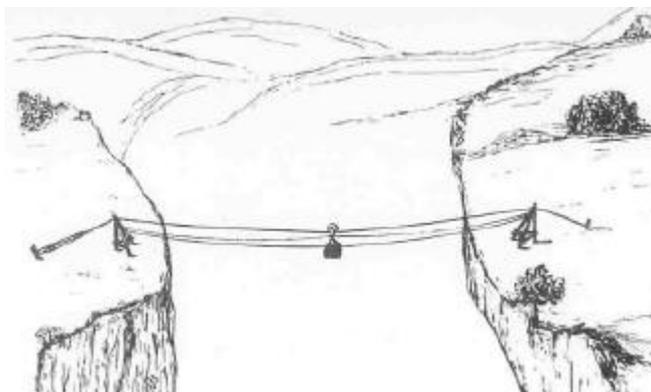
ABSTRACT

The urban transfer by using ropeways can produce impacts and externalities which, if well-managed, can trigger processes reliever, sustainable development and promoting tourism inside the city. The article starts from the consideration of urban transport by ropeways as a viable, effective alternative to the collective transfer among different areas of the city, particularly in those cities characterized by unique morphological or hydrographic territory which are fit for being overcome by mobility systems at high altitude. These features, in many international urban contexts, also contribute to enhance the amenity and the urban appeal. The paper intends to underline how the ropeways can become an efficient urban transport system between urban sites, often placed at different heights and for which there is a less accessibility by ground, and at the same time, a fascinating way of tourist mobility that allow people to observe the city from above (moving on it), in a sort of dynamic view. This interesting functional convergence has been often highlighted in the studies conducted on this mode of transportation, „which in the past was considered one of the real possibilities for urban moving. Many cities are characterized by this type of mobility and within which existing systems of lifts, oblique connections between parts of the city are provided by urban systems, lifts, cable cars, escalators, moving walkways, etc.. A focus is also provided in relation to the ropeways, currently operating in many cities around the world, highlighting the effectiveness of mobility solutions at high altitude, although not necessarily intended for the slope, taken in metropolitan contexts outside of Europe since the Seventies. Furthermore a specific attention it is payed to the plants currently disused in Turin and in Naples with a special regard to the possible recovery prospects in a new urban mobility system. For the city of Naples it is presented also a new project for a rope way between the two famous museums: the Archeological Museum, which is located inside the inner city, and the Capodimonte one which is at top if the hill of Capodimonte inside the well known area of the royal palace. Finally some new projects are presented regarding the cities of Rome and Milan. For the two biggest Italian cities there are two ropeways designed that will, in the case of Milan, link urban areas along a path that includes interchanges and stations in major urban hubs, starting from the airport; in the case of Rome the “link” will cross the river Tevere in order to connect two large districts of the city: the EUR and Magliana, historically splitted by the barrier river”.

A romantic vision of the urban transfer

The possibility to overcome the laws of gravity flying over the city, floating in the spaces between buildings and landing at stations located very high and marked by futuristic architecture, has always been one of the main feature of the visions of city science fiction. Flying over the city or using transport systems, which allow a free and impressive mobility “floating”, are actions that characterize the movement of the protagonists of many nineteenth-century fantasy novels, whose authors have frequently exercised in the provision of urban amenities of the future, for instance the foreshadowing of Jules Verne predicted in city (Paris), in addition to air travel, use of the Internet, air conditioning, magnetic levitation transport, etc. The aim of this paper is to bring the attention of engineers, urban

decision-makers and users to the ropeway as a viable, effective alternative to the public transport between different areas of the city; that consideration should be formulated especially for those cities characterized by hilly ground, slopes or geomorphologic uniqueness and/or hydrographic peculiarities that are fit for being overcome by cable mobility systems. These infrastructures in many cities worldwide, helping to increase the amenity and, like in some Italian cases, the urban appeal. The story of the “ropeway” begins with the human need for overcoming the rough topography. The use of vegetable strings and animal fibers to overcome cliffs and precipices is ancient and it is believed that already in Mesopotamia and Egypt people did use them specifically for this purpose. Later, in the Roman era, it seems that pulley-systems have developed mainly used for moving soil and other materials.



A first ropeway built on the border between Colombia and Venezuela by Spanish in order to transport passengers.

In the Renaissance many construction machines provided for the pulley of baskets containing the blocks for building and around the first half of the XVI century you can place the construction of cableways for passenger transport. The evolution of these plants was long proportionally related to the ability of tension ropes. Only in 1800 drawn steel wire ropes were produced being capable of supporting high voltages and thus capable of supporting substantial weight.

Technological development was driven by the need for having the availability, in the mining sites, of cable cars capable of handling large volumes of material extracted by the appropriate transport trucks for which the automatic detachable system was created. The XIX century was an era of great progress but the first products of modern passenger lifts should be placed at the beginning of the XX century. In Italy the first ropeway: linking Lana and S. Vigil (Alto Adige region) was built in 1912 by the company Cerretti & Tanfani and included a cabin holding 16 passengers and travelling at a speed of 2.5 mt per second. As it often happens, the war needs led to new progress in this field, being more modern and efficient, but by the end of the 2nd World War there will be a new requirement: the tourism one, particularly skiing, which will drive the research and technological development in ropeway field. After the 2nd World War the ropeway was considered as an efficient transport system even within cities and in particular inside hill towns. Then Ropeway transfer becomes effective urban transport system between urban places (often placed at different heights and with a difficult access by land), and at the same time a fascinating way of tourist mobility that is, the ability to observe the city from the top (moving on it), one of the famous sights. This interesting functional convergence has been repeatedly highlighted in the studies conducted on this transport modality that in the immediate past has been considered one of the real alternative for urban travel. Translating the above assumption on a scientific level, and referring

to the systemic logic for the interpretation of the city, we can say that in the specific contingency mobility function can simultaneously refer to both the sub-functional system, consisting of the features and functions allocated in the space and functions moving through space (mobility), and the perceptive sub-system, because the individual is able to have a dynamic perception of the city by a particular viewpoint. In the following pages the matter will be carried out, with specific reference to cableway installations made in urban areas that may still represent a valid alternative for sustainable mobility in the city.

The urban ropeways

Many cities and metropolitan areas are now reconsidering the possibility of creating local public transport connections by using the ropeway. The cable transport also provides for other transport systems, in particular the cable cars which allow the overcoming of strong gaps and slopes inside urban areas. Unlike the "funicular", cable cars do not foresee a shift in "pending" but overland and the cars run on tracks that pass through the drop by means of a driving force exerted by a "pull and release" cable, which pulls the downstream car and at the same time releases the upstream cabin. Naples is definitely the most famous Italian city for funicular public transport. Currently there are four different funiculars allowing to reach the hills of Vomero and Posillipo from the old city and from the areas of Chiaia and Mergellina. Funicular installations are active in many other "oblique" Italian cities, like: Genova, Bergamo, Biella, Como, Trieste, Livorno (solar powered), etc.



A post card about the Vesuvius funicular.

There are many others in the world especially in those countries (like in Latin America), where cities are often built on hills and hilly areas. One interesting example is Chile, which has 15 funiculars;

probably the best known of which is in Valparaiso, described in the movie "The Motorcycle Diaries" by Walter Selles. The historic cable cars are also facilities for going up the slopes of volcanic mountains like the case of Vesuvius funicular (Italy), opened in 1880 and destroyed by the last great eruption of 1944, and for which many times it was thought to restore through the redesign of the system. Even for the city of Naples, which will be discussed later, there are recent projects of new ropeways, but at the moment there are no concrete actions towards effective implementation. Ropeways and funicular had a particular period of boom around the first decades of the XX century. The specific mode of transport was the preferred choice for all those cities in which the accessibility depended on the capability to overcome specific sloping areas inside urban context. As mentioned before there are many examples but with the passage of time this mode of public transport has been superseded by other installations, mainly because of security requirements in the transfer. From a technical point of view we can distinguish two different types of urban ropeways:

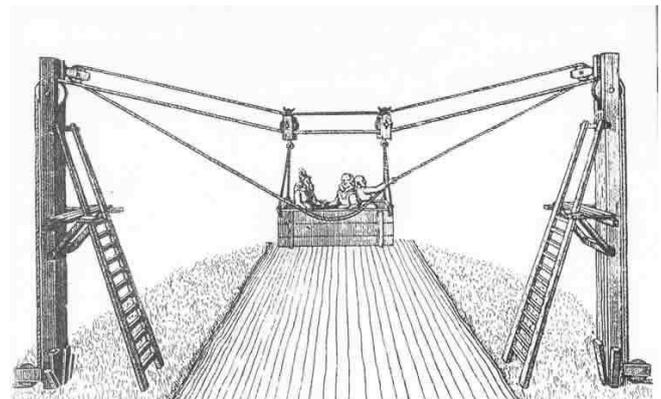
- "down-up", which allow to overcome height gaps, slopes and altitude inside the city (among them also funicular railways are included;
- "links", which represent urban suspended-rope connections, mainly developed horizontally, and reaching the stations placed at the same altitude. They are generally designed to overcome specific "barriers" or interruptions, to bypass urban rivers, to reach islands situated within the city, to overcome mobility infrastructures that block direct accessibility, etc..
- This installation may also vary depending on the type of traction, the characteristics of the cables, modality of traction truck, and so on.

In general it is possible to distinguish 5 different types of ropeways.

1. Aerial Tramway system (ropeway): classic cable car consisting of one or more cable cars suspended by a vertical metallic jaws and connected with two carrying ropes by a pulley truck and moved by a traction rope. This system involves some problems especially in urban area because of the stability of the cabins.
2. Funicular system: it consists of two cabins on railway tracks moved "up and down" by a haul rope. There is usually a single track route with an exchange area where the track is doubled to let the ascent train go up.
3. Funicor: made up of two suspended cabins, each of them is equipped with a four -cable truck.
4. Cable-car: they can be one-cable, or two-cable or three-cable facilities and are sufficiently stable in the wind and because of this chosen, even in the past, for urban realizations. They entail the detachable chairlift to the haul rope for movement at high altitude.

5. Funitel: it is an extremely stable way thanks to the dual system of ropes deployed at more than 3 meters far from each other.

This distance allows two vertical trucks to clamped safely to the drive system and to stand wind loads exceeding 100 kmh. At the moment the main problem in order to build up urban ropeways is related with the safe requirements of the system. In order to build up a ropeway inside the city, an appropriate area is necessary that must be cleared of buildings, plants or human presence. It is therefore difficult to find free corridors within the existing urban contexts where the fabric is characterized by a substantial building density. A possible solution could be reached by the advanced technology that could allow the execution of safety equipment capable of preventing or quickly stopping disaster. The European standards for the safety of cableways are the EN 1709 and EN 12397. It should however be noted that similar considerations, regarding the need for security may be made for the aircrafts takeoff and landing corridors near the municipal airports, now besieged by buildings.



A ropeway useful to cross over a river in 1600.

The ropeways as urban icons

It seems interesting, at this point, to describe some famous realizations in the urban settings of the new and the old continent, which have become part of the iconic heritage of the city. In Europe, as mentioned, there are numerous cableways in the hill towns and it would be difficult to list them all. There are also cases, including Barcelona, Naples, Seville, Turin, etc. ..., where the urban ropeway was built on the occasion of the expo meant to represent one of the attractions of international exhibitions and to allow a bird's eye view of the entire expo settlement. In the following pages the relationship between shift rope and cities will be described with specific reference to the case of Naples, and will analyze the reasons of abandonment or, as in the case of Seville, the sale of

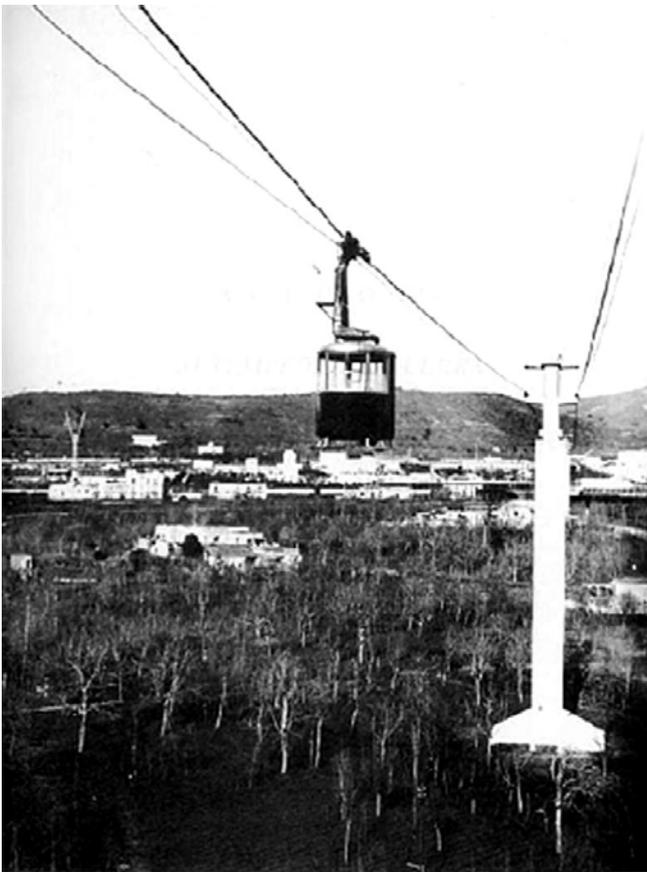
plants that could have still effectively carried out their role. The story that has characterized the Roosevelt Island Aerial Tram is totally opposite to those just mentioned. THE RIAT is definitely one of city ropeways that has most contributed to the construction of a subway in New York. The cableway, built in 1976, had to temporarily allow commuters to reach residents on Roosevelt Island, above the East River, until the completion and opening of the subway station. The RIAT has resisted time and at the presence of other means of travel on the same journey and now represents a "link", between Roosevelt Island and Manhattan, New York symbol of mobility. The track runs for a length of about a mile and reaches a maximum height of 80 meters, with travel at an average speed of 20 kmh. Each shuttle can carry up to 125 passengers but with only 10 seats; in one day the RIAT makes a total of 115 rides and up to now its implementation has allowed the movement of more than 26 million people. The distance between the island and New York is covered in about 5 minutes and the cab, in the final segment of the route, flies over city streets and buildings of the Second Avenue in Manhattan. This famous cableway allows a unique look at New York and represents one of the best known system of tourist mobility in the world. The image of the RIAT has often been used in the iconographic association to the city of New York. The distinctive elongated shuttle flying over the city, wedged between skyscrapers, appears in numerous films of which, perhaps, the best known is "King Kong". Even some well-known American comic book heroes, like Spiderman, have waged fierce battles with deadly enemies, on the roof of the cabins of RIAT, risking falling on the city streets. Even in the film "Moonraker" James Bond was fighting inside and outside of an urban cable car, in that case it was the Pao de Acucar in Rio de Janeiro. The European city that is remembered in particular for its multimodal transport system, which includes urban cable car and funicular railway, is Barcelona. In the Catalan capital it is possible to understand the texture of the fabric of the city by going up, from the southern edge of town, the slopes of Mont Juic (215 meters). To move along this direction is necessary to take the first funicular Avinguda Paral·lel and then the gondola of Mont Juic: "El Cable Car." The urban cable car, the flagship of the International Exposition of 1992, was built in 1970 and renovated in 2007 by architect Joan Forgas. Currently it includes a fleet of 55 cabins, with facilities for IDIS and redesigned with large glass areas to promote the views of the city from above; the cabins are at a distance of 752 meters from the downstream station to the new upstream station being advanced compared to the old track, to mitigate the impact in the park of the castle. Each cabin is able to cover the journey in about 4.5 minutes moving at a speed of 5 m/s. The gondola of Mont Juic it is able to overcome a height difference of about 85 mt. enlivening the cabins along the traction rope

stretched over 12 pylons being moved to a maximum height of 24 mt. For some years the movement has also adopted a rope in an urban environment in developing countries such as the cable car in the city of Constantine in Algeria. A cable system, the only one of its kind in Africa, was inaugurated in 2008 and consists of 33 egg cabins capable of transporting 15 passengers each and covering the distance of a mile in less than 10 minutes flying over the deep gorge of Sidi M'cid. In total, the cable car can carry about 500 passengers per hour representing a valuable support for local public transport in general experienced by urban bus routes.

Turin and Naples: Back to the Future

As already pointed out the urban cableways were often made on the occasion of international exhibitions in response to a threefold need: to create a symbolic infrastructure for the expo that would become a real attraction, allowing the perception from the above of the entire settlement exhibition, promoting a type of original furniture and, in some way close to the city's futuristic visions. There are many examples of urban lifts installed at the expo and which still exist in many cities such as Barcelona, Lisbon, etc.. Sometimes, as in the above-mentioned case of Seville, also plant a few years of operation and are in full working order abandoned because of management problems, whereas, in general, are owned by private entities. Even in Italy the problem of disposal and sometimes of abandonment has characterized some urban cable cars that had become a part of the image of the city and represented also a popular mode of transport and connection between urban areas. The case of Turin and Naples, cities often united by events related to urban innovation, is of particular interest since both cableways were settled on the occasion of international exhibitions: the "Mostra d'Oltremare" in Naples and the international expo "Italy 61" in Turin. Considering the case of Turin first, it will be told that a cable system, consisting of a cable car, connecting the hilly area of Cavoretto (Europa Park), with the area of exposure, in an area south of the current urban center, obtained by cleaning up the banks of the river Po, which had allowed the construction of a new exhibition celebrating the centenary of the unification of Italy. The cable car system was formed by the two upstream and downstream stations, among which, suspended from a cable about 10 feet high, sixty eagerly drawn cabins ran capable of carrying about 700 passengers per hour. The great exhibition was also part of another transport advanced system, "the monorail Alweg" futuristic icon of the exhibition which, after various events, was definitively abandoned in the late seventies. Currently in Turin there are proposals to recover the cableway station by recuperating the

Valentino and Cavoretto stations, also to recall, 150 years from the Unification of Italy, the sense of the 1961 exposure which tried to propose a new modernity for Country being also an expression of a century of unity of its people. Even in the case of Naples the cableway connecting the hilly area of Posillipo to Fuorigrotta district was released at the inauguration of the "Overseas Exhibition." The great international exposition, with the original title of "Triennial Exhibition of Overseas Italian countries, collected the products of the art of Italian colonies in North Africa and the Mediterranean. The large exhibition center, which gave rise to extensive changes in our urban area west of Naples, was built as a twin settlement of the EUR in Rome and was inaugurated by King Vittorio Emanuele on 9 May 1940.



An image of the Posillipo ropeway (Naples) during the last operating period.

The location of the new exhibition, celebrating the Italian colonial activity, required the adaptation of transport systems to the west area of the city, which had been separated from the historic center because placed beyond the natural barrier of the hill of Posillipo.

This obstacle was overcome either by means of a series of tunnels that allowed the crossing of the hill or by realizing the cable that connected the current area of Virgilian Park to the great Exhibition District consisting of 36 pavilions. The ropeway covered a distance of 1,170 meters and exceeded a height of 107 meters from the reference station, located near the entrance of the Mostra D'Oltremare, and now turned into a flower shop whose owner has curiously the same last name of the architect. Giulio De Luca, designer of the system. The two booths could carry 20 passengers (for a total of about 175 units per hour), traveling at a speed of 5.5 m / s and were able to cover the distance between the two stations in about 8 minutes. The cable car was first stopped during the Second World War, which caused its partial destruction. Rebuilt in 1953 remained in operation until 1961 when the Board Show was forced to close the plant because of the excessive proximity between the cabins and buildings constructed after the World War II. In 1970, the support and traction cables were dismantled and the suspended safety nets disarmed. Currently, the support pillars are still present on the old track, which after a liner run inclined towards the hill of Posillipo, and which remain as urban totem to report one of the many discrepancies in Naples. Within the downstream station, whose architectural structure crosses " the Circumflegrea track line by means of a "bridge, there is still one of the cabins abandoned for about 50 years. The upstream station, built on the slope of the hill of Posillipo is structured through a reinforced concrete box-body, which after the transfer was used as a bar for a period of time. The recovery and reuse of this ropeway has been proposed several times with various ideas for the redesign of the line. Nothing has been done partly because of security problems when moving at high altitudes remained unresolved at present. It is undoubtedly clear the importance and tourist appeal that the restoration of that ropeway line could have, without forgetting the important contribution that it could provide to the mobility between hilly area and flegrean area, also considering that the bus of local public transport take about 30 minutes (on average) to connect the two parts of the city by road, compared with about 5 minutes that new technologies could provide. One possible solution to the problem of excessive proximity of buildings to the path and the pylons could be to design greater heights innovative supports and to restore the original networks to protect the corridor below. In fact in the city of Naples there have been many proposals for ropeway installations, including those made by Aldo Capasso around the late 70s, which regarded possible links between the area of the Albergo dei Poveri and 'Botanical Gardens (east area of the city) with the Capodimonte hill, one from Marechiaro to Posillipo, and the circle one that starting from Fuorigrotta reached the hilly areas of and Capodimonte and Colli Aminei and went back down to Piazza

Garibaldi, where the Naples railway station it is located. The proposal partly took the route of the cable car of the show overseas to engage in a new location, which reached and passed over the crown of the hills surrounding the historic center of Naples. Another proposal has recently polarized the attention of the Neapolitan community and the regional administration, which in 2009 approved an allocation of € 1.348.000 to make a feasibility study for a new cableway in the old city. The project, known as the "2 museums ropeway", should connect the Archaeological Museum, located in the historical center of Naples to the Capodimonte Museum located on the homonymous hill area. According to the meta-project submitted by the Agency for Mobility (ACAM), there are two possible routes: the first route would connect Piazza Cavour, near the Archaeological Museum, to Via Capodimonte, flying over the Sanità district, the second provides that the Archaeological Museum could be connected through a treadmill to the station located in Piazza S. Giuseppe dei Nudi. From here the ropeway line could start, following the roads via S. Teresa Scalzi and Via Amedeo d'Aosta, and get the upstream station in via Colli Aminei from which, through an underpass, the Museo di Capodimonte could be reached. The trail is about 1.5 km and could be covered in less than 10 minutes by cab suspended 22 meters in height. It is estimated that the plant, the type Funifor Tandem, could handle a maximum of 3,300 passengers per day for a total of about 168,000 passengers a year. It has also been thought about possible fee charges, which should be a round-trip ticket of about 7 euros. At the moment very little is known about the proposal, for the achievement of which a financial commitment of 25 to 29 million euro has been estimated, but the recent financial difficulties of the Campania Region and a certain hostility from public opinion seem to have permanently invalidated. It should however be notified the attention that the transport community pays to this mode of travel especially in Naples, which could benefit greatly, in terms of relieving traffic congestion and reduction of pollutant emissions, from the installation of a rope system of mobility. The security issues, already mentioned above, still remain, in particular with regard to the overflight of built-up areas. The pre-project of ropeway seems not to worry too much about this aspect, in particular with regard to the proposed route passing over most of the Sanità district built-up area. Also other Italian cities are proposing interesting mobility projects based on cableways. One of the most interesting regards the construction of a large cableway, called "Project ALTAVISTA", to be implemented during 2015 Milan Expo and which is expected to connect the areas of Linate, Pero with Rho for a total track length of 18 Km. The vertical structures provide ten mushroom towers 130 meters high with 9 piers. The stations are located inside different districts: Linate Airport, Politecnico, Giardini Via Manin, Parco Sempione,

Vigorelli, P.le Lotto, Stadio Meazza, S. Leonardo, Pero Exhibition Centre, Expo village of Rho. The plant, the type Doppelmayr, would be able to carry about 3,100 passengers every 52 minutes, which represent the travel time. Another interesting initiative for the construction of a ropeway is that of the urban design of the Magliana cable in Rome proposed by the Roma Metropolitan company. The system is a "link" which is entrusted with the task of overcoming the Tiber to allow traffic between the EUR and Magliana districts, and which will allow residents of that area to use the Metro mobility systems (station Eur Magliana Line B) and the Roma-Lido railway. The roadmap entails a development of about 700 meters with ropes supported, in the central part, by a single pylon about 40 meters high, located near the viaduct Magliana. The cableway system would allow about 17 trips per hour with a carrying potential of about 2,200 passengers per hour in each direction. The investment value amounts to approximately 22 million of euros, but this project, presented with great fanfare in 2007 by the past city government, has gone missing. Recently, the deputy mayor with responsibility for tourism, assured his personal commitment on the initiative for whose final launch; the inauguration would be finally scheduled for 2012.

Conclusions

Some final remarks can be developed at the close of this article.

In the past the urban ropeway have represented one of the iconic elements for many cities, particularly the hilly ones, it provides an effective opportunity to link urban areas with poor accessibility. One of the most outstanding features of the shift is to be found in the tourist attraction, particularly in the possibility of allowing a view of the urban complex being difficult enjoyable otherwise and which gives the possibility of taking a view while moving. The development of urban links could allow the overcoming of obstacles and barriers, either natural or anthropogenic, in the area and to connect points of the city not reachable by different systems of mobility. The urban ropeway surely meet the new demands for sustainability in urban travel showing a relatively economical performance, low-impact installation, zero emissions, without any significant noise impact, etc. A recent survey of the Climate Partners Austria GmbH on the comparison of emissions between cableways and other nodal urban transport systems has highlighted the benefits of urban cable cars, concluding with the following statement: "The cable car opens a new level of transportation flying over the streets and making themselves independent of the congestion and is so much faster than the traffic. Furthermore, given the continuous motion of the cabins, passengers can go at

any time without waiting time and travel not only faster but, as highlighted by the study, also in an environmentally friendly way. " However, its limitations should be reported. The most negative element of this mean of transport lies in the necessary safety requirements. These requirements are mainly related to the need for ground areas, not built, corresponding to the corridors of moving boxes and for safety performance which should ensure the stability of trains in adverse weather conditions.

References

- Verne, J. (1995), Parigi nel XX secolo, Tascabili Economici Newton, Roma.
- Alexander James Wallis-Taylor, (1920), Aerial or wire rope-ways: their construction and management, C. Lockwood and son, London.
- Capasso, A. (a cura di) (2001), Trasporto verticale e città. Gli impianti di risalita nella mobilità urbana. Dagli ascensori alle funivie, CLEAN, Napoli.

Sitography

- <http://www.anitif.org>
- <http://www.funivie.org>
- <http://www.funivia-roma.it/home.htm>
- <http://www.romametropolitane.it/>
- <http://wirednewyork.com>
- <http://www.trenscat.com>
- <http://www.acam.it>
- <http://www.altaviamilano.it>
- <http://www.climatepartner.de>



Profili degli autori

Thomas Buhler

Engineer in Urban Systems Science, PhD candidate in Urban Planning, Urban Design and Geography at the National Institute of Applied Sciences (INSA) in Lyon. Mobility consultant for SCET, subsidiary company for urban planning of the French national investment bank. Interested in analyse of resistant behaviours to sustainable planning, specifically the disconnect between mobility-as-plan and mobility-as-practice.



Carmela Gargiulo

Associate professor of Urban Planning Techniques at the University of Naples Federico II. Member of the Researcher Doctorate in Hydraulic, Transport and Territorial Systems Engineering. Scientific consultant of Naples Municipality for the Strategic Plan, of the Province of Avellino for the Ptcp. Research interests are in the processes of urban requalification, in relationships between urban transformations and mobility, in estate exploitation produced by urban transformations.



Giuseppe Mazzeo

Researcher of the National Research Council (Institute of Studies on the Mediterranean Systems in Naples). Professor of Urban Planning Technique at the Faculty of Engineering, University of Naples Federico II. It carries out research activity at the Department of Planning and Science of the Territory (University of Naples Federico II) in the territorial planning, strategic environmental assessment and urban regeneration fields.



Jesus Gonzales-Feliu

Post-Doctoral Researcher at the French National Centre of Scientific Research (CNRS), and member of the Laboratoire d'Economie des Transports (LET). He obtained his Civil Engineering Master's degree in 2003 at INSA Lyon (France) and passed his Ph.D. in operations research in 2008 at Politecnico di Torino (Italy). His PhD thesis deals with urban freight distribution solutions and two-echelon vehicle routing problems.

**Joëlle Morana**

She is an Assistant Professor of Financial Control, Logistics and Strategy at the University Lyon 2 (France), and member of the Laboratoire d'Economie des Transports (LET). Her research interests include performance management in a logistical context, Supply Chain Management strategy and information systems. She has published several papers on these topics.

**Anna Trentini**

Doctorante de l'Ecole des Mines de Paris (ENSMP). She graduated in civil environmental engineering at Politecnico di Milano, she is an expert in sustainable mobility, urban policy and transport systems. Since several years she is involved in national and European projects in the field of transportation. As an engineer, she developed research activity within the Department of Architecture and Planning of the Politecnico di Milano, on the projet "rail Intermodality and urban development: the case of Venice", funded by the Italian Ministry of Education, University and Research.

**Nicolas Malhéné**

He joined the School of Engineering in Industrial Systems in 1999. He teaches the organization of global supply chain, inventory management, supplying, and production management, in particular through SAP. He is responsible for specialization and Management of Industrial Systems Engineering. He has participated in different industrial projects with companies like SOGERMA, DELPHI, or local SMEs to improve logistics and supply chain management. He has participated in European projects (EUREKA TIME GUIDE, ESPRIT REALMS, LEONARDO LOGTRAIN).

**Alan Clarke**

He works in the Department of Tourism at the University of Pannonia in Veszprem, Hungary. He previously worked at the University of Sheffield, where he revalidated the MA in Leisure Management; the University of North London in the Centre for Leisure and Tourism Studies; the University of Derby, where he was Assistant Dean for Research and Development in the Business School and drew up the blueprint for the School of Tourism and Hospitality management.

**Silvio d'Ascia**

Architect, he has worked in Paris since 1993. After a period in association with G.R. Associés, he founded his own office in 2001. In Naples, in his hometown, his creative research, has been the opportunity to be experimented in some projects: Montesanto Station (2003-2008), the "Complesso della S.ima Trinità delle Monache" (2005-07), Torregaveta Station (2005-10), a multifunctional complex called "la Porta del Parco" Bagnoli Futura, recently inaugurated.

**Romano Fistola**

Researcher at the University of Sannio (Benevento), Faculty of Engineering. In this University he teaches: Town and Country Planning, Town Planning and Territorial Management, Geographical Information Science. He is professor at the Ph. D. course of "Engineering of the territorial systems and networks" at the Faculty of Engineering of Naples. He carries out research activities on Innovation Technology and territorial change, GIS, sustainable planning and Urban Risk.



TeMA è il bollettino trimestrale del Laboratorio Territorio Mobilità e Ambiente - TeMALab del Dipartimento di Pianificazione e Scienza del Territorio dell'Università degli Studi di Napoli Federico II. La rivista propone ricerche, sperimentazioni e contributi che affrontano con un approccio unitario i temi dell'urbanistica, della mobilità e dell'ambiente. La rivista si articola in quattro sezioni: ricerche, sperimentazioni, contributi e osservatori.

TeMA is the official journal of the TeMA Research Group of the Department of Urban and Regional Planning of the University of Naples Federico II. The journal seeks to encourage debate about the integration of urban, mobility and environmental planning. The journal is articulated into four sections: researches, applications, focuses, reviews.

**Di.Pi.S.T. - Dipartimento di Pianificazione e Scienza del Territorio,
University of Naples Federico II, Piazzale V. Tecchio 80 Napoli
<http://www.dipist.unina.it>**

**TeMALab - Laboratorio Territorio Mobilità e Ambiente
University of Naples Federico II, Piazzale V. Tecchio 80 Napoli
<http://www.dipist.unina.it/ricerca/temalab.htm>**

**www.tema.unina.it
redazione@tema.unina.it**