

# TeMA

Journal of  
Land Use, Mobility and Environment

There are a number of different future-city visions being developed around the world at the moment: one of them is Smart Cities: ICT and big data availability may contribute to better understand and plan the city, improving efficiency, equity and quality of life. But these visions of utopia need an urgent reality check: this is one of the future challenges that Smart Cities have to face.

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**PLANNING FOR SMART CITIES**  
DEALING WITH NEW URBAN CHALLENGES

## SMART CITY CHALLENGES : PLANNING FOR SMART CITIES. DEALING WITH NEW URBAN CHALLENGES 3 (2014)

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# TeMA

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Land Use, Mobility and Environment

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## EDITORIAL PREFACE:

### SMART CITY CHALLENGES: PLANNING FOR SMART CITIES. DEALING WITH NEW URBAN CHALLENGES

ROCCO PAPA

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The role of urban planner is changing: ICT and big data availability, enabling them to monitor and analyze large amount of data and information, may contribute to better understand and plan the city, improving efficiency, equity and quality of life for its citizens and its capacity to face future challenges. Big data availability is shifting our focus away from the long to the very short term, affecting urban planner's efforts on generating an effective knowledge base for planning.

This third issue of the volume 7 of TeMA Journal of Land Use, Mobility and Environment focuses on this theme with a specific focus on the new urban challenges.

In the FOCUS section two articles have been selected. The first article is named "The role of tourism in planning the smart city" by Rosa Anna la Rocca starts from the consideration that tourism, for the size it has assumed and for its role in the economies needs adequate governance processes, politics and tools in order to reduce impacts on urban quality of life. The emerging paradigm of "Smart City" is an opportunity to reconsider the current urban planning means, but it needs a holistic approach. Nowadays, the technological component of Smart city prevails mainly because of the ease of diffusion of the instruments, rather than an innovation of the processes. Promotion initiatives concentrate exclusively on the city branding, rather than on initiatives to make cities able to support an additional urban load expressed by the tourism demand. Yet, potentialities of the application of new technologies could strengthen the decisional role in defining adequate urban policies to manage urban tourism. However, urban smartness for tourism seems to be concentrated on the amount of apps available to enhance the use of specific resources or, more rarely, of the urban mobility systems. Both the "big data" and the "open data" revolution, in Italy, do not yet seem to have achieved the hoped results, and the availability of data to allow appropriate management actions, is still one of the main difficulties for those involved in the analysis and quantification of the phenomenon. In addition,

the numerous rankings on urban smartness refer to the prevalence of one component on the others, failing to consider the complexity of the urban system and of tourism, in particular.

The second article titled "Politiche 'Smart' e Visione Metropolitana: la Dimensione Territoriale nell'Esperienza Progettuale della Amsterdam Smart City Platform" by Giulia Fini e Salvatore Caschetto aims at presenting the main projects and policies recently developed by the Municipality of Amsterdam in the field of energy policies, with particular reference to the projects promoted in the context of the ASC - Amsterdam Smart City Platform. The paper analyses projects and policies which are relevant for at least three aspects and for the matters raised by them: I. for the aim to connect policies and projects of the Amsterdam Smart City with the definition of a territorial vision for the Amsterdam metropolitan area; territory and the management's choices related to urban planning and urban design; III. the experience is relevant in relation with the consolidation of the ACS's platform as a place where several individuals are directly involved in the management of public services and where all requests and peculiarities contribute to define a common planning process on the energy and environmental fields of action in the metropolitan area. Based on the latest, most significant information of the activities performed by the Amsterdam Smart City Platform, the paper focuses on the results after four years since the projects and tests have been carried out, on the basis of a network structuring actions, energy-saving targets and space-related choices regarding the whole territory as well as ASC's policies.

The section Land-use, Mobility and Environment LUME collects two articles of the broader theme of integration between mobility, urban planning and environment. The article "Urban Taxing Alternatives for Private Vehicles as an Urban Mobility Management System" by Marins, Orrico and Nascimientto reflects on proposals for the use of urban tolls on private vehicles as a form of urban mobility management. The methodology used exploratory research for the development of a theoretical basis and a table was drawn up showing the experience in various countries. The conclusion is that toll fees are economic viable, the social and environmental benefits are considerable and this can be considered an important sustainable mobility strategy.

The second article of the LUME section, titled "Centro Direzionale of Naples. A "Smart" Concept" by Fabrizio Canfora and Fabio Corbisiero, highlights the results of a research conducted in Naples on the empirical case of the "Centro Direzionale". The design and construction of the Centro Direzionale of Naples is, in fact, an archetype of the smart city; a primal testing of "urban intelligence" in terms of transport systems, infrastructure, logistics, systems for energy efficiency and technology. More generally, a good practice of city administration and of exploitation of strategic spatial planning.

Finally the Review Pages define the general framework of the theme of Smart City Environmental Challenges with an updated focus of websites, publications, laws, urban practices and news and events on this subject.

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## THE ROLE OF TOURISM IN PLANNING THE SMART CITY

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### ABSTRACT

The article starts from the consideration that tourism, for the size it has assumed and for its role in the economies, can be considered an "urban phenomenon"; as such, it needs adequate governance processes, politics and tools in order to reduce impacts on the organization of cities and urban livability in general. The emerging paradigm of "Smart City" is an opportunity to reconsider the current mechanisms of government and planning of the cities, but it needs a holistic approach that goes beyond the one applied per parts that still seems to prevail in the decline of the components of urban smartness. At present, the technological component seems to prevail probably due to the ease of diffusion of the instruments, rather than an innovation of the processes. Promotion initiatives concentrate exclusively on the city branding, rather than on initiatives to make cities able to support an additional urban load expressed by the tourism demand. Yet, potentialities of the application of new technologies could strengthen the decisional role in defining adequate urban policies to manage urban tourism. However, urban smartness for tourism seems to be concentrated on the amount of apps available to enhance the use of specific resources or, more rarely, of the urban mobility systems. Both the "big data" and the "open data" revolution, in Italy, do not yet seem to have achieved the hoped results, and the availability of data to allow appropriate management actions, is still one of the main difficulties for those involved in the analysis and quantification of the phenomenon. In addition, the numerous rankings on urban smartness refer to the prevalence of one component on the others, failing to consider the complexity of the urban system and of tourism, in particular. With these premises, this article tries to underline how tourism could be the object of urban policies and strategies aimed at reducing impacts on the city.

### KEYWORDS:

Smart City, Tourism, Urban Planning

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## 旅游在规划智能城市中所起的作用

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### 摘要

本文设定可控的旅游业规模，并且旅游业在经济中所扮演的角色可归为“城市现象”；进而，它需要充分的治理过程、政治和工具以减少其对城市组织以及城市宜居性的影响。“智能城市”的兴起，为我们提供了一个重新思考当前政府机制和城市规划的契机，但需要进行整体的研究，超越目前仍在智能城市（经济、流动、环境、人、生活、治理）组件中流行的单一组件适用于每一部分的方式。

目前，技术组件的流行可能源于其工具的易于扩散性而非过程的创新。促销举措似乎专注于城市品牌，而非促进城市成为能够支撑由旅游业带来的额外城市负载。但新技术应用的潜力可以加强城市政策管理城市旅游、优化城市服务与设施供应的决策作用。然而，智能城市的旅游业似乎集中在提高特定资源的使用，或者更为罕见的城市流动系统的应用程序上。“大数据”和“开放数据”

的革命，在意大利似乎还未能达到希望的结果。允许适当管理行为的可用数据，仍然是参与分析和量化现象所面临的主要困难之一。此外，许多智能城市的排名参考某一组件在其他组件的流行度，未能考虑到城市系统、尤其是旅游业的复杂性。在上述前提下，本文试图阐述旅游业，如何成为城市政策和策略旨在减少其对城市影响的对象。

### 关键词

智能城市、智能旅游、大数据

## 1 INTRODUCTION

This article considers tourism as an urban activity that can transform urban organization. The connection between tourism and urbanity is complex: the city is the physical place where tourist desires and inhabitants needs intersect. This means that cities must to face different demands by offering adequate services and facilities. In this sense, tourist load on the city can compromise its balance, affecting urban quality of life. Nevertheless, present cities aim to promote themselves as tourist destination to increase their competitiveness, and tourism is seldom studied as an intrusive activity because of its indisputable positive economic effects. Since the 80s, the sustainability paradigm has been applied at the tourism sector too, affirming a new tourist model, being more responsible and respectful to hosting communities<sup>1</sup>.

Meanwhile, in the last decades, cities have become one of the preferred tourist destination (Page and Hall, 2003) generating a new form of tourism that can be defined as urban tourism). The presence of cities into the “tourist experience” shows the change that has been increasingly affecting the tourist demand.

Indeed cities have become the “object of tourist desire” as they are the place where more experiences can be lived contemporarily. Urban tourism has developed during the 70s and refers both to travels towards cities or places with high levels of population density and to the time spent, that is shorter than time normally spent for vacation before. In this period, in tourists’ opinion cities become “a perfect destination for a short holiday” (Van Der Borg, et al. 1993) where a large number of attractive factors are concentrated.

According to Tourism Towards 2030, UNWTO’s recently updated, long-term outlook and assessment of future tourism trends, the number of international tourist arrivals worldwide is expected to increase by 3.3% each year on average from 2010 to 2030. This represents some 43 million more international tourist arrivals every year, reaching a total of 1.8 billion arrivals by 2030. Based on available data, UNWTO describes that tourism’s contribution to GDP ranges from approximately 2% (for countries where it is a comparatively small sector) to over 10% (for countries where it is an important pillar of the economy).

Therefore, the competition among cities is more and more based on their capacity of attracting tourist flows, because of the undeniable positive effects on economic development. In Italy, for example, tourism contribution to the gross national product is 130 billion euro (about 9% of national production) and it is assumed as one of the leading sector of investment (WTTC, 2013).

In the last few years, due to the internet spread and the accessibility to the use of new technologies, tourist demand has rapidly changed again<sup>2</sup>. Tourist cities have been called to review their strategies to maintain their attractiveness and to promote their image in a “virtual” dimension too. On the other side, tourists have become more conscientious and active in their role of visitors and city-users.

In this period, the “smart city” paradigm arises asking for a model of city based on efficiency, resilience, sustainability and social equity. The perspective of sustainability, indeed, seems to call for a change or, at least, to a re-visitation of the present models of socio-economic growth, which cannot be defined “sustainable” at all.

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<sup>1</sup> The Global Observatory on Sustainable Tourism (GOST) initiative was launched by UNWTO in 2004 in response to the growing demand of tourism organizations and stakeholders for a more systematic application of monitoring, evaluating and information management techniques, such as the UNWTO Indicators of Sustainable Development for tourism destinations. These techniques are key tools for the formulation and implementation of sustainable tourism policies, strategies, plans and management processes. In 2013, the first Sustainable Tourism Observatory in Europe under the auspices of UNWTO was inaugurated on the Aegean Islands in Greece. The Monitoring Centre for Sustainable Tourism Observatories examine the environmental, social and economic impacts of tourism in the archipelago and serve as a model to expand the concept to a national level.

<sup>2</sup> Some scholars date at the end of the 90s the beginning of e-Tourism, at first, based on the use of internet to promote cultural heritage of a city. After this first period, the use of internet has radically transformed the phase of travel planning, and then the way to communicate and share information and experiences (Maguer 2011; Kennedy-Eden and Ulrike 2012).

The concept of “smart city”, although more recent, is not less controversial than the sustainability one. It seems to widen the application of sustainability principles to the urban competitiveness, by referring both to the use of information and communication technologies (ICTs) and to the quality of “social capital”. Indeed, the presence of a high quality level of social capital represents one of the main factor of territorial competitiveness and attractiveness.

Caragliu, Del Bo, Nijkamp (2009) stated that a city can be defined smart if «investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance» (p. 178).

Since when in 2011, EU has launched the program “Smart Cities and Communities” to finance European cities that will stand out for cutting consumptions and planning a sustainable development, all the cities aimed to become smart, making the scientific researchers wonder about what urban smartness could really be (Fistola, 2013).

What stands out clearly, is the need of contrasting our present development model to assure a better quality of city-life. Nevertheless, the possibility of realizing the “smart city” model seems to be mainly based on the capacity of deeply changing both the administrators and users lifestyles (La Rocca 2011).

Through these premises, this article by analyzing the relation between tourism and city, try to underline the key-role that urban planning, grounding on a holistic approach to cities’ development, should play in coordinating and integrating urban policies addressed to building up a Smart City.

In the first part, the article focuses on the definition of smart city and smart tourist trying to point out what are the changes occurred. In the second part, referring to Italian situation, the article briefly tries to highlight how some difficulties still arise in collecting tourist data even though “Big and Open Data Revolution” is already started. In the third part, the article attempts to highlight the leading role that tourism activity could assume in the transition to urban smartness.

## 2 SMART CITY AND SMART TOURISM: WHAT IS CHANGING?

“Smart City” seems to be the new dimension towards where every city would like to go. From an urban planning point of view, it is not very clear what is the way to get this new dimension and what actually a “smart city” is. Nowadays, the questions very spread among cities are: how is it possible to become a smart city? Which are the strategic factors to drive the city towards this new dimension? How to promote urban smartness?

To answer these question, the way to drive the urban system towards this “new dimension” (the smartness) a renewal in the urban planning processes and in the present urban tools seems to be needed and reducing urban entropy should be the main target of urban planning (Fistola and La Rocca 2013).

Referring to the systemic approach, cities can be assumed as complex and dynamic systems (Bertuglia e Vaio, 1997) and to minimize their entropy production<sup>3</sup>, they must be properly addressed and governed during their development trends.

Cities affected by high levels of entropy cannot produce an appropriate potential of urban smartness nor support sustainable processes of urban planning. The emergent “smart city” paradigm seems to highlight that, from a town planner point of view, the actual challenge consists in making cities more efficient as

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<sup>3</sup> Entropy has to be considered as a widespread negative condition of the system, which hinders the positive processes to achieve sustainability and tends to move the system towards trajectories totally different from those expected. For more detail see Fistola R., La Rocca R. A. (2013), “Smart City Planning: a systemic approach”, in proceedings of: The 6th Knowledge City World Summit, Istanbul, September 2013 .

regards better quality of services, reduction of environmental impacts (polluting emissions), and control of energy consumption, by means of innovating technologies (ICTs) capable of supporting the management, monitoring and functioning of cities.

Smart City approach bases on the assumption that technology is part of the system and it is not an additional element in performing urban activities at different levels (economic, social and physical).

In this vision, an intelligent city is the one that, using technological innovation, spends less and in the best way without reducing the quality and quantity of services for citizens and firms. It is able to monitor the phenomena that occur, arise, develop, move and end inside it, because it is a sensitive city (Ratti 2011).

Indeed, definition and approaches to the Smart City have not yet reached a common vision and smart city seems to be more an urban label than an alternative approach to the urban themes (Holland 2008).

As stated by Giffinger et al. (2007), “the term is not used in a holistic way (...) but it is used for various aspects, which range from Smart City as an IT-district to a Smart City regarding the education (or smartness) of its inhabitants”.

Smart city definition		
Hardware centered definition	Emphasis on ITC infrastructures and apps	(Cairney and Speaks, 2000; Washburn and Sindhu 2010)
Social centered definition	Human Capital as core factor	(Partridge, 2004; Berry and Glaeser, 2005);
Technological capabilities and social innovation are combined each other	Smarter communities support the well-being of all citizens	Kanter, R. M., & Litow, S. S. (2009). Campbell, T. (2012), Beyond Smart City: How cities network, learn and innovate, Earthscan, NY.

Tab. 1 Table tries to synthesize the main typologies of smart city definition during the last decade in literature

Even though the combination between the technological component and the social one is coming to catch on, still now two different groups of interest can be identified in defining of the smart city: the industrial and the scientific one.

The first one has major interest in equipping the city by sensors; the second one should point out methods and techniques able for governing urban system (planners should be in this second group). Currently, contributions in literature are mainly oriented to define urban indicators to “measure” whether and how a city is “smart”.

Rarely contributions refer to a holistic vision of urban smartness, a partial vision applied per parts of the system (smart building, smart district, smart street, smart infrastructure, etc.) seems to prevail. On the contrary, a holistic vision should allow positive effects both by technologies and by social capital (Papa, Gargiulo e Galderisi 2013; Fistola 2013).

Indeed, more and more often the availability of a good level of human capital is considered as a factor of competitiveness and territorial capacity of attraction (Florida 2003).

The active role of the human factor (the anthropic system: the urban actors, residents, city users, tourists) is becoming increasingly important also because it can significantly affect the “destiny” of a city, for instance in terms of success or not of a tourist destination.

In this sense, tourism could represent one of the main fields where the real achievement of the possibilities given by the paradigm of smart cities can be tested. On the other hand, the competition among cities has to compare also with the ability that each city (at the administrative level) has in attracting tourist flows and

investments in order to improve the supply system (services and infrastructures), by supporting this via the employment of new technologies.

Big Data and Open Data revolution, if they were real, could represent an indisputable occasion to impose a rapid acceleration within the valuation and interpretation of urban phenomena.

However, they still seem far from being tools actually usable and available, at least in Italy and especially for the tourist sector.

While there are yet some difficulties in sharing data to manage tourism phenomenon in urban areas, the smart city paradigm has also encouraged the Smart Tourism Destination (STD).

Connected to the smart city, this new concept has not been so investigated as to get a shared definition (Buhalis 2014) but, as for the urban smartness, some emerging typologies can be identified as follow:

- apps “information-centered” where the main attention is focused on the number of application that tourist can utilize in visiting the chosen destination (QR codes, virtual guides, interactive maps, etc.);
- apps “tourist-centered” aimed at emphasizing “tourist experience” (Augmented Reality);
- apps “tourist-engaging” that allow tourists to have an active role as “urban sensor” in monitoring urban inefficiency regarding specific services or situation (social media, big data).

All the three typology highlight the leading role of technology, especially social and mobile, in the tourism sector referring to both the supply of specialized services and the ability of tourists to be involved in the urban life.

“Smart city” and “smart tourism” (tab. 2), then, are two strictly connected concepts, if we stress the technological component.

Nevertheless, the UNWTO Assistant Secretary-General, Geoffrey Lipman, introduced smart tourism concept in 2009, during the first Meeting of the UNWTO Tourism Resilience Committee. It was defined as “clean, green, ethical and quality at all levels of the service chain.

A type of tourism able to satisfy the needs for the short-term responses to the economic crisis as well as those one of long term as sustainable development, poverty alleviation and mitigation climate change”.

In the common sense, instead, as for the smart city, smart tourism refers to the use of technology applied to tourism, as already underlined before where preference is given to the number and maybe to the quality of apps available for the tourist use of the city.

On the contrary, smartness paradigm for tourism has to consider the temporary dimension of tourist that are not residents. It has to refer both to their behaviors and to their consumptions that have to be sustainable and restrained, in order that the urban system does not exceed his threshold of carrying capacity<sup>4</sup>, (fig. 1) falling down into the entropy zone (Fistola and La Rocca 2014).

Furthermore, as tourism is a complex activity, smartness applied to tourism has to consider also the supply component that is availability of services and efficiency of destination as a whole.

The spread of technologies like the Internet of Things (IoT), cloud computing, high performance information processing and intelligent data digging, surely has transformed the various sectors of tourism, but there is still a lack of coordination among the various sectors (for instance the public administrative level and private industry).

Tourist cities, still now, “suffer” from the excessive charge generated by tourist activity (Venice in Italy could be the most significant example) and on the side of management of this phenomenon.

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<sup>4</sup> Carrying capacity refers to the “the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and an unacceptable decrease in the quality of visitors’ satisfaction” (UNWTO 1981).

Smart tourist profile

- Cultured
- Connected
- Media expert
- Media equipped
- Informed
- Active
- Critic
- Demands high quality level of personalized services
- Shares sentiment and impression by social media
- Dynamical
- Contributes to create his personal tourist experience
- Utilizes the end-user devices in multiple modes
- Prosumer (promoter + consumer)
- Multisensory
- Real time connected
- Sustainability supporter
- Careful about energy consumptions
- Desire to be involved in local life
- More careful towards host population
- Sense of responsibility

Smart tourist city characteristics

Organizational level:

- coordinates all relevant information to make it accessible in real time;
- engage with local communities, tourists and government in cocreating tourism experience;
- Organizational agility, speed decision making and responsive to customers' needs based on just-in-time insights

Government level:

- Engagement in data openness process;
- assurance of data privacy;
- coordination among administrative levels;
- activation of public-private partnership;
- integration of tourism in governmental urban processes and tools;
- safeguard and promotion of heritage and culture;
- active involvement of residential and local population in promoting urban culture and .
- provide for network infrastructures;
- planning of sensor network and its feature;
- disposing of interoperable social platform;
- control of energy and resources consumptions
- balance between integrating information for the common good and protecting privacy
- capability of create sustainable solutions that reduce costs
- reduction of social conflicts

Tab. 2 Smart tourism and smart tourist city characteristics (re-elaborated from Buhalis et 2014 )

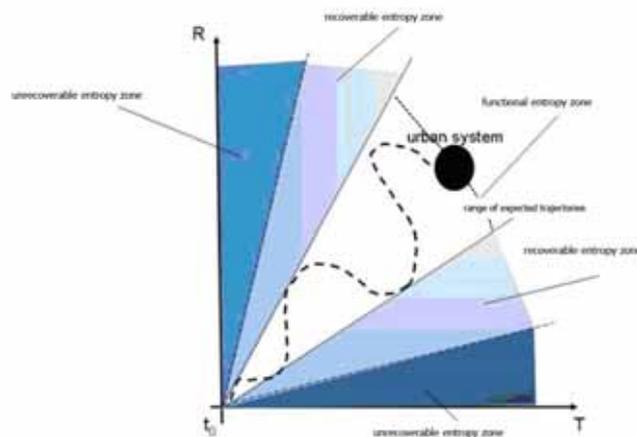


Fig. 1 The evolution trend of the urban system can be diverted by external forces (tourism uncontrolled load for instance) that could make it falling into entropy zone. The process of government of the urban system aim at maintaining it within the angular range of trajectories expected

Smart tourism, thus, concerns both demand and supply and has to consider tourist behaviors as well as private sector (tourist operators) and public administrators (decision makers).

Tourist demand has change faster than tourist supply especially as concern the administrative level. The Smart Tourist Destination should be the place where these three aspect will merge being supported by technology to both enrich tourist experiences and enhance cities competitiveness (Buhalis 2000 and 2014).

## 2 STATISTICAL DATA VS BIG DATA

The aim of this part is to underline that transition towards urban smartness also bases on availability of appropriate tools and methods. If this condition can be registered at theoretical level it is not enough applied at practical level, at least as it concern Italian situation and mainly the tourist sector.

The main difficulty in the pursuit of objectives aimed at managing the tourist activity in urban areas is the limited availability of data to "measure" the phenomenon in all its components (supply, demand, preferences, behaviors, spending, productivity, etc.). Available data are elaborated by national istitution (Istat, Chambers of Commerce, Banca Italia, Enit, Censis, ecc.).

In Italy, the main surveys on tourism are elaborated by ISTAT (National Statistics Institute) in conformity with the EU Regulation 692/2011 of the the European Parliament.

Reffering to survary site, Istat carries out two surveys on tourism:

- capacity of tourist accommodation establishments;
- occupancy of tourist accommodation establishments.

The first one collects each year, at municipality level, the number of establishments, bed places, bedrooms and bathrooms for hotels and similar accommodation (classified with stars from 5 to 1 or hotel-tourism residences) and the number of establishments and bed places for other collective accommodations (tourist camp-sites, holiday villages, farm houses, youth hostels, holiday dwellings, B&B, etc.).

The second one collects each month, at municipality level, data on arrivals and nights spent by residents and non-residents at tourist accommodation establishments, divided by category of hotels and similar accommodation, and by type of the other collective accommodation establishments. Data are broken down by country of residence in the case of non-residents, and by region of residence for Italian residents. Moreover, it also provides information to calculate the occupancy rates of bed places and bedrooms for hotels and similar accommodation.

In collecting data, Local Authorities play the role of Intermediate Bodies (Provinces or Regions or other Local Authorities responsible for tourism) according to the regional organizational structure, currently referred to three levels (regional, provincial and sub-provincial). In Italy, in fact, Regions have competence and administrative function in tourism sector since 2001 (Reform of Title V, Part 2, of the Constitution and Constitutional law of 18 October 2001 n. 3, Art. 117). Regional administrative organization can vary as they work in autonomy, so data collection, recording, processing, checking and transmission to Istat involve different entities. For these reasons, the process is very long in time and has a "variable geometry" pointing out a dispersive and heterogeneous situation both at administrative and technical level. The impact on disposability, utility and maybe on updating of tourism data is high.

In 2013, Italy endorsed the G8 Open Data<sup>5</sup> Charter and committed in starting action to activate open data availability for all citizen at all social level. At present, this availability is very different among Italian regions

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<sup>5</sup> Open data refers to both a philosophy and a practice consisting in the free accessibility to information without copyright or other restriction.

and does not contemplate tourist data. Thus, at least referring to tourism, the announced revolution by the Open Government Data Movement in Italy is late to come.

Nevertheless, nowadays, this is still the Italian framework of the official statistics in spite of large opportunities that the “Big Data” revolution seems to offer in moving from “data scarcity to data abundance that is the “data deluge” phenomenon (Heerschap et al. 2014). Big Data are changing radically and rapidly the statistical methods: phenomena are no more the object of the statistical studies needed to be understood by data support, they are “data producer” in the new dimension of the “real time”. From the initial difficulty in collecting data, the new challenge consist in the capability of processing and extract the desired information and converting them into useful information.

Tourism is not out of this revolution. Big data revolution comes from some milestones (Beinart 2014):

digital transaction, i.e. everybody's (resident, tourist, workers, city users, scholars, etc.) daily and usual actions can be tracked because they are associated with a digital apparatus (pc, tablet, smartphone, GPS, electronic card, etc.);

social media: i.e. everybody is on the net in real time sharing opinion each other's (Facebook; Tweeter; Google+, ecc.);

internet of people i.e. net of people sharing opinion on some experience, facilities or services (Tripadvisor, Trivago, Airbnb, Booking.com, etc.);

Internet of things i.e. our common daily use objects are connected each others and can be able to manage themselves.

Big Data refer to multiple contextualized transactions: not only information but context's description and impression. Residents, city users, tourists are “anthropic sensor” both sharing information in the functional space and describing a phenomenon in the physical space. In this sense, private ITCs operators are radically changing their role, becoming “holders” of customers' behaviors.

Researchers of the Collective Sensing associated to the Department of Geoinformatics - Z\_GIS and the Doctoral College GIScience at the University Salzburg, Austria elaborate methods combining traditional data with social data from (Vodafone and Tweeter) to elaborate information about tourist preferences (Beinart 2014). The experimentations refers to tourist flows in Italy during the period November-may 2013 (fig. 1). Elaborations allow to describe tourist preferences (i.e. where they prefer to go and visit, where they prefer to make shopping, how much long will they stay in a destination; if they will stay in more than one destination) and their characteristics (i.e. where they come from, transport chosen, etc.). Tweeter based statistics allow to elaborate a “sentiment analysis” consisting in associating to the tweet a *sentiment* expressed and shared in the net by the tourists during their visit. Models and application of massive new data developed by the group of research Collective Sensing aim at reconstructing the dynamics of complex systems and cities. In this sense, the Big Data challenge could support the decisional phase in the process of governing urban transformation, even if some alarms seem to come by the researchers in statistics and data elaborations. The arrival of Big Data presents new opportunities for official statistics, but also it needs some definition being yet an arbitrary concept for a rather heterogeneous set of new data and information sources coming from many different guises and having many different characteristics.

Some other Big Data application to define the characteristics of tourist demand and to use them in supporting the decisional phase in tourism planning refer to “semantic analysis”. This consists in classifying and interpreting some “no structured text ” (i.e. posts in Facebook, Tweeter and other social media) using technology to elaborate the information. Technology associate a mood to each post and valuate the level of positive or negative sensation expressed by tourist during his experience. This analysis allow to value tourist satisfaction while visiting a monument or taking a lunch or having a walk through the city by considering

their sentiment (enthusiasm, fear, security, expensive, and so on). In the Report on Italy tourist perception, edited in July 2014 by Sociometrica and Expert System using Cogito technology, authors examine about 600.000 post of foreign tourists visiting Italy from April to July 2014. The target of the study is to evaluate the level of perception of Italy trying to individuate the sensible areas where it is necessary to intervene to promote tourism. The analysis points out a positive global score for Italy (more than 70, setting 60 as the minimum threshold for the positive value) but also allows making consideration about the quality level of services. The Report confirm also the general opinion concerning the paradox between the high level of Italian historical heritage and the low capacity in promoting and protect it. (Pompei is perhaps the best-known example, but Agrigento or Paestum such as other archeological Italian areas that would need better planning in promoting their singularities). The innovative contribution of this analysis maybe consists in transforming from a passive to active the role of tourists and get information by their sensations.

The transition from “scarcity to abundance” of data while on one hand seem to offer the solution to the knowledge of complex phenomena acting inside the urban system; on the other hand calls for paying large attention in the interpretative phase such as in the phase of selecting information.

What really could be pointed out is the lack of being able to get these technologies inside the process of governing the urban system (Fistola e La Rocca 2013). The major challenge is not collecting the data from the internet, but converting them into useful tools to understand the complexity of urban phenomena like urban tourism.

### 3 THE ROLE OF TOURISM FOR THE SMART CITY: CONSIDERING ACTUAL CHALLENGES

The Smart City approach might necessarily consider potentialities committed to urban development and tourist promotion according to the physical, functional and social aspects of the urban system. Being a transversal activity, tourism is affected by economic conditions as well as by climatic ones.

Tourism paradox consists in being contextually development factor and element which produces negative effects on urban livability. The challenge that tourist cities have to face consists exactly in their ability to find a balance between promotion and safeguard of their (historical, cultural, architectural, territorial, environmental) resources. From a town planning point of view, this condition requires intervening through actions and policies targeted to the optimization of urban livability

The new way to share experiences and sensations that is radically changing the way of promoting tourist cities must necessarily be considered as part of urban strategies.

According smart city paradigm, tourism can play an active role in:

- promoting resources and attractiveness as system;
- implementing sustainable system of services and infrastructure (energy saving, soft mobility, slow food, etc..).

As stated before, Big Data revolution enables the achievement of the objectives identified in the first action. It may support the decision-making both in the drafting of the strategies to be pursued both in the identification of sensitive areas inside the urban system with priority of intervention in order to improve levels of enjoying city's attractions and to promote unknown urban sites.

The Travel Appeal Index, for instance, has been pointed out to value tourist attraction inside the city or referring to a specific structure. The target is double: benchmark among destinations, and strategy to solve weakness of destination (<http://www.travelappeal.com>). In this field, some scientific in-depth have been developed by the group of research DICAR - University of Cagliari, in South Italy, try to investigate the

opportunities of social media analysis and its georeferentiation in supporting urban planning especially referred to Sardinia territorial context.

Referring to the second group of objectives, it is necessary to point out urban policies able to reduce environmental impact generated by tourist activity, according to the Horizon 2020 indications.

Sustainability in tourist destinations and their monitoring is one of the main lines of action of European policies. The European Tourism Indicator System for Sustainable Management at Destination Level is one of the key initiatives to improve sustainable management of tourist destination. The System is composed by a toolkit, a database and a set of indicators intended to support planning of policies of management of a tourist destination. The indicators are part of an integrated approach to destination management that stresses the importance of collaboration, cooperation, on-going assessment, effective communication, and a holistic perspective (tab. 3). In the first pilot phase, about a hundred of tourist destinations have been interested (Belgium, Bulgaria, Estonia, Finland, Italy, Latvia, Ireland, Romania, Slovakia, Slovenia, Spain, Greece, Scotland, the Netherlands, Lithuania, Croatia, Sweden, UK, Portugal, Turkey ) it ended the last April; the second phase will be ended in the next December including also not UE destinations (Montenegro, Serbia, Albania).

Section of Indicators	Objectives for each indicator
Section A: Destination Management Core Indicators	Destination management Indicators emphasize important decision -making and communication issues that contribute to sustainable tourism management in the destination
Section B: Economic Value Core Indicators	Economic value indicators help track the contribution of tourism to economic sustainability in the destination.
Section C: Social and Cultural Impact Core Indicators	Social and cultural impact indicators focus on the effects of tourism on the residents and cultural heritage in the destination.
Section D: Environmental Impact Core Indicators	Environmental impact indicators focus on those elements that are critical to the sustainability of the natural environment of the destination.

Tab. 3 Core Indicators of the European Tourism Indicator System

Referred to a specific component of tourist supply, in 2011, the UNWTO has developed the Hotel Energy Solutions (HES) in collaboration with a team of United Nations and EU leading agencies in Tourism and Energy. The project is aimed at supporting Small and Medium Enterprises (SMEs) in the tourism and accommodation sector to increase their energy efficiency and renewable energy usage.

If these initiatives, on the one hand, show the commitment undertaken at Global and European level to reduce the impacts of the tourism sector on the environment; on the other hand, they invite some reflection about the need for coordination between different actors involved in promoting tourist development.

## CONCLUSION

This article has tried to put in evidence how tourism is becoming an urban phenomenon and in this sense, it should be integrated within the process of govern the urban system. The emerging paradigm of “Smart City” can be an opportunity to reconsider the current mechanisms of government and planning of the cities, but it needs a holistic approach that goes beyond the one applied *per parts* that still seems to prevail in the

declination of the components of urban smartness (economy, mobility, environment, people, living, governance). At present, the technological component seems to prevail, probably due to the ease of diffusion of the instruments, rather than an innovation of the processes. Tourist promotion initiatives seem to concentrate chiefly on the city branding, rather than on plans to make cities able to support an additional urban load expressed by the tourism demand.

Yet, potentialities of technologies are still weak in supporting the decision-making phase of the definition of appropriate plans of actions aimed at optimize the effect of an well-oriented and sustainable urban tourist development that could implement the “urban smartness”. The urban tourist dimension seems to be still considered as “other”, namely not integrated in the urban processes to drive the evolution trend of the urban system towards compatible states of development. Although tourism plays a major role in the management of cities as both instrument and outcome of policy (Ashworth and Page 2010), its planning and management is far to be considered as part of town planning objectives. What this article tries to underline, maybe in a critical vision that should be further investigated beyond this limited context, refers to the observation that neither the new emergent smart city paradigm has overtaken the partial vision that privilege the vision of tourism as economic activity. In this sense the smartness achievement remain closely relied to the capacity of promoting cities (its cultural heritage, its historical resource, its monuments, etc.) rather than to provide for adequate measures enabling the city to contain tourist fluxes according adequate town planning design.

Difficulties in availability of tourist data, even though open and big data era is already started, hamper any control on tourism phenomenon and its dimension in urban areas, especially referred to fluxes activated by occasional events or periods.

The characteristics of smart tourism destination that have been listed in the previous pages represent the attempt of individuating some “fields of application” that could permit to reach urban smartness for the whole system.

Present cities, besides, are expected to become megalopolises with millions of inhabitants and to govern the inevitable change of these large urban systems, it will be necessary to have more direct administrative powers. The coordination among local authorities, thus, will represent one of the core factors for finding solutions capable of coping with these urban dimensions. What stands out, maybe in hidden way yet, is the assertion of a society model that is more exigent about the procedures of the decision-makers. Nevertheless, such a social dimension should be ready to modify its lifestyles in order to reach “smart” livability. The transition to smart city, therefore, needs the integration between policy goals and common lifestyles. Furthermore, urban systems being in entropic states cannot develop urban smartness (Fistola La Rocca, 2013). This consideration should push to evaluate the copious number of initiatives labelled as “smart” that did not lead to any improvement of urban life.

A first attempt to define preconditions for the development of smart city could refer to the systemic approach considering city into three subsystems: physical, functional, and socio-anthropic. Each subsystem could contain structural elements that may allow the evolution of the urban system into smartness conditions (Fistola 2013).

Smart dimension necessarily involves a review of the processes for the governance of the urban system. Within this dimension, ITC technologies play a primary role that need to be supported, optimized, improved and integrated with urban process of government. In the transition toward the smartness, technology has to be adopted and not added up in the urban evolution process, this means that technologies have to be integrated into the development process towards the urban smartness, they have not to be intended as an

additional equipment (like detectors) to the physical system of the city. In this sense, technology is meant as one of the key-factor for the smart city.

By the use of ICTs technologies, residents, tourists and city-users can act a dynamic role in monitoring urban functioning permitting to reduce the lack of efficiency if properly integrated with decisional levels that should be well structured to adopt and elaborate information into action plan.

The concept of “smart city” has large potentialities: it is also a challenge for those cities living in structural levels of crisis. Academics, technicians, administrator must work hard not to let it be just a slogan. This could be a good starting point to reflect about smartness of present cities. But, further research is needed to expand the theoretical contributions of this research as well as to validate its findings.

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## IMAGE SOURCES

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## POLITICHE 'SMART' E VISIONE METROPOLITANA:

LA DIMENSIONE TERRITORIALE NELL'ESPERIENZA PROGETTUALE  
DELLA AMSTERDAM SMART CITY PLATFORM

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### ABSTRACT

The paper aims at presenting the main projects and policies recently developed by the Municipality of Amsterdam in the field of energy policies, with particular reference to the projects promoted in the context of the ASC - Amsterdam Smart City Platform. The analyzed projects and policies seem to be relevant for at least three aspects and for the matters raised by them:

I. for the aim to connect policies and projects of the Amsterdam Smart City with the definition of a territorial vision for the Amsterdam metropolitan area;

II. for the strong connection characterizing this experience between energy-management policies on the territory and the management's choices related to urban planning and urban design;

III. finally, the experience is relevant in relation with the consolidation of the ACS's platform as a place where several individuals are directly involved in the management of public services and where all requests and peculiarities contribute to define a common planning process on the energy and environmental fields of action in the metropolitan area. Based on the latest, most significant information of the activities performed by the Amsterdam Smart City Platform, the paper focuses on the results after four years since the projects and tests have been carried out, on the basis of a network structuring actions, energy-saving targets and space-related choices regarding the whole territory as well as ASC's policies.

### KEYWORDS:

Smart City Platform; Area Metropolitana; Energy Network; Dimensione Spaziale; Politiche Energetiche

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## “智能化”政策与都市愿景:

阿姆斯特丹智能化城市平台设计经验中的地域规模

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### 摘要

本文旨在阐述阿姆斯特丹市政府在能源政策方面最新推出的主要项目和政策，并特别提到被提升到“阿姆斯特丹智能化城市（Amsterdam Smart City，简称ASC）平台”经验内部的各项项目。所分析的这些项目和政策至少在三个不同的方面与由此引出的问题向我们呈现出其相关性：一、旨在把“阿姆斯特丹智能化城市”的政策和项目引回到阿姆斯特丹都市区建设的愿景构建上；二、在这一经验下，旨在在该区域的能源管理政策与由政府选择的空間规划、城市设计之间取得紧密的联系；三、最后，旨在巩固ASC平台，使其成为在公共财产管理方面不同主体直接参与和互动的地方，当中各方都有自己的需求和特色。本文通过重述“阿姆斯特丹智能化城市平台”活动的最新最重要的数据，从网络结构、预设的节能减排目标，以及对该区域内部和ASC政策本身的一些空间选择的固定的角度来反思三年来各项目和各试验的启动所取得的结果。

### 关键词

阿姆斯特丹智能化城市平台，智能化城市，  
能源网络·空间影响·都市愿景

## 1 LE POLITICHE DI GESTIONE DELL'ENERGIA NELLA CITTÀ DI AMSTERDAM: SIGNIFICATIVITÀ DEL CASO E PECULIARITÀ

La Municipalità di Amsterdam, l'Amsterdam Metropolitan Area e la piattaforma della Amsterdam Smart City (ASC) rappresentano un caso significativo di tre soggetti istituzionali impegnati nella costruzione di un progetto, di politiche e di una vision per il territorio in grado di coniugare lo sviluppo della regione urbana olandese con l'investimento in energie alternative e con le risposte alle domande di resilienza che la regione deve affrontare<sup>1</sup>.

I progetti che analizziamo, riconducibili alle attività della ASC Platform, ci appaiono rilevanti per almeno tre diversi aspetti e per le questioni che questi sollevano: I. per l'obiettivo di sviluppare le politiche e i progetti della Amsterdam Smart City alla costruzione di una visione territoriale per l'area metropolitana di Amsterdam; II. per il forte nesso fra le politiche di gestione dell'energia e le scelte di pianificazione spaziale e di disegno urbano, alle scale urbana e territoriale, compiute dall'Amministrazione; III. per l'intento di consolidare la piattaforma della ASC come il luogo dove diversi soggetti sono direttamente coinvolti nella gestione del bene pubblico, ciascuno con le proprie istanze e peculiarità<sup>2</sup>.

L'interpretazione qui proposta dell'esperienza dell'Amsterdam Smart City è volutamente selettiva e tematizzata rispetto alle tre questioni sopra richiamate. E' volta cioè a sottolineare alcuni aspetti che riteniamo cruciali ed innovativi di questa esperienza, mentre è solo in parte ricondotta a una letteratura e a un dibattito più ampi, ma spesso altrettanto imprecisati, sul tema delle smart cities. Le diverse esperienze di smart city (Amsterdam, Copenaghen, Barcellona ed Helsinki solo per citarne alcune) sono infatti riconducibili a programmi e obiettivi diversificati e a un concetto che si è rivelato 'strumentale', quindi differentemente declinato a seconda dei contesti e delle politiche ad esso associate<sup>3</sup>.

Le attività della ASC sono riconducibili, come vedremo, ad azioni e interventi di diversa natura: dal risparmio energetico nelle abitazioni alla definizione di spazi di condivisione lavorativa quali i coworking, dalla mobilità elettrica allo sviluppo di un'economia collaborativa e condivisa. Tutte le azioni ed i progetti contribuiscono al raggiungimento di un obiettivo comune e di una visione di lungo termine: la riduzione del 50% delle emissioni di CO<sub>2</sub> entro il 2025.

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Il presente contributo e la sua impostazione sono frutto di una riflessione congiunta dei due autori. Tuttavia la redazione delle parti 1, 2 e 4 è da attribuirsi a Giulia Fini; la redazione delle parti 3 e 5 a Salvatore Caschetto. La riflessione proposta è stata presentata in forma non definitiva e non aggiornata in occasione della XVI Conferenza Nazionale SIU, "Urbanistica per una diversa crescita. Aporie dello sviluppo, uscita dalla crisi e progetto del territorio contemporaneo", Napoli, 9-10 Maggio 2013, come frutto dell'attività di ricerca di entrambi gli autori.

<sup>1</sup> I soggetti istituzionali richiamati si caratterizzano per diverse scale di azione e per le attività che promuovono all'interno della regione di Amsterdam, oltre che per il differente ruolo dei soggetti pubblici e privati coinvolti. La Municipalità di Amsterdam presenta due livelli amministrativi: i quattordici distretti in cui il territorio si divide e il livello Municipale, «responsible for matters that extend beyond the boundaries of a single city district, or exceeds its power» (DRO, 2008: 12). La Metropoolregio Amsterdam comprende oltre alla città di Amsterdam, altre 36 Municipalità appartenenti alle province del North Holland e delle Flevoland. La Amsterdam Smart City, per la quale si rimanda alla Parte 3, si presenta come «a unique partnership between businesses, authorities, research institutions and the people of Amsterdam. Together, our goal is to develop the Amsterdam Metropolitan Area into a smart city» (AIM-ASC, 2006: 9).

<sup>2</sup> Si sottolinea come il tema delle reti tecniche sia spesso gestito in modo quasi unicamente settoriale, senza cogliere la dimensione 'fisica' e spaziale dei progetti delle reti, e come questa dimensione possa costituire uno spazio di confronto e coinvolgimento per i cittadini. L'articolazione dei progetti della ASC nei campi del *Living, Working, Mobility, Public Facilities* e *Open Data* sin dall'inizio della sua istituzione evidenzia invece come le politiche smart abbiano ricadute dirette nello spazio fisico della città (si veda al riguardo la Parte 3).

<sup>3</sup> Le esperienze richiamate declinano in modo diverso il concetto di 'smart city' riconducendolo a progetti legati al risparmio energetico (Amsterdam), alla mobilità sostenibile (Copenaghen), allo sviluppo di tecnologie ICT (Edimburgo), al miglioramento dei servizi e alla condivisione dei dati (Helsinki). Sul tema più ampio di progetti e politiche 'smart' si rimanda a Campbell (2012), Hatzeloffer *et al.* (2012), e per i diversi casi ai testi di Caschetto (2012) sul sito [www.smartinnovation.forumpa.it](http://www.smartinnovation.forumpa.it).

Rispetto all'obiettivo di coniugare lo sviluppo della regione e le risposte a nuove domande di resilienza è interessante sottolineare che la Municipalità olandese e la sua area metropolitana si pongano infatti tutt'ora l'obiettivo di accogliere nei prossimi decenni una crescita demografica ed economica consistente (DRO, 2011a: 6-7). All'interno dei documenti e dei piani più recenti<sup>4</sup>, l'area metropolitana di Amsterdam è presentata come il luogo all'interno della Randstad dove realizzare soluzioni innovative, secondo l'obiettivo istituzionale, per gli spazi dell'abitare, per il lavoro terziario e per la produzione, per gli spazi della logistica e dei trasporti. Una regione urbana all'interno del *Green and Blu Delta* caratterizzata da un'elevata connessione globale, pur senza perdere gli elementi di abitabilità e tutela delle risorse naturali che la caratterizzano.

Il territorio urbanizzato di Amsterdam e delle vicine Municipalità si trova infatti delimitato dalle aree protette rurali del Green Heart a sud, e da quelle delle Waterland e dal bacino del fiume IJ a nord. La necessità di coniugare le scelte della pianificazione con la protezione delle risorse naturali, e il rispetto per la conformazione di un territorio per larga parte sotto il livello del mare, hanno costituito la dimensione caratterizzante dello *spatial planning* olandese e della programmazione della Municipalità di Amsterdam in particolare. Nel corso degli ultimi venticinque anni sono invece state le presenze dell'aeroporto internazionale di Schiphol (con le aree riservate alle attività aeree e di logistica ad esso collegate) e del porto, ad aver ulteriormente determinato i confini e la direzione della crescita dell'urbanizzato della regione<sup>5</sup>. Inoltre, in tempi più recenti, questioni ambientali emergenti quali l'innalzamento delle maree e il cambiamento climatico, unite alla storica scarsità di suolo e alla conseguente competizione fra le attività, hanno spinto l'Amministrazione a rafforzare la collaborazione con le vicine Municipalità della *Metropoolregio Amsterdam*. Questa pianificazione di livello metropolitano riguarda la definizione delle poche nuove aree di sviluppo della regione (come gli interventi strategici di IJburg o quelli nel territorio di Almere), la riqualificazione dei tessuti esistenti, le possibili forme di crescita sostenibile del territorio, fino alla gestione delle risorse naturali e del risparmio energetico. Rispetto a queste politiche, e a questi obiettivi, è possibile individuare rapporti e sinergie fra i diversi enti istituzionali alla scala urbana e metropolitana e la piattaforma della Amsterdam Smart City, come nei paragrafi successivi illustreremo con riferimento sia alle principali aree tematiche di azione della ASC sia a specifici progetti e interventi.

## 2 UN APPROCCIO INTEGRATO PER LE POLITICHE SETTORIALI E GLI OBIETTIVI DI RISPARMIO ENERGETICO

Rispetto ai temi del risparmio energetico, e a come questi sin dalla loro definizione possano necessariamente dialogare con le scelte spaziali, il caso di Amsterdam è peculiare perché l'influente DRO - il *Physical Planning Department* della città - ha storicamente svolto un ruolo cruciale nell'interazione delle politiche settoriali, nella loro applicazione e nella definizione delle ricadute di quest'ultime sul territorio. Rispetto a queste stesse intersezioni, altre riflessioni di grande interesse potrebbero essere condotte indagando il rapporto fra le scelte spaziali della regione e le reti della mobilità, o ancora osservando le scelte di regolazione delle attività

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<sup>4</sup> Il riferimento principale è all'ultimo piano strutturale, *Structuurvisie Amsterdam 2040*, elaborato dal DRO (DRO, 2001a) e (DRO, 2001c): «Amsterdam continues to develop further as the core city of an internationally competitive and sustainable European metropolis (...) The area in question, with 2.2 million inhabitants at present and a projected 2.5 million in 2040, boasts the scale and diversity that are necessary to remain competitive internationally» (DRO, 2011a: 6-7).

<sup>5</sup> L'aeroporto internazionale di Schiphol è il quarto aeroporto in Europa per traffico merci e passeggeri. In confronto alla *catchment area* di un paese di dimensioni ridotte come i Paesi Bassi, ha un impatto fortissimo sul territorio circostante (Fini, 2010). Oltre agli spazi riservati alle attività aeree e allo stoccaggio delle merci ulteriori restrizioni sono determinate dai contorni del suono e dell'inquinamento dell'aeroporto.

commerciali nei tessuti urbani ed extraurbani, essendo l'attenzione alla dimensione fisica nella pianificazione territoriale un elemento caratterizzante questo specifico contesto.

All'interno della Municipalità è quindi il DRO a rimarcare la necessità di una transazione verso una 'post-fossil fuel era' all'interno di un contesto generalizzato di 'energy transition' della regione (DRO, 2011b: 26). L'obiettivo cui tendono le diverse azioni della Municipalità in tema di risparmio energetico è quello di una riduzione del consumo di energia e di emissioni di CO<sub>2</sub> in riferimento alla 'trias energetica' come principio guida per la politica di gestione dell'energia sul territorio (Fig.1) (Ivi; Covenant of Major, 2008).

Tra le implicazioni spaziali collegate a questi obiettivi il DRO sottolinea come sia la rete elettrica l'infrastruttura per la quale sono in corso i maggiori cambiamenti. Questi risultano determinati dalla crescita di strumenti di generazione di energia elettrica decentralizzati, dalla presenza di nuovi e differenziati sistemi di generazione (Fig.2), dall'avvento e dall'ascesa di mezzi di trasporto elettrico, e infine dall'aumento del settore delle applicazioni ITC.

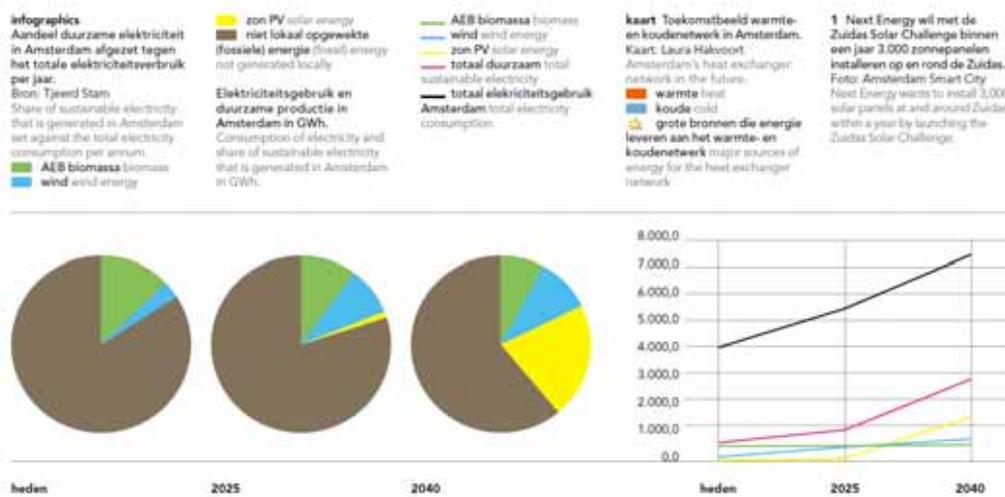


Fig. 1: Le quote di energia sostenibile generate ad Amsterdam sul totale del consumo di elettricità annuo e obiettivi al 2025 e 2050. Con il colore verde è indicata la produzione di energia tramite biomassa, con l'azzurro l'energia eolica, con il giallo l'energia solare.

Fonte: DRO, 2011b.



Fig. 2: Diverse realizzazioni di produzione di energia alternativa nel territorio della Municipalità. In senso orario: pannelli solari collocati sul tetto di un'abitazione privata ad Amsterdam East; un sistema di pannelli solari comunali realizzati a IJburg sull'edificio della Homeowners Association; un turbina a vento privata nel suburbio di Osdorp; pannelli solari sul tetto di una houseboat a Keizersgracht come sistema di approvvigionamento supplementare. Fonte: DRO, 2011b.

Il rapporto fra spazio e reti tecnologiche - che possono quindi propriamente essere considerate 'infrastrutture' nel senso più ampio del termine<sup>6</sup> (Fig.3) - è ulteriormente definito attraverso la collocazione di turbine per la produzione di energia alternativa; il disegno di nuovi quartieri quali IJ e Houthavens dove i temi energetici trovano definizione sin dalla fase iniziale del processo di pianificazione e disegno urbano (DRO, 2011b: 26) e attraverso i progetti che investono l'ambiente naturale e costruito a più livelli: il sottosuolo, il livello di superficie, il livello dei tetti e del cielo, il sistema della acque; la definizione di sistemi di stoccaggio sotterraneo di energia geotermica con la relativa 'underground physical planning policy'. Ci sembra quindi rilevante come sia nella dimensione comprensiva sia negli interventi specifici, le scelte relative al risparmio energetico siano gestite con un ruolo significativo del Department of Physical Planning della città: sottolineando con forza anche la dimensione fisica che queste scelte hanno e come queste possano concretamente contribuire al disegno dello spazio urbano e delle politiche di pianificazione territoriale.

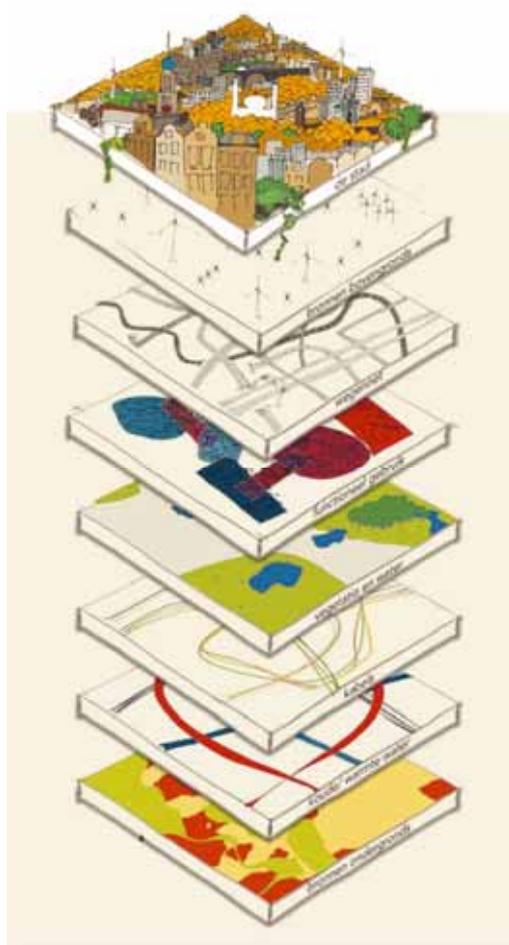


Fig. 3: Le infrastrutture e le reti tecniche della città in una rappresentazione schematica per layers. Si riconoscono le fonti di acqua sotterranea; le reti di distribuzione dell'acqua, dell'energia e le reti tecnologiche, gli spazi funzionali e i servizi; la rete stradale; le fonti fuori terra; infine sull'ultimo layer il costruito. Fonte: DRO, 2011b.

<sup>6</sup> Il richiamo a una concettualizzazione ricca di significati del ruolo delle infrastrutture e a un loro progetto più articolato è, tra gli altri, presente in Viganò (a cura di, 2001: 118-120) e in Gabellini: le infrastrutture «costituiscono l'indispensabile supporto delle relazioni e degli scambi (...) a cui è affidata la possibilità di rompere isolamenti e diffondere effetti positivi» (2010: 68).

### 3 L'AMSTERDAM SMART CITY PLATFORM: CARATTERISTICHE DELLA PIATTAFORMA E PRINCIPALI AMBITI DI INTERVENTO

Il raggiungimento degli obiettivi in campo energetico delineati sinteticamente nel paragrafo precedente e l'approccio che caratterizza il DRO di 'integrazione' fra le diverse politiche settoriali trovano nei progetti della Amsterdam Smart City Platform realizzazioni concrete.

La piattaforma è definita come una 'partnership' tra soggetti privati, università ed enti pubblici e la cittadinanza. Rappresenta il campo d'interazione e sperimentazione privilegiato per lo sviluppo dell'area metropolitana di Amsterdam verso una Smart City, attraverso azioni, progetti e politiche che contribuiscono a raggiungere la sostenibilità urbana indicata nella strategia Europa 2020<sup>7</sup>. I progetti della ASC ci appaiono innovativi non solo perché si legano strettamente alle scelte di pianificazione urbana e di sviluppo economico compiute dalla Municipalità, ma anche perché sono perseguiti e si consolidano attraverso il coinvolgimento attivo di un numero ampio di soggetti; si considera inoltre interessante la gestione della piattaforma, che avviene attraverso una Public-Private-Partnership, condizione che accomuna numerose esperienze legate al tema smart city. Gli attori che compongono il processo della ASC costruiscono una visione integrata di più competenze, alla base di progettualità complesse legate ai diversi interventi che saranno descritti di seguito<sup>8</sup>. La nostra tesi è che l'esperienza della ASC - composta da una piattaforma come luogo di confronto e da progettualità puntuali realizzate sul territorio - contribuisca direttamente alla definizione di pratiche di produzione sociale dello spazio pubblico e alla valorizzazione dei beni comuni primari (in questo caso la gestione delle risorse energetiche). Andando oltre la sua dimensione tecnica, ma per le implicazioni e per la capacità di attivare soggetti ed interessi, contribuisce inoltre alla costruzione di prefigurazioni progettuali e visioni per il futuro di questo territorio (Fig.4).

La piattaforma, inaugurata nel 2009, si compone oggi di circa 70 soggetti differenti. Costituisce un acceleratore per la promozione di progetti pilota, con l'obiettivo di replicare le iniziative e i progetti su tutta l'area metropolitana. In questo caso il concetto di "scaling up" rappresenta un obiettivo di sostenibilità ed economico. Attraverso le partnership istituite per la realizzazione dei progetti, e ai soggetti privati che prendono parte alla piattaforma, è garantito un ritorno economico dell'investimento iniziale e la diffusione della buona pratica e/o del progetto sul territorio.

Un altro elemento divenuto necessario per i progetti legati al tema delle smart city, è la misurazione dei risultati raggiunti. Per questa ragione, vengono costantemente monitorati i processi, i risultati e la fattibilità economico-finanziaria dei progetti promossi dalla piattaforma ASC.

A partire dalla sua fondazione il principale soggetto promotore della ASC è stato l'AIM - Amsterdam Innovation Motor, un ente esterno alla Municipalità che ha l'obiettivo di coordinare la strategia generale della Amsterdam Smart City. A questo si affiancano i partner principali quali Liander, prima società fornitrice di energia dei Paesi Bassi; KPN, azienda produttrice di servizi internet e fibra ottica; la Municipalità di Amsterdam e il TNO, istituto di ricerca indipendente chiamato a dare il suo contributo per rafforzare il valore scientifico dei risultati previsti, in termini di riduzione di CO<sub>2</sub> per progetto sperimentato.

Le diverse azioni e progetti della vision di ASC sono suddivisi in otto macro ambiti di intervento di cui si introducono sinteticamente gli obiettivi. Questi ambiti costituiscono un'evoluzione rispetto alle iniziali aree di intervento in cui la Piattaforma ASC si articolava (*Living, Working, Mobility, Public Facilities* e in seguito *Open Data*) segnando il consolidamento e al contempo un'articolazione dei progetti:

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<sup>7</sup> Per approfondire la strategia decennale "Europa 2020" si rimanda al sito dell'Unione Europea: [http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/index\\_it.htm](http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/index_it.htm)

<sup>8</sup> Per una descrizione dei numerosi progetti afferenti alla ASC si rimanda alla documentazione presente sul sito della piattaforma ([www.amsterdamsmartcity.com](http://www.amsterdamsmartcity.com)) e alla pubblicazione *Smart stories* pubblicata nel 2011.

*Smart Living*: secondo gli studi condotti, un terzo delle emissioni di CO<sub>2</sub> della regione sono provocate dalle abitazioni private. Introdurre nuove tecnologie, ma soprattutto rafforzare la consapevolezza tra i cittadini della propria impronta in termini di consumo energetico in base alle proprie attività e all'uso di dispositivi, è indicato come uno strumento significativo in termini di riduzione delle emissioni;

*Smart society*: la piattaforma svolge un ruolo essenziale nel coinvolgimento degli abitanti della Municipalità di Amsterdam e delle aree limitrofe, attraverso informazioni sui processi, sui progetti e con strumenti di formazione. Oltre allo sviluppo dei processi di partecipazione, la piattaforma promuove in senso più ampio lo scambio e il rafforzamento dell'interazione sociale tra le persone. In questo campo di applicazione specifico il ruolo della piattaforma è quindi di quello di promuovere forme di attivazione sociale nelle aree definite, in accompagnamento alle altre azioni;

*Infrastructures*: la mobilità rappresenta per Amsterdam un terzo delle emissioni di CO<sub>2</sub>. Per questa ragione si stanno avviando progetti di gestione delle aree con maggiore congestione, di uso di mezzi alternativi in città, di punti di ricarica elettrica per permettere una maggiore facilità nell'usare i mezzi elettrici e/o ibridi quali autovetture, scooter e battelli. In aggiunta ai progetti legati alle infrastrutture della mobilità rientrano in questa area anche i progetti di altre reti, quali la *smart grid* nel distretto di New-West, le reti Wifi, le fibre ottiche;

*Smart Economy*: le azioni dedicate alla Smart Economy sono relazionate al potenziamento della regione di Amsterdam come territorio attrattivo e competitivo a livello internazionale, contribuendo ai processi di innovazione, imprenditorialità, produttività e agli scambi internazionali già in corso;

*Smart Areas*: questa strategia sviluppa un approccio comune per lo sviluppo di più progetti all'interno della stessa area, individuando le opportunità e relazioni fra interventi prossimi. Essendo la Municipalità è il principale partner della vision della Amsterdam Smart City, con l'obiettivo prioritario di diventare una municipalità *climate neutral* entro il 2025, numerosi progetti tesi a ridurre il consumo di energia sono stati previsti per attrezzature e servizi, quali scuole, ospedali, centri sportivi, biblioteche e strade, attraverso un approccio condiviso e replicabile nei diversi interventi.

*Big & Open Data*: Amsterdam, come altre numerose città, ha pubblicato i propri dati con due obiettivi principali: anzitutto per rendere i dati della pubblica amministrazione quanto più possibile trasparenti e accessibili ai cittadini, come secondo elemento per agevolare lo sviluppo da parte di operatori o cittadini di applicativi e piattaforme potenzialmente utili per lo sviluppo delle tecnologie urbane. Le azioni della ASC si muovono rafforzando questa direzione: "data fuels the information society. Publicly-available data that can be used and combined to provide Amsterdammers with new insights and the chance to make decisions based upon actual facts and figures" (sito web della ASC, sezione 'Projects')<sup>9</sup>;

*Living Labs*: i Living Lab costituiscono un'esperienza peculiare della ASC: aree dedicate alla conoscenza e alla prova dei dispositivi, delle nuove tecnologie e dei servizi della piattaforma, sia da parte dei cittadini che delle imprese. Sono proprio l'intervento di IJburg e i distretti di Nieuw-Ovest e Zuidoost, di seguito presentati, che sono stati individuati come 'living labs' luoghi dove sperimentare e creare le maggiori sinergie fra un numero ampio di progetti.

Le otto macro famiglie, pur rappresentando la complessità di interventi e di azioni che si sta sviluppando nella città, convergono in un unico obiettivo comune: la riduzione attraverso diversi campi delle emissioni di CO<sub>2</sub> e la consapevolezza dell'energia utilizzata o risparmiata.

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<sup>9</sup> Una spiegazione dettagliata dei dati disponibili, e su che cosa si intenda per 'Open Data' è presente sul sito web della ASC. Sono Open Data i dati pubblici, non soggetti a copyright o a diritti di terze parti, finanziati da fondi pubblici e secondo uno standard o formato aperto, che non presentano restrizioni d'uso o consultazione, un altro aspetto molto sensibile: "these preferably meet 'open standards' (no restrictions regarding use by ICT users or ICT providers) and are preferably computer readable so that search engines can find information in documents" (sito web della ASC, Sezione 'Projects').

Le sperimentazioni dei numerosi progetti, sia puntuali sia areali, della piattaforma ASC sono strettamente connesse con l'intera area metropolitana di Amsterdam che risulta quindi essere un laboratorio urbano dove poter testare i progetti con cui ridurre le emissioni di carbonio: non in modo astratto o teorico, ma attraverso progetti ideati a partire dall'ambiente, e rafforzati nella loro concezione e sviluppo dalle pratiche degli abitanti. Alla scala dell'area metropolitana, i tipi di spazi ricorrenti dove sono attualmente compiute le sperimentazioni riguardano i parcheggi dei centri sportivi, le aree dedicate allo shopping, l'illuminazione delle aree comuni, il vasto campo delle leggi e delle regolamentazioni di questi spazi, le reti di connessione internet e la definizione degli ambienti di lavoro.



Fig. 4: Alcuni dei progetti promossi dalla ASC. In senso orario: il progetto 'Energy Management Haarlem' teso a favorire la consapevolezza degli abitanti dei propri consumi energetici; una realizzazione del progetto 'Ship to grid' nel porto di Amsterdam. In basso, momenti di discussione collettiva degli attori e partecipazione degli abitanti ai progetti della Platform: gli esercenti della Utrechtsestraat, nel centro di Amsterdam, per il progetto 'Klimaatstraat' e un momento di partecipazione degli abitanti all'interno del quartiere New West per il progetto 'Geuzenveld - Sustainable Neighborhood'. Fonti: AIM - ASC (2011) e Sito web istituzionale della ASC.

#### 4 LE SVOLTE PIÙ RECENTI DELLA ASC: LA DEFINIZIONE DI TRE MACRO AREE DI SPERIMENTAZIONE E L'ALLARGAMENTO ALLA DIMENSIONE METROPOLITANA

Nel corso degli ultimi due anni sono stati compiuti dalla Piattaforma ASC alcuni cambiamenti importanti relativamente al numero di progetti seguiti e alla loro collocazione, insieme al rafforzamento del ruolo di tre aree specifiche di intervento. Seguendo lo sviluppo delle sperimentazioni, i progetti della ASC non sono più solamente collocati all'interno dei confini municipali di Amsterdam, ma nella più vasta area metropolitana: la piattaforma si è infatti ampliata ad alcuni interventi nelle Municipalità di Aarlem (con il progetto *Watt for Watt*) e di Almere (con i progetti *Almere Smart Society* e *Health Lab*)<sup>10</sup> che costituiscono parti dell'area

<sup>10</sup> *Watt for Watt* si compone di una serie di progetti alla scala del quartiere per aumentare l'efficienza energetica delle abitazioni e la consapevolezza dei residenti. *Almere Smart Society* «is a vision of living and working in Almere, in all its facets supported by ICT and technology». L'Health-Lab si caratterizza per una collaborazione «between companies, government, care and research institutes to stimulate ICT & Care developments». Le citazioni sono prese dal sito della piattaforma ASC ([www.amsterdamsmartcity.com](http://www.amsterdamsmartcity.com), Sezione 'Progetti').

metropolitana nelle quali il rapporto con il cuore della conurbazione è forte. I progetti della ASC sono pertanto riconducibili ad una visione più ampia, che dai confini della città passa ad una dimensione metropolitana. Il concetto di 'Scaling up' dei progetti sul territorio rappresenta inoltre un'opportunità per allargare il campo di azione, direttamente collegato agli obiettivi di riduzione delle emissioni di CO<sub>2</sub>.

Parallelamente a questo ampliamento le tre aree del Nieuw West, di Zuidoost e di IJburg sono divenute le aree di sperimentazione più innovativa ed estensiva dei progetti, più recentemente ricondotte al concetto di *Living Labs* (Fig. 5): «Amsterdam Smart City has established the Amsterdam Metropolitan Area as an 'urban living lab' that allows businesses the potential to both test and demonstrate innovative products and services. Three areas in the Amsterdam Metropolitan region *play a significant role*» (Sito web della ASC, Section 'Three areas'). E' attraverso questo allargamento compiuto dalla Piattaforma che sono stati rafforzati il confronto con le scelte di spatial planning della città e il ruolo che la Piattaforma ricopre nella costruzione di una vision metropolitana a cui ricondurre i singoli progetti. Le tre zone rappresentano infatti luoghi importanti per l'intera regione, sebbene per motivi diversi: aree di 'cerniera' fra la città e il territorio circostanze o al centro delle strategie spaziali e dei progetti di trasformazione della città. Stilizzandone i caratteri, si tratta di un nuovo intervento (l'area di IJburg), di un quartiere prevalentemente residenziale realizzato fra gli anni 50' e 60' (il Nieuw West) e di un distretto con importanti funzioni commerciali, terziarie e di intrattenimento realizzato a partire dagli anni '90 (Zuidoost). Sebbene Nieuw West, Zuidoost e IJburg presentino caratteri spaziali e morfologici molto diversi, tutti i progetti della ASC mirano a rileggere in chiave sostenibile i tre insediamenti, testando progetti e sollevando risposte differenziate.

Nel distretto Zuidoost l'obiettivo è ridurre l'impronta ecologica dell'area compresa fra lo stadio Arena e l'ospedale AMC, con l'obiettivo di ridurre le emissioni come parte del progetto europeo 'Transform'. Due importanti strumenti sono sperimentati in quest'area. Il primo è la *Zuid Oost - Laws and regulations free zone*: una zona laboratorio, libera da regolazioni e vincoli di legge validi invece sul resto del territorio, dove le soluzioni innovative possono essere applicate: "It is important that regulation does not limit innovation. Therefore Amsterdam smart City puts effort in realizing a freezone for sustainability: a district where innovation can really be tested, with the smallest limitations by rules and regulation. Why? Technology changes fast, sometimes faster than the context it operates in" (sito web della piattaforma ASC, Sezione 'Progetti'). Il secondo strumento è costituito dal progetto *Stakeholders in the drivers seat*, che ha previsto l'inventariazione dei bisogni e delle idee degli stakeholders già presenti (molto numerosi, considerando i caratteri dell'area); la creazione di una Energy Service Company per il distretto; il supporto dei workshops coordinati dal Service Design Thinking, tesi a favorire lo sviluppo di nuovi progetti, l'interazione e il disegno dei nuovi spazi<sup>11</sup>. Una potenzialità importante dell'area Zuidoost è costituita dalla possibilità di raggiungere con i progetti sperimentati centinaia di persone, come gli utilizzatori della stazione di Arena-Bijlmer, i lavoratori e i pendolari dell'area, i residenti e i numerosi visitatori delle attività commerciali e di intrattenimento (AIM-ASC, 2011). Per la Municipalità: «la presenza di uffici vacanti, dei datacenters, del grande ospedale e l'abbondanza di tetti piani sono una promessa per l'area di diventare un *energy production landscape*» (Sito web della ASC, 'Section Zuidoost', descrizione del progetto specifico). Oltre agli interventi da testare sui singoli edifici, è quindi il progetto dello spazio in-between a diventare l'infrastruttura per un nuovo progetto sostenibile e al contempo occasione per un ripensamento complessivo dell'area.

Il distretto del New West pone invece condizioni differenti. Caratterizzato da una solida rappresentanza demografica e da un mix di edifici residenziali ed uffici, è una zona con un consumo di energia superiore alla

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<sup>11</sup> Tra le iniziative preliminari promosse dai Service Design workshop vi sono l'utilizzo del calore prodotto dal Data Center e dall'ospedale; un sistema di gestione del traffico nei momenti di punta; l'utilizzo di energia solare a livello distrettuale; investimenti nello spazio pubblico con la collocazione di display e wi-fi, etc. Per una lista completa dei progetti schedati si rimanda al sito della Piattaforma ASC.

media della città, per le tecnologie edilizie e tecniche in parte datate con cui sono stati realizzati gli edifici. Il quartiere è la prima aerea in tutti i Paesi Bassi in cui è stata realizzata la nuova *Smart Grid* di Alliander, che delle 40.000 famiglie residenti ne serve 15.000 (Fig. 6). Si tratta di una 'rete elettrica intelligente', contenente computer e sensori aggiuntivi, con l'obiettivo di fornire funzioni di monitoraggio e controllo più accurate rispetto agli usi degli abitanti del quartiere e ai loro bisogni.

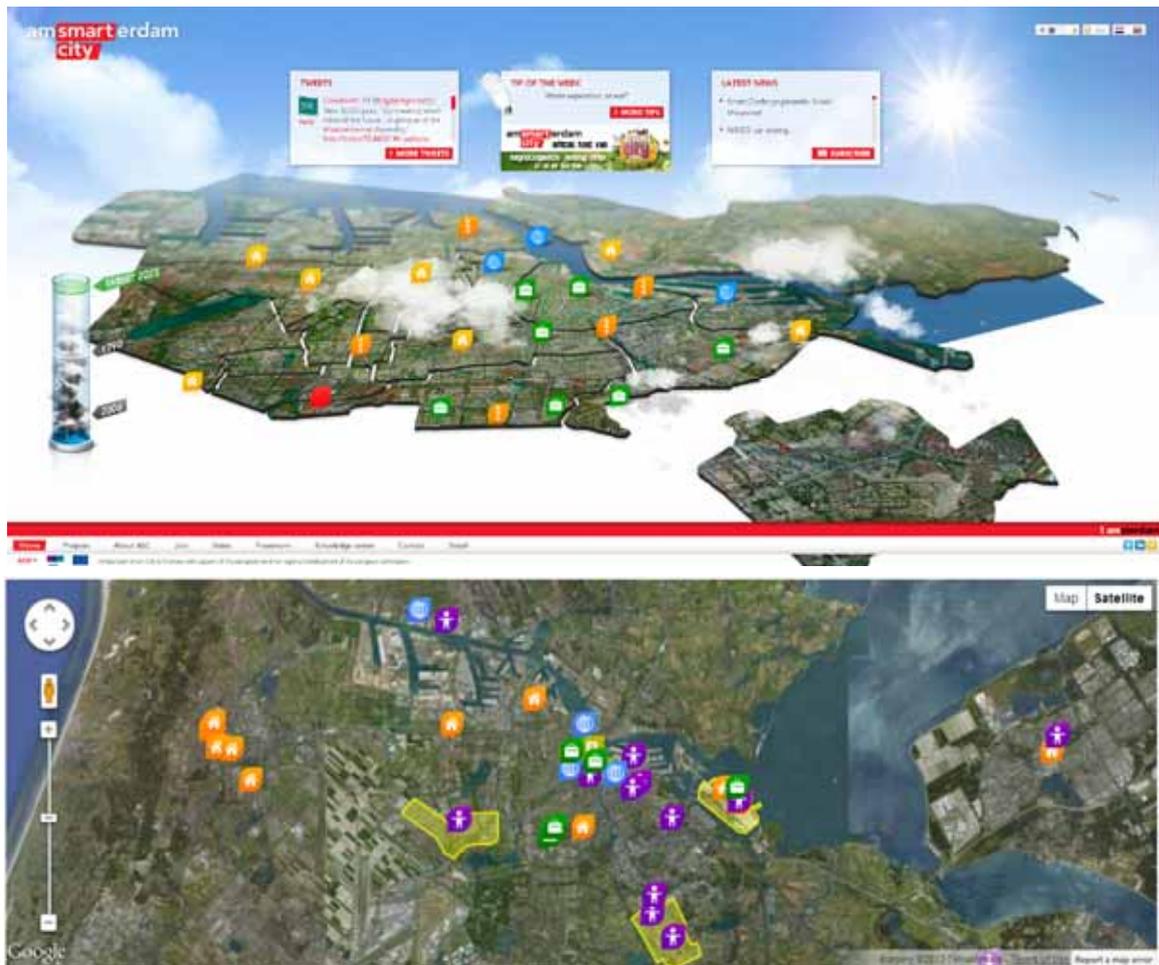


Fig.5: La presentazione dell'area su cui si applicava la Piattaforma di Amsterdam Smart City e i relativi progetti all'inizio della sua attività (in alto) e l'estensione del territorio attuale con la collocazione dei nuovi progetti. Si nota l'individuazione delle tre aree specifiche, con il colore giallo, e l'allargamento all'area metropolitana verso Aarleem e Almere.

Fonti: AIM - ASC (2011) e Sito web istituzionale della ASC

Un ulteriore progetto testato nel New West è il *Geuzenveld - Sustainable Neighborhood*. Più di cinquecento abitazioni sono state dotate di contatori intelligenti e di display informativi aggiuntivi, che consentono ai residenti di diventare più consapevoli del proprio consumo energetico, rispetto agli usi, ai dispositivi e agli apparecchi casalinghi utilizzati. In questa area gli obiettivi del risparmio energetico si concretizzano quindi nella fornitura di una rete innovativa, in azioni puntuali ma estensive realizzate nei singoli edifici e si misurano al contempo con il tema della gestione collettiva dell'infrastruttura come elemento che può contribuire al rafforzamento della comunità e alla gestione consapevole del bene pubblico.

Infine IJburg - quartiere di nuova realizzazione costruito su un'isola artificiale all'interno del bacino del fiume IJ e collegato attraverso un ponte al resto della città - che costituisce l'intervento residenziale di maggiori dimensioni promosso dalla Municipalità negli ultimi dieci anni. In quest'area i progetti della ASC si innestano

su un tessuto urbano in cui i principi per la costruzione degli edifici e per la definizione degli spazi pubblici si dichiarano sostenibili. ASC promuove la dotazione in tutto il quartiere di una connessione internet pubblica, in fibra ottica a banda larga. Per la Municipalità «IJburg è un'area di straordinario interesse per lo sviluppo di nuovi prodotti e servizi: una popolazione giovane e attiva, un alto livello di connettività e un ambiente moderno circostante». Amsterdam Smart City insieme con i residenti di IJburg promuove lo sviluppo di nuovi prodotti e servizi tesi a migliorare la qualità della vita dei giovani abitanti in settori che comprendono il trasporto, il lavoro, la fornitura di energia e le connessioni internet. Tra i progetti realizzati gli *SmartWork@IJburg* (spazi per il lavoro, ad alta connettività ed attrezzati, tesi a favorire il telelavoro e a diminuire gli spostamenti pendolari con mezzi privati, Fig. 7) e *IJburg: YOU decide!* una piattaforma di partecipazione attiva per i progetti sostenibili di IJburg.



Fig. 6 Il progetto della 'Smart Grid' di Alliander realizzata nel quartiere New West: schema generale e assonometria della rete intelligente. Fonte: Sito web istituzionale della ASC.



Fig.7 Alcuni degli spazi per il lavoro ad alta connettività ed attrezzati, parte del progetto 'SmartWork@IJburg', all'interno del quartiere residenziale IJburg, tesi a favorire forme di telelavoro e a diminuire gli spostamenti pendolari con mezzi privati da/verso Amsterdam. Fonti: AIM - ASC (2011) e Sito web istituzionale della ASC.

## 5 I RISULTATI RAGGIUNTI DALLA ASC PLATFORM E CONCLUSIONI

I progetti della Amsterdam Smart City e le più ampie politiche energetiche promosse dalla Municipalità di Amsterdam, permettono di riflettere in modo integrato sulle questioni legate alla transazione energetica che devono affrontare i contesti urbani. Le conclusioni che l'esperienza solleva sono di due ordini differenti: le prime riguardano i risultati tecnici raggiunti nei termini del risparmio energetico e della promozione di energie alternative; le seconde l'interpretazione che dell'esperienza può essere data, rispetto alle questioni sollevate in apertura del contributo (cfr. la Parte 1).

Rispetto al primo ordine di interrogativi, quali sono ad oggi i risultati raggiunti dalla piattaforma? I dati forniti dalla ASC, aggiornati al 2011 (momento della prima condivisione dei risultati raggiunti) sono incoraggianti,

pur cogliendo il carattere *in fieri* della strategia di Amsterdam Smart City. L'ambizione della città è quella di ridurre del 50% le emissioni entro il 2025: un obiettivo che costituisce il riferimento a cui i diversi progetti devono tendere. Nell'aprile 2011 i 32 progetti sperimentali parte delle cinque aree tematiche originali, avevano prodotto una riduzione delle emissioni dello 0.9% annui rispetto al totale. La previsione dello *scaling up*, ovvero dell'applicazione dei progetti a tutta l'area metropolitana di Amsterdam (già in corso) prevede una riduzione di 171 kton di CO<sub>2</sub> annui pari al 7% del totale (AIM-ASC, 2011: 143). Da questi primi esiti, risulta come la strategia attuata dalla piattaforma sia un segno tangibile verso la sperimentazione di politiche energetiche e di scelte di pianificazione che incidano sul modo di vivere la città, attraverso la sensibilizzazione nell'uso efficiente delle risorse energetiche.

Con queste prospettive, la possibilità di replicare i progetti puntuali e le azioni su larga scala costituisce l'elemento indispensabile per avere una capillare diffusione della strategia generale e raggiungere risultati significativi. Su questo aspetto, la Municipalità sta puntando in modo particolare anche grazie alla piattaforma online ([www.amsterdamsmartcity.com](http://www.amsterdamsmartcity.com)), che favorisce la comunicazione e lo scambio di informazioni sia all'interno dei singoli progetti sia fra le diverse esperienze. In questa fase risulta infatti indispensabile informare i cittadini in merito ai progetti in corso, agli obiettivi da raggiungere e al network dei soggetti sperimentatori. Questo processo può potenzialmente produrre un consenso ed una maggiore consapevolezza diffusa, mentre la presentazione collettiva dei numerosi progetti in corso e dei loro esiti contribuisce ad attirare cittadini, enti, imprese pubbliche o private interessati alla sperimentazione<sup>12</sup>.

Se i risultati raggiunti dalla Amsterdam Smart City sono ancora in evoluzione dal punto di vista del risparmio energetico, rispetto all'interpretazione avanzata all'inizio del contributo riteniamo che questa esperienza ponga importanti apporti di riflessione ed alcuni elementi innovativi. Le progettualità che oggi popolano la strategia della ASC nel suo insieme, non sono tutte considerabili come interventi strategici di tipo risolutivo e al contempo emergono nella piattaforma anche elementi di marketing territoriale che hanno l'obiettivo di incentivare investimenti privati e consolidare opportunità di finanziamento europee, tuttavia l'esperienza della ASC è considerata significativa in Europa, fra esperienze simili, grazie al consolidamento di una piattaforma che funge da facilitatore di processi di gestione tra diversi attori.

In aggiunta a questi elementi più generali, l'esperienza della Amsterdam Smart City permette di riflettere appieno non sul senso dei progetti legati all'energia in modo settoriale, ma piuttosto sulla dimensione integrata che un progetto sostenibile e resiliente deve avere e può contribuire a creare. Il caso mostra con forza come il progetto dell'infrastruttura energetica - apparentemente solo tecnica - possa diventare progetto per la collettività, attraverso l'interazione con un numero ampio e differenziato di soggetti, (cfr. le Parti 2 e 3); sottolinea la necessità di costruire e condividere anche rispetto ai temi energetici una strategia collettiva proiettata verso il futuro (cfr. la Parte 3) e mostra come questi progetti possano contribuire alla costruzione di una visione territoriale per l'area metropolitana e al disegno di nuove parti della regione urbana (cfr. la Parte 4).

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<sup>12</sup> La schedatura di tutti i progetti sperimentati, la spiegazione per ciascuno di essi dei soggetti coinvolti e delle diverse quote di coinvolgimento degli attori pubblici o privati, accompagnati da una grafica chiara ed intuitiva, sono elementi importanti che contribuiscono a mettere in valore le singole attività, favorendo la conoscenza, il confronto e le nuove adesioni.

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United Nations Environment Programme | [www.unep.org](http://www.unep.org)

UN-Habitat, the United Nations programme for a Better Urban Future | [www.unhabitat.org](http://www.unhabitat.org)

## IMAGE SOURCES

Figg. 1, 2, 3: DROb [Dienst Ruimtelijke Ordening, Gemeente Amsterdam] (2011), "New energy for Amsterdam. Shift in the energy landscape", *Planning Amsterdam*, no.4, Amsterdam.

Figg. 4, 5, 7: AIM - Amsterdam Innovator Motor, ASC - Amsterdam Smart City Platform (2011), *Smart stories*, Amsterdam.

Fig. 6: Amsterdam Smart City, sito web istituzionale della piattaforma ASC | [www.amsterdamsmartcity.com](http://www.amsterdamsmartcity.com)

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Giulia Fini, architetto (2006, Università IUAV di Venezia), PhD. (2010, Politecnico di Milano), insegna presso il Master in Urban Planning and Policy Design della Scuola di Architettura e Società del Politecnico di Milano, dopo esperienze di collaborazione in diverse Università e workshop internazionali. E' dal 2011 editor in chief di *Planum. The Journal of Urbanism* | [www.planum.net](http://www.planum.net) e dal 2013 è tutor dei corsi di dottorato del Dipartimento di Architettura e Studi Urbani del Politecnico di Milano. E' stata assegnista di ricerca dal 2010 al 2014 presso il DASTU - Dipartimento di Architettura e Studi Urbani del Politecnico di Milano e ha sviluppato negli anni diverse collaborazioni professionali. I suoi interessi di ricerca si concentrano intorno alla dimensione spaziale del progetto urbanistico, con particolare interesse verso le aree periurbane, le aree di frangia e le polarità periferiche specializzate. Svolge inoltre ricerca sulla tradizione italiana del progetto urbanistico attraverso importanti figure di riferimento.

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Salvatore Caschetto collabora dal 2014 con l'Assessorato Politiche per il Lavoro, Sviluppo Economico, Università e Ricerca del Comune di Milano. Precedentemente ha collaborato con ForumPA, e dal 2012 con il Comune di Milano, Settore Sviluppo Economico, Smart City e Università, dove ha seguito in particolare il processo strategico di Milano Smart City ed i progetti di innovazione finanziati da partnership pubblico-privato che hanno visto il Comune di Milano come ente sperimentatore. I suoi interessi professionali e di ricerca si concentrano sull'innovazione tecnologica applicata agli ambienti urbani, temi su cui ha sviluppato la tesi di laurea specialistica (Politecnico di Milano, 2012), ha scritto articoli e condotto confronti con enti e municipalità in diverse città europee. E' dal 2011 redattore di *Planum. The Journal of Urbanism* | [www.planum.net](http://www.planum.net).

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## ALTERNATIVE CHARGES ON PRIVATE VEHICLES AS A WAY OF MANAGING URBAN MOBILITY

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### ABSTRACT

In this article, we reflect on proposals for the use of urban tolls on private vehicles as a form of urban mobility management. The methodology used exploratory research for the development of a theoretical basis and a table was drawn up showing the experience in various countries. The conclusion is that toll fees are economic viable, the social and environmental benefits are considerable and this can be considered an important sustainable mobility strategy.

### KEYWORDS:

Urban Taxing Alternatives; Private Vehicles; Urban Mobility Management

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## 城市交通管理系统：

城市私家车征税方案

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### 摘要

本文就对私家车征收通行费作为城市交通管理的一种方式进行了思考。文中采用了探索性研究的方式对这一领域的理论成果和在不同国家中的相关经验进行了详尽阐述，并由此得出结论：征收通行费在经济上是可行的，并能产生巨大的社会和环境效益，可以视作一个重要的可持续交通战略。

### 关键词

城市征税方案；私家车；城市交通管理

## 1 INTRODUCTION

Transport plays a significant role in environmental problems, mainly due to it being the largest and a growing consumer of non-renewable energy and a pollution generator. Furthermore, means of transport as mobility agents have a direct impact on people's quality of life, allowing them to come and go and access to goods and services, leisure, study and work. One of the main causes of environmental problems has been the excessive use of the automobile as the main form of urban transport. It will be difficult to change this in the short or even medium term, mainly due to the advantages and significance that the automobile presents and represents to society.

To Banister (2005, 2008), the features that cause the automobile to be a global icon are: they are goods manufactured by companies that are themselves icons of industrialization and world capitalism; they give their users status; it is a complex product that makes use of numerous accessories and, for that reason, feeds a broad and varied sector; it provides individual mobility that is superior to other means of getting around (public transport, bicycle and walking); and it shapes and organizes the lives of people (work, leisure, study, etc.). Another important aspect is the flexibility and freedom that the car represents, allowing the users to come and go as they please, while the transport alternatives (public and non-motorized) have lost their ability to attract and retain users. Taking the city of Rio de Janeiro as an example, in the last two decades, the population growth was approximately 5%, while the growth in the automobile fleet was 50% and that of motorcycles was 300%. As shown in Table 1, there is one automobile for every four people. The big problem is not the ownership of automobiles, but the fact that they are in everyday use for short, medium and long distance travel. The ideal would be to use the public transport system, in any of their combined modes, and non-motorized transport. The trouble with this is the lack of quality and investment in these forms of transport, which makes them less attractive than utilizing the automobile. (Orrico et al. 2012).

	<b>Year</b>	<b>Number</b>
Population	1999	5,814,750
	2010	6,323,037
Automobiles	1999	1,062,190
	2010	1,521,716
Motorcycles	1999	40,903
	2010	161,306

Tab. 1 Population, automobiles and motorcycles in Rio de Janeiro, from 1999 to 2010.

Within this scenario, it is necessary to seek alternatives that allow for the management of mobility and the control of automobile use, so as to minimize its impact on the environment and on people's quality of life. In this respect, urban toll fees have become an important strategy for sustainable urban mobility, as they help to offset the impact by generating a source of revenue that can be invested in improving the public transport and the transport infrastructure in general, as well as discouraging automobile use as the principal means of transport (Wu and Shang, 2014). The methodology of this study was to examine the use of the urban toll system as a form of urban mobility management. For this purpose, qualitative and exploratory research was conducted, for the development of a theoretical and descriptive basis for presenting some models that have been adopted by the world's major cities. The overall objective was to analyze the urban toll system as a form of management of urban mobility and incentive to sustainable transport and to analyze and compare

the different urban toll models adopted in different countries, as well as to reflect on the importance of urban tolls as a way to manage automobile use and encourage the use of public and non-motorized transport.

In addition to the present section, this work is organized in the following manner: in Section 2, the theoretical basis for sustainable mobility and urban tolls is presented, while in Section 3, we show the analysis and reflection on using urban tolls as a form of mobility management, and the last section presents the final considerations.

## 2 THEORETICAL BASIS

### 2.1 SUSTAINABLE URBAN MOBILITY

Sustainable mobility is one of the most central and complex aspects in public transport planning, especially with regard to infrastructure, utilization of renewable energy sources, vehicles, non-motorized transport and improved land use.

Originally, papers and discussions about mobility, transport and sustainable development were restricted to environmental factors, dealing with matters such as climate change, pollution, the use of natural resources and sources of non-renewable fuels, etc. A more up-to-date approach incorporates other dominant aspects for achieving a sustainable transport system, such as social, economic, cultural and technological factors, while the term "sustainable" now embraces a set of interacting and interdependent elements.

The term mobility involves a set of elements that permeate public administration and involve the planning, management and regulation of public transport, urban freight logistics, land use and accessibility. Mobility has a direct impact on people's quality of life, allowing access to the means of production, leisure and education. As a consequence of the lack of planning, there has been an increase in the pollution from gas emissions, increased traffic congestion due to the use of private automobiles, centralization in the use of land, etc. (BRAZIL, 2007, 2012). Another definition offered by the National Urban Mobility Policy, presented by SEMOB (BRAZIL, 2007, p.41) is:

(...) "an attribute associated with people and goods; it corresponds to the different responses of individuals and economic agents to their transportation needs, considering the dimensions of the urban space and the complexity of the activities carried on within it", or, more specifically, "urban mobility is an attribute of cities which refers to the ease of moving people and goods around within the urban space". Such movements are made using vehicles, roads and the entire urban infrastructure (streets, sidewalks, etc.)" (...) "It is the result of the interaction between the movement of people and goods and the city itself."

Given the need for a reformulation of the current paradigms involving mobility and public transport, some concepts and sustainability models, applicable to urban mobility, have become necessary. According to Richardson (2005) and Ramani (2008), sustainable transport can be defined as the capacity to meet the demand for transport without compromising future generations. This definition is based on three key areas: economic, environmental, and social. Also based on these three areas, according to those authors, is a set of variables that can be used as sustainability indicators: safety, traffic, fuel consumption, vehicle gas emissions and accessibility. Moreover, according to Richardson (2005), each transport system is complex and its complexity derives from the multiplicity of the infrastructure, people and organizations involved. This is intensified by the different legislation and regulations, service providers, financing systems, technologies, land use strategies and consumer behavior.

According to Litman (2008, 2012), a sustainable transport system must:

- meet the basic needs of the people, businesses and society in a manner that is safe, consistent and healthy, while protecting the ecosystem and the interests of future generations;
- be accessible, seeking to be efficient and effective, operating as fairly as possible, offering choices of transport, and stimulating economic competition and balanced regional development;
- recognize the planet's limited ability to absorb the waste and pollution generated by the current model, utilize renewable resources at below their regeneration capacity and non-renewable resources more slowly than the rate of development of renewable alternatives, while minimizing the impact on land use and generation of pollution.

According to Banister (2005, 2008), every form of transport is unsustainable, as it consumes non-renewable resources, and the non-motorized means of transport are closer to being sustainable, since they consume little non-renewable energy, even while consuming other types of resources, such as space. Banister presents a hierarchy of energy consumption and external effects generated by the different forms of transport.

A study carried out in 2008, in 168 European cities, by the European Conference of Ministers of Transport, identified the main barriers to a sustainable urban transport policy. Among them are: "weak integration and coordination policies, counterproductive institutional roles, unsustainable regulatory frameworks, pricing deficiencies, bad data, limited public support and lack of political will". It also considered as critical factors in sustainable transport strategies: improvements in public transport, charging for automobile use and controlled land use. (May and Ison, 2008). Douglas et al. (2011) relates the use of the automobile as the main form of transport to public health problems, connecting human health and global sustainability. The authors argue that the use of the automobile should be compared to the use of tobacco, due to its health-endangering effects. Furthermore, the use of bicycles or walking lead to a decrease in obesity, the reduction of air and noise pollution and in the number of accidents, as well as enabling greater interaction between people and helping to mitigate climate change. They also point to the efforts of the automotive industry, just as with the tobacco industry, in lobbying for increasing consumption and use of private automobiles. The dependency on the use of the automobile occurs at the individual and social levels.

## 2.2 AUTOMOBILE USE AND TRAFFIC CONGESTION

In the last few decades there has been an exponential increase in the use of automobiles in urban centers and what used to be a problem exclusive to great metropolis' has now spread to medium and small sized urban centers. The problem has become particularly acute in developing countries, due mainly to economic growth and the social rise of the less favored classes. Linked to this are the government incentives (tax reduction and extension of financing lines) for the automotive industry, and subsidies and exemptions on fuels, which make the acquisition and use of automobiles cheaper. Litman (2002) states:

"Automobile dependency is defined as high levels of per capita automobile travel, automobile oriented land use patterns, and reduced transport alternatives. Automobile dependency increases many costs: higher vehicle expenses, reduced travel choices, increased road and parking facility costs, congestion, accident damages, and a variety of environmental impacts. Beyond an optimal level, excessive automobile dependency may reduce economic productivity and development. A more balanced transportation system can provide many benefits to consumers and society."

The automobile has become an important symbol in modern society and has a considerable influence on people's lives and the redefining of society, urbanization and land use. It provides freedom and enhanced mobility, but its effects entail high social costs, making it one of the biggest problems and challenges for public administrators today (Torales and Paulitsch, 2010). Despite the transport benefits, the burden is excessive, generating operational (accidents, noise and atmospheric pollution, congestion, etc.) and

infrastructural costs that fall upon the population as a whole. According to Litman (2002), in the USA, parking costs are estimated to represent as much as 30% of transportation spending. The use of the automobile generates external factors (indirect or external costs) that fall upon all of society and, as Button (1993) and Torres (2007) state, they come about when there are negative effects from one group affecting another without any compensation. Litman (2012) argues that for each amount invested in expanding the road network, parking and traffic control, an equal amount must also be invested in alternative means of getting around, such as bicycles, walking and public transport. A study carried out by the ANTP (2010, apud Gomide and Morato, 2011) presented data on urban mobility between 2003 and 2009 and it was possible to verify that the increase in the number of vehicles, by around 7%, was greater than the increase in roads, of 2%. It was also greater than the population and income growth. The consequence is an increase in traffic congestion on the roads and in a low level of sustainable mobility. According to Gomide and Morato (2011), the period between 2009 and 2010 saw an even bigger increase in the number of automobiles, at 8.4%.

	2003	2004	2005	2006	2007	2008	2009	Growth Rate
Population (million) <sup>1</sup>	108	111	113	115	117	120	121	2.5%
Breadwinner Income (R\$)	1034	1025	1044	1091	1128	1270	1310	4.0%
Roads (thousand km)	294	304	309	314	319	328	332	2.0%
Public transport (thousand) <sup>2</sup>	93	95.2	97.6	97.1	100.6	102.3	103.4	1.8%
Vehicles (million) <sup>3</sup>	18.4	19.3	21.2	21.2	24.0	25.9	28.0	7.2%

The 437 municipalities with 60,000 inhabitants or more in 2003

Includes urban and inter-city buses and rail passenger vehicles

Includes automobiles, vans, trucks, buses, micro-buses, motorbikes and motor-scooters

Tab. 2 Data progression in selected municipalities that comprise the ANTP1 mobility data system (2003-2009)

The same study also presents an estimate of the internal (fixed and variable) and external (social) costs for each type of transport. The automobile has the highest overall cost, compared to other types of transport. However, it should be noted that the ANTP study (2010, apud Gomide and Morato, 2011) includes accidents and air pollution, but doesn't include costs such as lost time, excessive use of public areas for the expansion of roads and public parking lots, fragmentation of urban space, energy consumption and other problems deriving from excessive urban traffic.

	Buses	Motorcycles	Automobiles <sup>5</sup>
Fixed cost <sup>1</sup>	R\$ 0.00	R\$ 0.84	R\$ 2.88
Variable cost <sup>2</sup>	R\$ 0.00	R\$ 0.74	R\$ 2.31
User cost (A+B) <sup>3</sup>	R\$ 2.17	R\$ 1.58	R\$ 5.19
Social cost <sup>4</sup>	R\$ 0.20	R\$ 1.87	R\$ 0.50
Total cost (C+D)	R\$ 2.37	R\$ 3.45	R\$ 5.69

1. Buses: includes ticket price. Motorcycles and automobiles: depreciation, maintenance and taxes.
2. Buses: includes ticket price; Motorcycles: fuel; Automobiles: fuel and parking.
3. Buses: ticket price. Motorcycles and automobiles: sum of A plus B. Represent internal costs.
4. Accident (greater for motorcyclists) and pollutant emission costs. Represent external costs.
5. Average of gasoline and alcohol powered automobiles.

Tab. 3 Fixed, variable, social and total cost per capita for each type over a 7 km urban journey

According to Torres (2007), the external factors could be immediate (as with traffic congestion), cumulative (CO2 emissions), local or global. From an economic perspective, they can be intra-sectorial or inter-sectorial. According to Freeman (1997, apud Torres, 2007), the external factors can be divided into four categories: damage caused by transport services (congestion, accidents); pollutant gas emissions; infrastructure investment; and vehicle and fuel production impacts. On the other hand, Button (1993, apud Torres) defines the external factors as technological (production or transport use) or pecuniary (produced by other parties). And in the transportation process there are five types of external factors: atmospheric and noise pollution, accidents, additional energy consumption and traffic congestion. Litman (2012) characterizes as indirect costs investment in infrastructure (road network, traffic services and parking).

Traffic congestion is one of the main external factors and it causes harmful effects on drivers, pedestrians and public transport users, as well as increasing the atmospheric, noise and visual pollution and journey time.

According to Torres (2007, p. 22) congestion may be categorized as:

- **Circulatory:** related to the excessive number of vehicles in relation to the road capacity;
- **Destination:** related to the time wasted in searching for a parking space;
- **Recurrent:** repeated and possibly seasonal occurrences in cycles;
- **Non-recurrent:** random occurrences that are caused by contingencies such as accidents, special events or weather conditions;
- **Arterial:** restricted to a section of the network, on a structural or arterial road that does not compromise the rest of the network;
- **Network:** occurs in a part of the network, or all of it.

According to Torres (2007), the classifications and typologies are not mutually exclusive, but they can be interdependent. Some examples mentioned are the circulatory and destination congestion being related, since the increase in the number of vehicles results in a decrease in the number of parking spaces available and an increase in demand.

According to Litman (2002), the dependency on automobile use leads to an increase in infrastructure costs, creating the need to expand the road network by up to three times the size that would be required under a more balanced model. This generates greater occupation of physical and symbolic space, depending on the means of transport, speed and idle (parked) time (Torres, 2007). Figure 1 shows the occupation of road space, by means of transport.

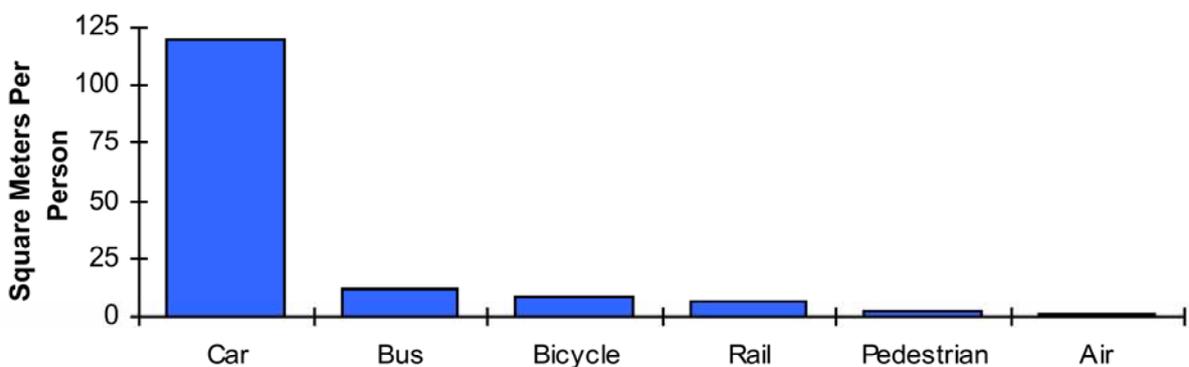


Fig. 1 Road Space By Mode

It is clear that the car is by far the transport mode that occupies the most road space, followed by buses, bicycles, trains, pedestrians and air travel. According to Torres (2007), what causes traffic congestion is people's need to move from one place to another, or the need for mobility. However, it is the concentration of automobiles and the limited road space that determines the congestion. The author also notes the space-time aspect of congestion, whereby "journeys with great time elasticity can be transferred to other less heavy hours, thereby avoiding traffic jams". However, it is the objectives or activities to be performed that impose limits on reorganization. Consequently, it is the rush hours (time for going to work, school, etc; lunch time; coming home from work, school, etc.) that will determine when and where the traffic jams will occur. The annual cost of congestion in São Paulo has reached R\$ 350 million and in Rio it is R\$ 70 million (IPEA/ANTP, 1999; Torres, 2007).

According to Torres (2007, p. 28) there are two approaches for dealing with the problem of congestion:

- **Traffic Engineering:** treats the phenomenon as an inadequacy in the ratio between the supply and demand for road capacity and studies vehicle circulation based on the relations between the three main variables: speed, flow and density;
- **Economics:** treats congestions as a failure by the market mechanisms to achieve a balance between supply and demand. It states that congestion is caused by the fact that the road transport products and consumers do not consider the external costs that are borne by others. They consider only the internal costs in their transportation decisions.

IPEA (Institute for Applied Economic Research) and the ANTP (National Public Transport Association) conducted a study in 1999 aimed at evaluating the impact of congestion in terms of cost. The main effects identified were: excessive time spent on main and tributary roads, fuel consumption, air pollution, direct operational costs, cost of establishing and maintaining the road network, and the urban space occupied by automobiles and buses. The study provided an analysis of the diseconomies (costs) generated by congestion in ten Brazilian cities and Table 4 shows the results.

City	Additional time lost (million passenger hours)		Additional fuel consumption (million liters))		Additional pollution emissions (t)						Road network	
	Cars	Buses	Cars	Buses	Cars		Buses				For circulation (m <sup>2</sup> )	For parking (m <sup>2</sup> )
					HC	CO	HC	CO	NOx	MP		
Belo Horizonte	6,06	40,54	5,57	0,55	252,59	2.851,91	22,66	55,44	39,88	1,98	246.318,75	61.579,69
Brasília	0,50	2,41	0,57	0,11	20,40	178,58	3,06	7,48	5,38	0,27	457.800,00	114.450,00
Campinas	3,51	2,45	4,10	0,20	181,92	2.012,79	8,05	19,69	14,17	0,70	193.687,50	48.421,88
Curitiba	2,82	2,37	2,50	0,06	115,07	1.309,74	2,92	6,56	4,72	0,23	14.347,50	3.586,88
João Pessoa	0,77	1,21	0,60	0,05	27,46	310,70	1,84	4,51	3,25	0,16	122.910,00	30.727,50
Juiz de Fora	0,18	1,69	0,14	0,05	6,68	76,24	2,11	5,16	3,71	0,18	-	-
Porto Alegre	3,00	3,42	2,57	0,18	116,10	1.309,78	6,93	16,96	12,20	0,60	79.031,25	19.757,81
Recife	1,79	3,67	1,36	0,11	66,38	759,62	5,42	14,22	9,53	0,82	117.750,00	29.437,50
Rio de Janeiro	33,03	80,41	35,85	2,11	1.605,43	17.884,39	86,44	209,75	150,89	7,48	206.100,00	51.525,00
São Paulo	198,43	117,87	198,53	3,65	8771,38	95.992,53	157,65	385,76	277,50	13,75	5.551.496,25	1.387.874,06
<b>Total</b>	<b>250,09</b>	<b>256,03</b>	<b>251,79</b>	<b>7,06</b>	<b>11.163,42</b>	<b>122.686,26</b>	<b>297,08</b>	<b>725,53</b>	<b>521,22</b>	<b>26,17</b>	<b>6.989.441,25</b>	<b>1.747.360,31</b>

Tab. 4 Summary of total annual costs caused by severe traffic congestion in ten cities

As the table above shows, the cities of Rio de Janeiro and São Paulo present the worst results, mainly due to being the largest and most populous cities in the country. Two important details are that in the ten cities there is additional time wasted totaling over 500 million passenger hours, due to the congestion in these cities, and the amount of space devoted to parking totals 1,747,360.31 m<sup>2</sup>. Taking into account that this study is from 1999 and that, in the last 14 years, it is estimated that the automobile fleet has grown by more than 50%, one can imagine how much worse these numbers would be today. According to Torres (2007), there are three possible steps that can be taken by the administrators:

- **Non-intervention:** involves letting congestion reach its saturation peak. This is based in the concept whereby congestion is a natural phenomenon and a normal consequence of road traffic. In other words, with the increase in congestion there will be a tendency for some drivers to stop using the automobile and turn to other means of transport, or at least to take alternative routes;
- **Supply Side:** involves increasing road capacity by building new roads or widening and duplicating existing roads. The increase in road space will involve employing Traffic Engineering techniques in road expansion and the regulation and coordination of traffic lights. This is the main emphasis given to traffic management and planning in Brazil and it can generate increased demand (generated traffic and induced demand), due to the increase in the supply of road space. According to Litman (2012), “generated traffic and induced demand” can be defined as the increase in journeys resulting from an increase or improvement of the road system. While congestion can lead to migration or displacement of journeys to alternative routes or to a changing of travel time, the improvement of the roads can lead to an expansion in the number of automobiles. According to Toralles and Paulitsch (2010), “the increase in road capacity creates space for new automobiles and also for those that were not previously circulating, because their drivers were put off by the state of saturation”. Meanwhile, Downs (1992, *apud* Litman, 2012 and Torres, 2007) introduces the concept of “triple convergence”, which is the transfer of users from other roads (spatial convergence), times (temporal convergence) and other types of transport (modal convergence), due to, among other reasons, the increase in capacity and improvement of the road system. According to the author, a solution to “triple convergence” would be regulation through “urban tolls”, which would bring about “triple divergence” (transfer of journeys to other roads, times and types of transport);
- **Demand Side:** According to Torres (2007), demand management will have the objective of inducing demand, be it in a coercive manner or by developing awareness, to alter its travel behavior and seek more sustainable means of transport. It involves acting to minimize the use of the automobile through regulation, which is achieved through public sector intervention on three fronts: physical, institutional and pricing.

Physical intervention involves the prohibition and restriction of the circulation of vehicles on specific roads, in certain locations and at certain times, following defined criteria. An example of this occurs in São Paulo, with the “license plate rotation” and “rush hour operation” and in Mexico City, with “*Hoy no circula*”. This type of restriction can lead to the acquisition of a second vehicle or to fraud (Torres, 2007; Toralles and Paulitsch, 2010). Economic regulation involves the reduction or prohibition of circulation on specific roads or in certain locations, subject to payment of a fee, such as an urban toll. Examples of this are the toll on the “*Linha Amarela*” express highway and on the Rio-Niterói bridge, as well as London’s “Congestion Charge”, which started in 2003 and was the pioneer for this type of intervention. According to Kelly and Clinch (2006), for transport demand management (TDM), the urban toll is the best alternative, followed by parking policy and charges.

Quoting Torres (2007), there are a few strategies that can be utilized in demand management:

- **Regulating the ownership and use of private automobiles:** restrictions on the ownership of vehicles and parking spaces, with a system of acquisition quotas;
- **Limiting parking space:** physical control by suppression of parking spaces, reservation of spaces for certain user categories and charging parking fees.;
- **Controlling moving vehicles:** Segregated traffic and selective access;

- **Regulating through taxation:** taxation of vehicle ownership, paid parking, fuel taxation and fees for distance traveled.

### 3 ANALYSIS AND REFLECTION

Gomide and Morato (2010) state that, according to economic theory, the most effective measure for discouraging the use of the automobile and canceling out the external factors would be through toll fees, based on the costs generated by automobile use. The resources raised could be utilized for improving the public transport and the development of non-motorized transport.

Urban charges would be aimed at limiting the circulation and use of vehicles in specific areas and locations. The main form of urban charge is the urban toll fee, which was first used successfully in 1974, in Singapore, and remains in operation to this day (Torales and Paulitsch, 2010).

In Brazil, the main examples of urban tolls are the on the “*Linha Amarela*” and the “Rio-Niterói bridge”. The best known case and a successful example of an urban toll is in London, which was implemented in 2003 and innovated by linking urban traffic management and fund raising for improvement and expansion of public transport and non-motorized transport.

The toll can be classified as: a financing or concessionary toll, aimed at raising funds for investment in infrastructure and not for regulating demand; or regulatory or environmental.

According to Torres (2007), there are three types of urban toll, according to the method of application:

	Arterial Toll	ALS Toll	Zonal Toll
Main purpose	Infrastructure financing	Traffic control in a specific area	Traffic control in a specific area
Scope	A single highway, bridge or tunnel	All roads within the specific area	All roads within the specific area
Fee-generating trigger	Going through the road billing point (toll plaza)	Crossing the limit for access to the restricted area	Entering, circulating or parking within the specific zone
Form of inspection and billing	Manual or automatic at the toll plaza	Electronic inspection and automatic billing	Electronic inspection and automatic billing
Billing period	Every day (24/7)	Morning and afternoon on business days	Morning and afternoon on business days
Rate flexibility	Fixed fee	Variable: higher during rush hour	May be fixed or variable
Effectiveness in fee collection	High	Low	Low
Effectiveness in reducing congestion	Low	High	High
Examples	Rio-Niterói bridge	Singapore	London

Table 5: Main types, characteristics and examples of congestion fees.

The urban toll has shown itself to be a viable and efficient alternative for regulating and managing urban mobility. In London, for example, since its introduction in 2003, it has brought about a 30% reduction in

congestion, diminishing the circulation of vehicles and increasing the use of non-motorized transport. It provides an incentive to other types of more sustainable transport.

Many cities in the world, besides those already mentioned, have implemented or are planning to implement the urban toll fee as a way of regulating urban traffic, and among them are Milan, in Italy, Stockholm, in Sweden, San Francisco, in the USA, Manchester and Cambridge, in the UK, and Barcelona, in Spain. In Brazil there have been moves along these lines in São Paulo, Campinas and Salvador (Torelles and Paulitsch, 2010).

Table 6 presents some of the experience with the implementation of urban toll fees in various countries, along with the benefits and forms of application. As can be seen, the urban toll systems provide considerable benefits and are economically viable.

However, their efficiency depends on the use of intelligent traffic control systems and investment in public and non-motorized transport. In fact, the use of these systems should be aimed at encouraging the use of means of transport other than the automobile.

According to Hau (1992) and Torres (2007), the following driver behavior is likely to occur when faced with the implementation of a toll system: pay the toll fee; use toll-free routes; change the time of journeys (outside billing hours); change to other types of transport; change the destination or cancel the journey.

Care must be taken not to cause congestion on other roads outside the toll zone. This can be done through traffic monitoring on all roads. To obtain the desired success, significant investment is necessary in sustainable mobility alternatives, giving priority to non-motorized transport. Some cities around the world have developed successful educational and even prohibitive campaigns.

In Bogotá (Colombia), a network of bicycle lanes was built that was integrated with the BRT (*Bus Rapid Transit*) system and there was a "Car-Free Sunday Program" that combined to reduce the automobile traffic by 40%. It is recommended that the toll system be directed towards promoting and economically supporting more sustainable urban mobility systems. Some precautions should be taken to ensure the success of the toll system, among which is the matter of popular approval. This is possible when there is transparency regarding the expected results (social, environmental and economic benefits), the collecting of funds and investment of economic resources. Moreover, it is necessary to seek political approval and support, so that it can become integral to a larger long term program for urban mobility.

It is important to emphasize that the urban toll fee should be part of an overall mobility program, including expansion of the public transport network and improving its quality.

This would provide options and would meet the extra demand of automobile users who opt for public transport due to the urban toll. In other words, there is no point introducing the toll without first offering mobility options, especially for those who are unable to pay the toll fee.

As noted by Kottenhoff and Freij (2009), the urban toll model introduced in Stockholm, Sweden, was a good example, as part of a three-part public policy package: the congestion fee, the expansion of public transport and improvement of the roads and access areas.

Moreover, it was an inter-sectorial action plan involving six phases, starting with the expansion of public transport and the subsequent introduction of the fee. And it was precisely the improvement of the public transport that contributed decisively to the popular acceptance of the urban toll fee. The improvement and expansion of the public transport network and non-motorized transport help to justify the introduction of the fee and facilitates its acceptance by the population.

Different configurations can arise from the proposal to introduce an urban fee, as shown by Ieromonachou, Potter and Warren (2007), who compared the introduction of a toll at cities in the UK (Durham and London) and Norway (Bergen and Oslo). It was found that there were different levels of popular acceptance, forms of

investment, technologies used, public sector performance and needs met. The important thing is that in all cases, the efforts were successful.

The urban toll is not the only form of urban charge aimed at managing the traffic and the transport demand. Although, for decades, parking was treated as just a part of the fixed cost of travel, many studies have been carried out that highlight the use of parking fees as a strategy that offered an alternative or was complementary to the urban toll for regulating urban traffic, including those of Barata, Cruz and Ferreira (2011), Caicedo and Diaz (2013), Kelly and Clinch (2006) and Ieromonachou, Potter and Warren (2007).

In their study, Kelly and Clinch (2006), for example, examined how different price bands can affect the behavior of demand, in a study carried out in Dublin, Ireland.

As shown by Ieromonachou, Potter and Warren (2007), an urban toll is not always sufficient to bring about a reduction in motor vehicles. In Bergen, Norway, after the introduction of the urban toll, the number of motor vehicles actually went up, but the traffic management involved a mix of toll fees and control of the quantity and prices of parking spaces. Parking fees went up 20 times faster than the toll, leading to a diminishing of traffic within the city.

Caicedo and Diaz (2013) emphasized that, in developing countries, it is common for illegal use to be made of urban space for parking and that the control and billing, as well as being a source of funds for investment to meet social demands, also increases the level of control over the circulation of vehicles.

The free supply of parking, whether legal or illegal, encourages automobile use and consequently increases the demand. In some cases, according to Murray (2001), charging for parking can be used to balance the use of the public transport system with automobile use, especially when use of public transport has been rejected.

Moreover, different agents, such as public and private institutions, can be used in this strategy, both in the planning and the execution. The operation of parking areas can receive public and private resources, directly or indirectly. In Brazil, for example, it is common for the state to make improvements in infrastructure and subsequently grant and regulate a concession to a private company or consortium. In any case, it is an interesting and effective strategy.

In Brazil there are major barriers to the introduction of urban tolls, among which is the low quality, variety and efficiency of the public transport.

Furthermore, most of the political decisions on mobility are taken in a disorganized manner and the country has a strong tendency to make inefficient use of public resources. Long-term policies are always tied to keeping a particular group or political party in power, otherwise decisions only last until the end of the political term, leading to a lack of continuity in the development and implementation of public policies. There is still no tradition of organizing mobility policies along with other important sectors, such as housing, education, health and administration, which hinders their effectiveness.

An example of this was the license plate rotation introduced in São Paulo in 1997, with the aim of curbing automobile use and encouraging the use of public transport.

However, since there was no significant improvement or expansion of the public transport to meet the likely increase in demand, it ended up stimulating the purchase of a second vehicle with a license plate that could be used on different days.

The result is that São Paulo became the only city in Brazil in which the use of private transport is greater than that of the public transport.

## 4 FINAL CONSIDERATIONS

This paper was aimed at demonstrating the effectiveness of the urban toll as a system for mobility management and reducing congestion and automobile use. It was possible to ascertain that there are significant operational and environmental gains. It also leads to improved transport efficiency a changing habits in the movement of people. It was also possible to verify in the examples that the system is economically viable and can be the principal means of financing more sustainable mobility. A limitation of the work is the lack of models and examples in Brazil that would have allowed a broader and approach that compared local examples with other models adopted around the world. In future work, other approaches may be developed, such as the matter of determining the ideal price for the fees, operational aspects, and the use of information and communication technology in the toll systems, among others.

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## IMAGE SOURCES

Tab. 1: Orrico et al. (2012, p.8) (Adapted)

Tab. 2: ANTP (2010, apud Gomide and Morato, 2011)

Tab. 3: ANTP (2010, apud Gomide and Morato, 2011)

Tab. 4: (IPEA and ANTP, 1999)

Tab. 5: Gomide and Morato (2010, p. 22)

Fig. 1: Litman (2002, p. 15)

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## CENTRO DIREZIONALE OF NAPLES A "SMART" CONCEPT

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### ABSTRACT

The topic of urban planning linked to the growth of smart cities is now quite common also in the urban-sociological debate. Recent studies (Besselaar, Koizumi, 2005; Fistola, 2010) identify the main focus of the smart city no longer exclusively in the strategic role played by I.C.T. infrastructures, but above all in the factors enabling urban growth, defined as the ability to stimulate innovative urban developments, along with an increasing attention to the environment, eco-design, improved living levels, as well as the "bio-socio-environmental capital" (Corbisiero, 2013). Based on this theoretical background, the paper highlights the results of a research conducted in Naples on the empirical case of the "Centro Direzionale". It is an intervention of urban design of considerable impact on the city. The design and construction of the Centro Direzionale of Naples is, in fact, an archetype of the smart city; a primal testing of "urban intelligence" in terms of transport systems, infrastructure, logistics, systems for energy efficiency and technology. More generally, a good practice of city administration and of exploitation of strategic spatial planning.

### KEYWORDS:

Urban Planning; Smart City; Centro Direzionale; Bio-socio-environmental Capital

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## 那不勒斯迪雷佐纳莱中心

“智能”概念

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### 摘要

如今，城市规划与智能城市发展相关的主题在城市社会辩论中也习以为常。近期的研究表明（Besselaar, Koizumi, 2005；Fistola, 2010），智能城市的重点不再局限于ICT基础设施战略角色的扮演，最重要的是促进城市经济增长，即刺激创新城市发展的能力，同时越来越注重环境问题、生态设计、改善生活水平、以及“生物-社会-环境资本”问题（Corbisiero, 2013）。基于这一理论背景，本文重点突出了那不勒斯有关“迪雷佐纳莱中心”实证案例的研究结果。这是一种对城市设计对所在城市影响的干预。事实上，那不勒斯迪雷佐纳莱中心的设计和构造，即智能城市的原型；是对“智能城市”在运输系统、基础设施、物流、能源效率和技术系统的基础测试。普遍而言，是战略空间规划和城市管理的一种有效实践。

### 关键词

城市规划、智能城市、迪雷佐纳莱中心

## 1 INTRODUCTION

In many cities in Europe, between the sixties and the nineties, new urban planning procedures were experimented, designated as "strategic territorial planning" (Martinelli, 2005). They belong to the trend usually called participatory planning, where the "centralization of authority" is removed and decisions are not imposed "from above" (Healey, 1997).

The objectives of the strategic planning can be analyzed from a dual perspective. On the one hand there are the specific goals of the plan; they are usually structured according to the specificities of the area and of possible future scenarios: reconversion, relaunch, internationalization, recovery, innovation, decongestion, quality of life, etc... From another point of view, the strategic plan should be understood as a partly or mainly social process (Fera, 2005).

Over the years the way cities are planned has been changing and planning has taken on new dimensions. In fact, planning is oriented toward the realization of smart cities. The principle of environmental sustainability, also related to the natural environment, is given a stronger emphasis and a broader meaning. Within this principle, the "cultural environment" is considered as an element of the planning action and as a resource to be protected and to be used creatively to meet the needs of life quality as well as of cultural and socio-economic development. The cultural environment is thus considered as a category including both the preservation of landscape and nature and the protection and enhancement of cultural heritage as well as the promotion and development of the human activities established in the territory. The goal is to create a reference paradigm for the development of the territory not only in financial terms, but also in terms of creativity and participation in cultural, social and political development (Carta, 1996).

These new models of urban planning should be supported by such new technologies that can "help" the cities to be "smart", turning them into "intelligence laboratories" capable of finding clever and ingenious solutions (Granelli, 2012).

Another central theme in planning in recent years concerns the use of the territory, the questions about investments to make, the use of public resources and governance processes. The concept of "smart planning" is based on the dimensions of "smart economy", "smart environment", "smart people", "smart mobility", "smart living", "smart governance"... (Villa, 2011).

The first signs of change are observed between the seventies and the nineties, when in several European cities - Paris, Liverpool, Copenhagen, Rome, Milan, Naples... - attention is focused on the question of re-distribution of tertiary activities in the urban setting. At the same time, the redevelopment of city centers, saturated by the concentration of activities related to trade and services, was discussed.

The planning of the business districts (it. Centri Direzionali), in this scenario, is viewed by the international city-planning culture, and the Italian one in particular, as "the keystone of the new city: heart of urban renewal, but also a mediating element between planning and architecture" (Tafuri, 1964, p.27). The principle guiding the design of business districts is to create tertiary-oriented neighborhoods, designed mainly in order to place offices and political-administrative, economic and financial activities in a specific part of the city. The aim is to define a new dimension of urban space and the relative design methods.

In this regard, the business districts foreshadow the new principles of city planning in recent years, when cities become home to the "new challenges" that mankind is called to face. The achievement of environmental sustainability, social and cultural integration of billions of people, economic development, new forms of welfare state are just some of the goals which urban planning focuses on nowadays.

Although "smart planning" is oriented towards the development of I.C.T. (Information Communication Technology) infrastructures, it can also be viewed as a trigger of urban growth and innovative evolution. That's

a reason why “smart planning” takes care of environment, eco-design, living quality and in general of human and social capital (education, culture, etc.).

On the basis of these assumptions, this paper presents the results of an empirical study, whose object is the Centro Direzionale of Naples (CDN) as a case study. This district, especially in its ongoing extension or “step two”, recalls the planning logic of smart cities.

Although smart cities are based both on I.C.T. and human and social capital (De Luca, 2012), the CDN concept insists mainly on the latter and focuses on eco-design.

CDN actually appears as an institutional and business center as well as a residential area, planned after Jacobs’ concept (1961) of “planning for vitality”, that is of a city based on a “smart capacity” to mix urban and social types. The center hosts, in a wise distribution of spaces, the Courts, the region’s administration, universities and other institutions. The planners also left much space to private uses: trade, shops, “communication” towers (Wind and Telecom Italia) projecting towards the sky as vertical silos. Cdn also hosts many inhabitants, mainly middle-class and employees.

At the time when CDN was planned, the connection of the smart city concept to I.C.T. was just being conceived, but its planning includes the core idea to use the new communication technologies to link administration and urban infrastructures. The CDN concept does indeed include the innovative and sustainable criteria for a smart city in its structural and social planning.

The reasons for starting the research arise from the will to understand the impact of this operation, notably in relation to the socio-morphological context in which it is inserted. It is, in fact, an intervention of urban, social and economic planning of major importance for the reorganization of the metropolitan system, which produces inevitable effects on the local context.

The research aims to reconstruct the project’s history and the developments leading to the creation of the district, in order to describe the current state, to identify the elements of support and contrast in the planning phase and thus to highlight the peculiarities and the criticalities of this experience.

With respect to what has been already built we will try to answer two main questions: what planning principles was the project stage based on? How does the district appear today?

As for future prospects, the questions addressed are: what scenarios should be assumed in view of the completion of the Centro Direzionale expected in the coming years? Can we speak of a “smart Centro Direzionale”? Will it represent a starting point to define the city of Naples as a smart city?

## 2 SMART PLANNING

Among the components of the economic and environmental crisis that struck the western world in recent years, some aspects concern the “quality of the development” (Vianello, 2011).

It is apparent that this crisis is imposing patterns of production, consumption and life quite different from those so far known, and urban areas represent the scenario in which these transformations are being tested. The development process which starts from the Second World War, and lasted until today through “new forms of development”, aims to ensure the welfare of the people. In this direction the technologies I.C.T. are oriented, ie the tools that support citizens and authorities in the processes of government and participation in an innovative way.

The information and communication technologies began to spread in the sixties. In those years techniques of “contamination” between IT and telecommunications were first tested. These two sectors had hitherto progressed independently of each other because the telecommunications industry was mostly based on an analog technology. In the seventies and eighties, the spread of personal computers starts a digital revolution

that applies to the audio-visual field. Only in the nineties, thanks to the web, a path is completed that determines the multimediality and the interconnection; millions of people are able to share information through audio-visual devices to the point of encouraging dialogue and communication. In recent years, several local authorities in Europe decide to start using these tools experimenting with new models of urban planning, managing new technologies in support of participatory processes to an extent which they had never reached before.

But who governs these processes in a globalized world? In the social imaginary it is the sum of the national states and international organizations (eg the UN).

In reality, these competitive and aggregation processes occur between the cities.

The competition for attracting manufacturing facilities and generating knowledge and learning takes place between the urban areas. The protection guaranteed by the welfare systems, the quality of life, the environmental sustainability are issues that are being discussed more and more at a city level.

Today, when it comes to development of the city reference is made to specific development parameters including "economic strength", "physical capital", "financial maturity", "institutional effectiveness", "human capital", "environment and natural risk", etc... Therefore, in order to be competitive and to grow in an intelligent way it is necessary to fulfill the above criteria through synergy, putting aside particularism: to grow avoiding to "consume the territory" by generating environmental unsustainability.

Thus, in the design of urban environments one should not waste environmental resources, as space is an asset which can not be reproduced. The logic of the plan should be "smart", subject to the capacity to attract capital, to develop specific economic activities and stimulate the establishment of valuable human resources in the area. To be competitive, cities need to become "cities dreaming the future and practicing innovation" (*Ibid.*, p. 16) Following these principles, planning should foster social inclusion and the promotion of innovative activities. The cities must be first and foremost "able to detect and gather information through a system of sensors, from the most innovative, which perceive the characteristics of the environment, to the more traditional" (Farioli, 2011).

The value of these sensors plunged into the city is tested to the extent in which citizens are enabled to interconnect all the information, to make it interact in the network and then take it to the "intelligence engine". The "intelligence engine" has as its center the local administration, which generates the government and the planning of an urban system.

Being an intelligence engine means to gather this information and integrate it through systems of data analysis and governance (*Ibid.*,2011). The organization and the government of cities is undergoing profound changes and therefore also "smart policies" are needed whose scope has not yet been completely understood. The speed and pervasiveness of innovation of I.T. technologies that "change" the knowledge, transforming it into value added, undermines the strategic planning of urban development (Fistola, 2013).

### 3 NEW MODELS OF THE CITY: THE SMART CITIES

In recent years, city planning seems entirely oriented toward the horizon of smart cities. This is mainly due to a strong thrust of the European Union which has allocated substantial funds as an "investment" towards urban innovation and formalization of the "smart city model". It is difficult to achieve a clear definition of this concept that describes an intervention on the city proposing definitions only partially convergent, but often not related to each other. In the socio-economic field, for example, it is fundamentally related to the existence of I.C.T. districts with a high degree of employee training and capabilities. The idea of smart city also refers, however, to the use by the public administration of the new communication channels to interact with citizens, by focusing

on e-governance and e-democracy. Very often it signals a significant use of information technologies in the daily life of a city in terms of transport systems, infrastructure, logistics and systems for energy efficiency. In other cases, the term smart city will emphasize softer factors of urban development such as good practices of participation, high levels of security and enhancement of cultural heritage.

In the scientific community the concept of smart city also evokes aspects of quality of life, paying more attention to the aspects of urban life such as housing, or the development of sustainable energy platforms...

The European institutions, on the other hand, mainly connect this concept with the fight against pollution, and in general to the "Europe 2020" strategy. In this respect, in Europe there is a growing interest in the themes of "smartness" so as to induce the EU to make them a central part of its financial planning.

The tendency of the European Union is to interpret "smartness" from the point of view of the environment and energy, and this is confirmed by some of the main instruments of this strategy: "The Strategic Plan for Energy Technologies" (European Commission, 2007) and "The Technology Road Map" (European Commission, 2009) where the reference to the smart city, and the budget allocated to it, appear clearly.

Therefore, it is possible to say that a smart city is a city where all the resources become accessible thanks to an efficient online network that allows the citizen and the municipality to dialogue (Fistola, La Rocca, 2001).

The term "smart" implies being able to get the resolution of a problem "operationally", indicating what may be the "tools" to be used, designed for this purpose. In other words, choosing the reference models and "operating" through specific "devices".

The smart city is the place where the planner effectively uses available structures, spaces and technologies or invents new ones.

The smart city can therefore represent a physical space in which a widespread and inclusive technology supports the growth of social capital and enables the development of functional systems that virtualize activities (*Ibid.*,2001). This saves space and time and helps to raise the quality of living in the urban system.

This is the theoretical basis of the case study presented here.

#### 4 THE BUSINESS CENTRE AS THE ARCHETYPE OF SMART CITY. THE CASE OF NAPLES' CENTRO DIREZIONALE

In the full development of strategic planning, in the period between the sixties and the nineties, in Europe and especially in Italy, several so-called "business centers" were created.

One of the earliest in Europe was the "Secteur de la Défense" in Paris. In Italy, a first example is in Rome with EUR, Rome Universal Exhibition, designed as a structure for housing exhibitions, which has become over the years a true Centro Direzionale. Another example is represented by the Centro Direzionale of Milan, who was meant as a new "center", not only for Milan and its hinterland, but for the entire Lombardy Region.

Its goal was to create a new administrative and financial core, easily accessible because close to the railway stations and major highways.

In those years, the debate on the "city-region" started (city region) (Scott, 2001), considering the possibility of vast territories with the function of "urban joints" between the cities of the same region. The complexification of the services of the tertiary sector, the transformation and the uncertainty of industrial processes, the importance of rapid economic transactions, are factors that lead to a reconfiguration of the urban context in "multiple administrative districts" (Corbisiero, 2013), rooted in second-generation metropolises (Martinotti, 1999, p. 56). The birth of the Business centers not only responds in full to the new Italian territorial morphology - whose structure is defined by the complementarity of functions between centers and peripheries of the metropolitan complexes - but promises to be a platform for "smart urban development". In fact, the business

center is defined as an "architectural element, able to test critically the growth potential of whole parts of cities" (Ferrari, 2005, p. 54). It must, in short, take on the role of financial-economic pivot of big cities, but at the same time of a "smart district" such as to represent the symbol of territorial innovation. So business centers should represent places where the planner "exploits" the space and technological innovations for the benefit of the area.

While following the basic principles of the construction of the Business centers in Europe, the CDN seems to overcome the limitations that characterize the centers of Milan and Rome assuming that "elastic form" that would revitalize the entire metropolitan area and connect it with satellite towns (Cavola, Vicari, 2000).

It is not possible to establish with certainty a beginning and an end of its story, for we can still consider it as a "work in progress".

The debate on the establishment of the CDN dates from the early sixties. In 1964 the Commission for the New General Plan of Naples, conceived in response to the nefarious speculation of the post-war period, reflects the initiative of Mededil S.p.a. (Mediterranea Construction Company) which is assigned the task of "promoting urban renewal and the creation of new districts in the city of Naples" (Cerami, 1994). An area suitable for the establishment of a "Centro Direzionale" is selected in Poggioreale, an industrial neighborhood in the east-central part of the city (fig. 1).



Fig. 1 Site boundaries, undergoing executive urban plan

The urban project, which covers an area of about 110 hectares near the Central Station, divides the district into two macrozones put to different use: one for the buildings of the tertiary sector (courts,

Local authorities, public offices) and another intended for residential use. Its location was meant to favor the decongestion of the entire coastal line. The construction of the new CDN was also a response to the speculation that plagued Naples in the fifties. The first project was entrusted to a team of Neapolitan architects, coordinated by Giulio De Luca's, in the early seventies (*Ibid.*, 1994).

In 1980, due to ongoing disagreements between architect De Luca's team and the city administration, the implementation of the complex is entrusted to a starchitect, the Japanese Kenzo Tange, an emblematic figure in the international scene, in the hope of a "touristic-culturalistic turning point" of the project.

The choice of Tange is mainly political and is the expression of a radical change, a genuine technological innovation. The basic concept of Tange's project is to obtain a design concept that offers the city a of "multifunctional complex", competitive on several fronts: urban, economic, financial, cultural. The attention to the "cultural" dimension is just one of the most interesting and innovative of "Tange's project", one that can be called the "humanization of urban spaces" (*Ibid.*).

The Japanese designer reads the urban space as an agora in which the constituent element is the human relationship: even the space in front of a building must be characterized to encourage the phenomena of social life, allowing people to move freely, away from vehicles.

The project somehow anticipates the basic principles of urban planning as concerns innovation and the awareness of environmental, economic and social-relational factors. The Japanese architect wants to "put the man and not the machine to the center of the city scene... Make the Centro Direzionale as a place for socializing, integrated with the territory" (Tange, 1995). This produces a number of aspects that characterize the center as a real prototype of the smart city.

The designer suggests an urban structure articulated around three symmetrical "Axes", along which the whole complex is spread: 1 "Green Axes", in east-west direction, about 900 meters long and 70 wide, is designed exclusively for pedestrian traffic, below which is a two-story parking lot with two driveways around; 2 "Public Axes", with two squares, where public buildings and advanced services will be placed; 3 "Sport Axes", dedicated to green spaces and sport and *leisure* (fig. 2).



Fig. 2. Diagram map of Business District according to Kenzo Tange

Within a "smart logic", the idea of a public transport system to connect CDN to the city center is also very relevant: "I believe that the completion of the transport system will harmonize CDN and the city center, certainly favoring the urban development" (*Ibid.*, 1995).

Tange's basic concept was to achieve a unitary project enriching the city with a multi-function complex linked in innovative ways to the city's historic area and the surrounding region.

Since the nineties, the presence of an "advanced tertiary" is strengthened, which provides a further boost to investment in the area by various public and private entities.

Below we discuss some results obtained from the survey conducted in the field and showing what it looks like today at CDN.

## 5 AN "EMPTY BOX"?

The research is carried out in quali-quantitative approach, combining ethnographic observation, interviews with qualified and questionnaires submitted to city users and residents. The interviews were conducted following different tracks (history of the CDN, mobility, security, future planning), and according to them a number of specific questions have been asked. The topics were placed in non-rigid order, a form of "targeted" interview, leaving the interviewee the opportunity to manage the conversation.

The semi-structured interview revealed the point of view of several qualified witnesses. Among our tools we also used a semi-structured questionnaire with mainly closed questions, to be administered on a non-probabilistic sample of fifty city users. The questionnaire focused on socialization, security and accessibility. The decision to include closed- and open-ended questions is to provide greater uniformity to the information collected. The former allowed a univariate analysis while open-ended responses produced richer meanings and nuances.

The questionnaire was especially useful for the emergence of the perception of residents and city users compared to the goals of planning and of "Tange's project".

The analysis of the security issue was particularly interesting because the perception of the subjects who live a public place is considered of fundamental importance for the reliability of the same place and for the improvement of quality of life.

### 5.1 A SMART IDEA, BUT NOT TOO SMART AFTER ALL

Strolling down the CDN in the morning hours, you will come across a fast-paced flow of people moving in every direction, workers, visitors, athletes that populate the district, as it happens in global cities (Sassen, 1997).

The CDN, as interpreted by Tange, has among its functions to harmonize the use of space with the times of human connection. However, over the course of two decades, the emphasis on CDN, as a device for socializing and binding the administrative function with the social and cultural life, has been lost. The research shows that the spaces of the CDN do not fulfill the relational functions assumed, but correspond to a plurality of actors in motion along trajectories and interests not necessarily compatible, and all this does not go beyond office hours (fig. 3).

"In addition to a few bars and restaurants, here there are no more shops; because everything closes early. On Saturdays and Sundays all is closed, there is no business. Once the offices are closed, the Centro Direzionale is dead". (T.Q. 11, man, porter).



Fig. 3 A coffee shop at Centro Direzionale, Sunday morning

The predominant category of workers are the operators of the service sector, which flock to the area in a specific time slot, mainly early in the morning (fig. 4).

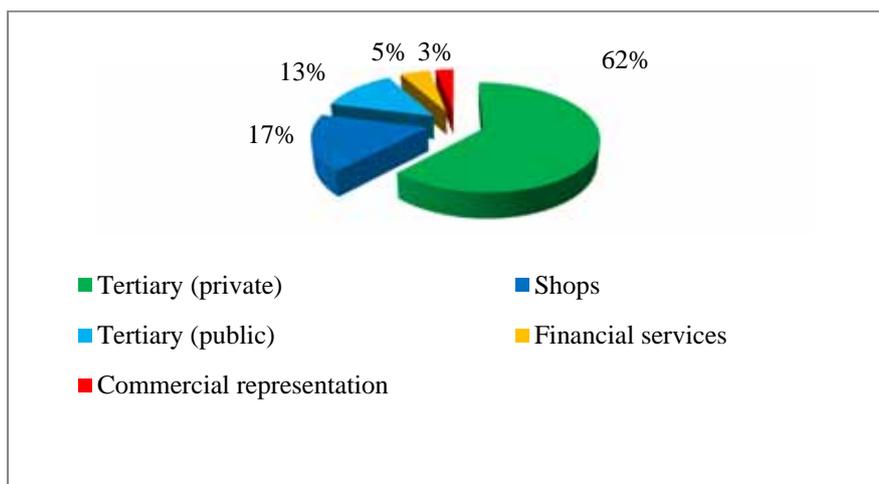


Fig. 4 Economic sectors in the Business District. Macro-categories

The majority of the commercial activities of the Centre follows those same working hours, since the number of potential buyers is drastically reduced after 6 pm. This have an impact on local residents

and, more specifically, on the residents of the Centro who work outside the area. In fact, coming home from work late in the afternoon, residents can not take advantage of the (few) shops that exist:

“When I come home from work at seven in the evening, I have to go shopping in Vasto, because here in the Centro, after six they are all closed” (I. 8, female, resident CDN).

The CDN has turned into a complex with a tertiary connotation, separated from the historic city and the rest of the territory. This problem is increased by an inefficiency of the transport system that serves the area badly. For this reason, users who need to reach the Centro choose mostly private forms of transport rather than opting for the “sustainable choice” of rail transport (Metro-Circumvesuviana), currently the only option that connects the CDN and other parts of the city (fig. 5).

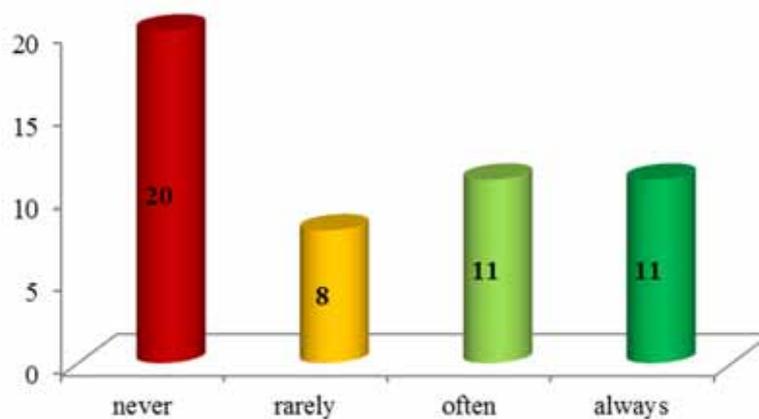


Fig. 5 Use of Public transport (from city center to CDN) - time frequency

The Centre is experienced by different categories of users that alternate in space and time, interact primarily through relationships among peer groups: workers, residents, foreigners, sportsmen, homosexuals. In this interweaving the behavior of social actors and the manner of their relationships are defined (Mela, Belloni, Davico, 2000). All this determines the presence of individuals not always definable as a group; rather they are “situational urban formations”, in which relationships are random and unpredictable; situations marked by “civil inattention” of subjects (Goffman, 1971). Through the analysis of some dimensions - socialization, accessibility, security - we have identified the “relational” features and the meanings given to the spaces at CDN. In particular, they have been called “not-homogeneous spaces”:

“...Because here you see the building in perfect condition, but you also see the floor completely disconnected or other buildings in a state of neglect”. (I. 8, woman, city user).

And “segregation spaces” (fig. 6):

“...Because you see only employees or professionals in suits who eat at the tables of pizzerias and taverns for lunch...” (I. 10 man, city user)

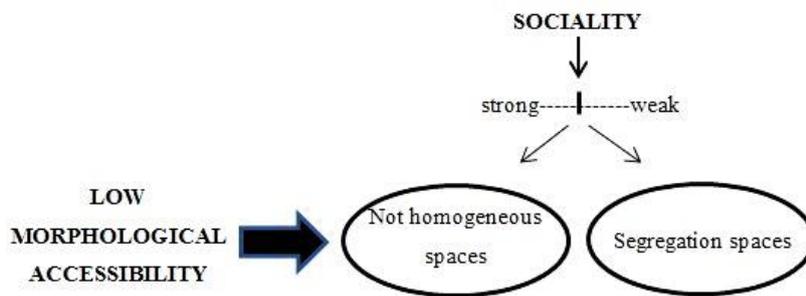


Fig. 6 Not-homogeneous and segregation spaces

In fact, the spaces of the CDN express the lack of strong relationships, and produce only transient relationships between people who meet by chance: one primary use is ineffective as a creator of urban diversity; but a primary use that is combined with another primary use is equally ineffective if they bring in the streets an alternating flow of users in the same hours (Jacobs, 1961; Piselli, 2009). In addition, the categories of persons present are distinct and do not appear to interact with each other. The residents are physically located in an area not too far from the offices, but spatially isolated, and live the spaces they inhabit even after 6:00 pm. Employees pass through the Centro in the morning, meet with colleagues in their offices, or at most in takeaways during the lunch break. The sportsmen perform their exercises when the Centro is preferably semi-desert in the late afternoon or Sunday morning very early (fig. 7).



Fig. 7 Mapping of the Centro Direzionale

\* Red rimmed are residential buildings. There is a big distance to other buildings

Some groups of foreigners use the CDN as a meeting place, mostly on Sunday mornings. Therefore many categories of visitors, who take turns in space and time, but mainly by interacting with those who belong to the same “group”. It may be useful to borrow the concept, developed in the context of urban sociology, of “refunctionalization of public space” (Mela, 1996, p. 195). This is what happens in some blocks of the CDN, where the streets and squares lose, for city users, any experiential meaning. The same streets and squares regain their original meaning of “space for humans” when they are frequented by immigrants or by homosexuals (fig. 8).



Fig. 8 A wall in the underground car parks. Now used as a board for private announcements.

The CDN is, therefore, the expression of a public space lived by a plurality of actors which are not connected to each other, pursuing divergent trajectories and targets, often placing their own points of interest and attraction elsewhere. A place of transition and exchange. The speed with which the different categories of users interface, the poor accessibility of the structure and a low degree of perceived safety are all factors that do not enhance the social and territorial capital of the district. In this respect, without pretending to draw a systematic framework of the state of the question, we want to point out some lines of reflection starting from the perception of safety as reported by users. As is clear from the questionnaires and from the information gathered, there is a clear perception of a safety problem. For respondents security is perceived as problematic; A total of 31 of 50 users say they feel unsure: of these, 13 feel very unsure, and 18 feel rather sure. This has consequences for the sense of belonging of the majority of users who identify themselves less and less with such a structure judged as unsafe. In fact, among the 18 subjects who feel rather sure, 17 assess the structure between insufficient and mediocre and adding another 11 expressing the same assessment and feel unsure, a total of 28 users feel not to be safe in relation to the limits of the structures (building condition) (fig. 9).

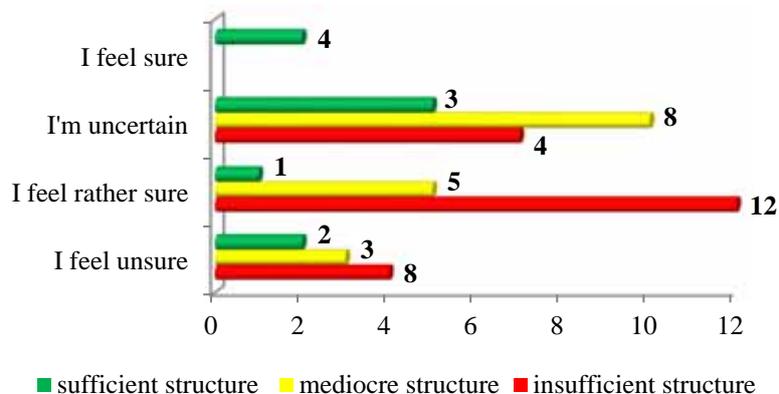


Fig. 9 Building condition Evaluation-security degree

The CDN is designed as a neighborhood divided along levels, axes, towers, etc.; the separation of functions is restored in the large partition of space and time: the urban material on one side and, on the other hand, work time, leisure time, public and private time.

From its large openings to the tall towers CDN includes all the reasons why it was planned: services, administration, communication and leisure.

A social-urban synthesis of post-industrial tertiarisation. The morphology is now a place of instability, heterogeneity, fragmentation and discontinued transformation, does not have a discernible structure as an organic whole, but is an expression of an "unusual" appropriation of space.

The porticoes around the buildings also represent a linkage between public and private life, favoring the socialization between city users.

As to its structural aspects, CDN is planned to minimize the impact on environment. Several buildings are realized in fact with eco-compatible materials such as *curtain wall*, a special anti-seismic structure resistant to wind gusts and fire. Surveillance and maintenance avail themselves of small electric cars and motorbikes.

As mentioned above, one of the bases of "smart planning" is the presence of social-relational capital in urban structures. Under this regard CDN represents an unusual kind of neighborhood, where the "smart idea" can be compared to an agora where urban intelligence is made up of human relations.

The main idea of this forward-looking insula is to "offer the people of Naples a comfortable, healthy environment, with a high social and cultural value" (*Ibid.*).

A business center anticipating the smart city concept inverting its issues, by putting people first and then technology in the center of the urban stage. In this regard CDN attracts intensely some social groups: immigrants and homosexuals.

Paradoxically, the separation of CDN from the city center and the empty streets after dark favors a "spontaneous takeover of space" (*Ibid.*, 2000).

A mix of different styles and uses of the space defining behaviors, goals and stories of these groups, who never even meet along their paths in space and time.

CDN spaces represent important points of reference for the sociality of either group. Immigrants use squares within it as gathering places if the different ethnic groups. Places and paths of CDN mirror different kinds of social relations. Each part of it recalls a particular sociality or maybe vice versa, it's the particular sociality which symbolically connotes a particular area.

The ethnic connotation is assigned to each square by the immigrant groups, youths, adults and elderly who gather especially in their free-time (Sunday mornings and Thursday afternoons) to meet, chat, eat, relax and enjoy the free spaces. Away from the mixed spaces where their daily activities take place in the city, some immigrant groups found in CDN an urban place to express themselves more freely.

Although it is just a make-shift solution, practiced within a "spare" area, it allows them to live their own social practices and their relationships with no outer interference.

Gay men, on the contrary, chose peripheral and underground areas of the complex, which assume for them the symbolic value of masculine homo-eroticism. Walking or standing in their own CDN paths male homosexuals enjoy all advantages of privacy and tolerance, guaranteed by the isolation and the anonymity of the center. Many streets and squares of CDN perform therefore for city users a function totally independent from its original business-aimed meaning and regain a more universal utilization as a place for human relationships when they are crowded with immigrants or gays.

CDN was certainly no perfect example for a sustainable planning, but it sure was a pioneering case of "smart district" in terms of "bio-socio-environmental capital" (*Ibid.*, 2013).

## 6 A SMART PERSPECTIVE

With the approval of the new Master Plan of Naples in 2004, the debate was resumed on urban planning with the focus on the principles of protection of the physical and cultural identity of the area, the restoration of the old city center and enhancement of green areas.

The aim is to redevelop brownfield sites into new settlements characterized by sustainable urban parks. At the heart of the new programming is the redevelopment of the suburbs, the historical centers, the improvement of services in the neighborhoods, the transformation of the mobility system reorganized around a modern rail network. So there is a trend towards that “sustainable use” of the city that provides for a “zero footprint” on the territory.

In this new frame of urban planning in Naples, an opportunity is represented by “Agora 6”, a project implemented since 2007, which seems potentially capable of enhancing a “bio-socio-environmental” capital (*Ibid.*, 2013) as a resource to revitalize the area and starting point for planning into the future in accordance with the “smart logic” of planning.

The resolutions approved by the City Council and the official acts of the Company “Agora 6” S.p.a. reveal that the project involves an area of 50 acres and plans to build public and private works intended to modify the urban context, providing it with modern facilities and a road system that integrates it with the rest of the city. Metronapoli S.p.a. will also build a subway line between the district and the central station in Piazza Garibaldi, where it will connect with all lines of rail transport in the city (fig. 10).

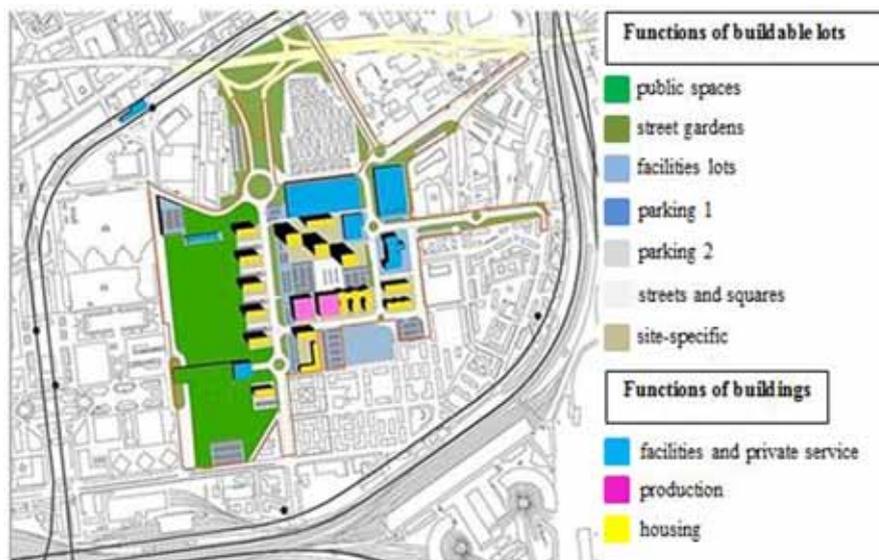


Fig. 10 Business District of Naples. New Planning

“Agorà S.p.A”. is also committed to provide the area with an urban park, in order to overcome the separation between the two levels, now only reserved for pedestrian and cars, respectively.

It is a large urban park located between the section currently existing and the new area, and it will feature a grid of pedestrian walkways and bicycle paths.

“Our project is completely new, and its concept is the smart city. We rely on the principles laid down by the city Administration who does not want to repeat the same town planning scheme as Tange, because it did not work in the management of the territory” (T.O. 8, “Agorà 6” project manager)

Facilities for leisure (cinemas) Sports (gyms, indoor and outdoor pools, soccer and basketball courts) will be built, as well as a school and several green areas, 1,500 car parking spaces at ground level and covered, apartment buildings and finally an area for social housing, with facilities for the disabled.

A system of wireless internet coverage will allow free access to the network in the perspective of smart cities. Finally, a computer network will ensure efficient information services for the dialogue between citizens and the administration.

The idea is to start a new model of relations between the internationally branched I.C.T. companies' supply and the demand of the stakeholders who are well acquainted with local issues.

With such a project, the aim is to "catch" the delay and to "heal the rift" formed between the current CDN and the territory.

The project seems likely to be able to ensure a better integration of the area with the existing urban fabric, leading to a change in the direction of some of the needs of residents and visitors to the CDN who now complain about the lack of infrastructure and services especially for the leisure and fun.

The success of such an attempt would also improve the already existing portion of the Centro. The collaboration between the municipal administration and the team of designers will be essential.

## 7 FINAL CONSIDERATIONS

Clearly to complete the CDN you need to include those components which, although expected, were never really taken into account in the first stage of planning.

As mentioned above, one of the innovative aspects of Tange's project is to have "put man at the center of the scene" so that during the first phase of the project there is a tendency for a "smart design". At present, however, the CDN looks like an exclusively architectural project, unable to capitalize on social and territorial public space.

It was welcomed as an opportunity given to the city by locating "new and rare functions", and creating an opportunity for the recovery of the surrounding areas, mainly residential. In fact, this "giant" did not trigger any process of redevelopment of the eastern end of town or the neighborhood (Poggioreale) where it was built. The result is evident in the urban and social consequences of which we are witnesses. You may not think to make a smart city through top-down directives; when you draw up the urban and territorial plans you need to enable tools that leverage the practices and principles of governance.

It will be necessary to start again from the impulse towards technological innovation of the original concept of CDN and to relate it to the most advanced principles of participated planning and "smart governance".

It is therefore necessary to consider the vocation of our cities, their specificity - for example, the presence of historical centers and a widespread cultural heritage - and give shape to the vision of the future just mentioned.

An efficient and sustainable city must ensure large pedestrian areas and pollution control. The "smart governance" is accomplished through defined objectives, clear plans, actions with a clear financial plan, ongoing monitoring that accompanies all phases of planning and design and divulgation of results.

Unfortunately there is still a rift between the scientific resources (urban planning, sociology, architecture) and the local administration anchored to old principles of planning, too heavily regulated. If only for a short time, "Tange's project" was for Naples an innovative breakthrough in the field of urban planning; however it was not followed by a phase of "smart relaunch" of the city, due to several structural and political constraints that prevented Naples to fulfill the principles and best practices of a smart city.

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## IMAGE SOURCES

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Fig. 2: is from Mededil S.p.a. Elaborated by the authors

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Fig. 9: is from Fabrizio Canfora

Fig. 10: is from Municipality of Naples-Department of Urban Planning

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# TeMA

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## REVIEWS PAGES

### SMART CITY CHALLENGES: PLANNING FOR SMART CITIES. DEALING WITH NEW URBAN CHALLENGES

Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always remaining in the groove of rigorous scientific in-depth analysis. During the last two years a particular attention has been paid on the Smart Cities theme and on the different meanings that come with it. The last section of the journal is formed by the Review Pages. They have different aims: to inform on the problems, trends and evolutionary processes; to investigate on the paths by highlighting the advanced relationships among apparently distant disciplinary fields; to explore the interaction's areas, experiences and potential applications; to underline interactions, disciplinary developments but also, if present, defeats and setbacks.

Inside the journal the Review Pages have the task of stimulating as much as possible the circulation of ideas and the discovery of new points of view. For this reason the section is founded on a series of basic's references, required for the identification of new and more advanced interactions. These references are the research, the planning acts, the actions and the applications, analysed and investigated both for their ability to give a systematic response to questions concerning the urban and territorial planning, and for their attention to aspects such as the environmental sustainability and the innovation in the practices. For this purpose the Review Pages are formed by five sections (Web Resources; Books; Laws; Urban Practices; News and Events), each of which examines a specific aspect of the broader information storage of interest for TeMA.

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News and events section keeps the readers up-to-date on congresses, events and exhibition related to the journal theme.

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## 评述页： 智能城市挑战：规划智能城市。应对新的城市挑战

TeMA 从城市规划和流动性管理之间的关系入手，将涉及的论题逐步展开，并始终保持科学严谨的态度进行深入分析。在过去两年中，智能城市（Smart Cities）课题和随之而来的不同含义一直受到特别关注。学报的最后部分是评述页（Review Pages）。这些评述页具有不同的目的：表明问题、趋势和演进过程；通过突出貌似不相关的学科领域之间的深度关系对途径进行调查；探索交互作用的领域、经验和潜在应用；强调交互作用、学科发展、同时还包括失败和挫折（如果存在的话）。评述页在学报中的任务是，尽可能地促进观点的不断传播并激发新视角。因此，该部分主要是一些基本参考文献，这些是鉴别新的和更加深入的交互作用所必需的。这些参考文献包括研究、规划法规、行动和应用，它们均已经过分析和探讨，能够对与城市和国土规划有关的问题作出有系统的响应，同时还对诸如环境可持续性和在实践中创新等方面有所注重。因此，评述页由五个部分组成（网络资源、书籍、法律、城市实务、新闻和事件），每个部分负责核查 TeMA 所关心的海量信息存储的一个具体方面。

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SMART CITIES CHALLENGES: PLANNING FOR  
SMART CITIES. DEALING WITH NEW URBAN CHALLENGES  
REVIEW PAGES: WEB RESOURCES

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In this number  
PLANNING THE NEW SMART CITIES

With over half of the world population living in urban areas, cities have become the place to address the major challenges of our century. Today, ICT and big data are the main themes which are brought up when talking about smart cities, but although it is evident that the mere use of new technology is not sufficient to build better cities (Barresi, Pultrone 2013), it is undeniable that it provides new approaches not just to plan the city of the future but also to re-think existing cities.

This issue of TeMA focuses on these topics and, here in this section, the three websites proposed can be a very interesting source of inspiration for those who want to study the smart city, project it or work on it.

We start presenting the website of The Centre for Advanced Spatial Analysis (CASA), which is one of the leading research centers in the application of new technology for investigating, modeling and controlling the city; a mix of different expertise collaborate in order to develop new ways of representation of space in time, exploiting the potential offered by new technologies, especially in the field of big data.

The content of the second proposal of this issue isn't focused on the research aspect but more on the best practices is: the website dedicated to the exhibition *Reprogramming the City: New Opportunities for Urban Infrastructure*. Once again the chances provided today by new technologies take center stage, but, this time, for the tangible re-use of existent infrastructure in a smarter and more sustainable way that takes into account another of the most debated issues of our times, that of the soil sealing; the exhibition, in fact, presents several projects in different cities around the world where urban infrastructures have been repurposed with success, providing significant results both in terms of sustainability and energy saving and in terms of recycle of unused urban spaces or facilities, without land consumption.

Then, the third and last proposal presents an Italian research project, co-financed by EU, where new technologies leave the leading role to the boarder theme of the integrated planning of the smart city: the research project *Smart Energy Master (SEM)*, carried out by the Federico II University of Naples, aims at developing a decision support system based on the different aspects that shape the city (physical, anthropic, functional, technological, etc) in order to identify the actions to improve energy efficiency and correct social behaviours that influence energy production and use.

In the following pages each proposal is described in detail



THE BARLETT – Centre for Advanced Spatial  
Analysis  
<http://www.bartlett.ucl.ac.uk/casa>

The Centre for Advanced Spatial Analysis (CASA) is part of the UCL's global faculty of the built environment (The Bartlett), which includes ten amongst schools and labs.

The Centre can be considered one of the most dynamic examples in the science of cities, promoting *new knowledge and insights for use in city planning, policy and design and drawing on the latest geospatial methods and ideas in computer-based visualisation and modelling*. One of the main innovation of CASA is its focus on multidisciplinary method: a great variety of experts works for the Centre, including architects, geographers, mathematicians, physicists, archaeologists and computer scientists that share their skills in order to build a new approach which is able to better understand and model the complexity of our cities.

CASA's website provides all the necessary information about the research centre, organized in six main sections: Programmes, Research, Partnership, People, Latest and About Us. In addition to that, almost weekly, the newsworthy CASA Blog Network offers updates about the research carried out by the Centre; it counts a wide number of contributors and contributions, collected in an easily accessible archive.

In the *Programmes* section you will find information on how you can get involved with CASA. The Centre offers two Postgraduate Programmes – MSc Smart Cities and Urban Analytics, MRes Smart Cities, MRes in Advanced Spatial Analysis and Visualisation – and the PhD research degree.

Short skills-based courses, open to everyone, can be a different opportunity to be involved in the Centre, even though they are not offered on a regular basis but run at various times throughout the year.

The *Research* section includes the description of current and past projects carried out by CASA, nationally and internationally.

*CASA's research is focused on the application of computer models, data visualisation techniques, innovative sensing technologies, mobile applications and urban and regional theory linked to city systems. Spatial analysis, geographic information systems, computer aided design technologies and custom tool-kits are used as basic forms of representation for space-time data. These are explored via a wide range of methods from social physics, scaling to econometric and statistical models, augmented reality and hyper-local sensing.*

CASA collaborates with different companies and organizations from diverse sectors, both for Research & Development and Consultancy; a list of examples can be found in the *Partnership* section.

Moreover, within the section *People*, the staff and students profiles involved in CASA are described: the Centre currently includes nineteen Research Associates and ten PhD students. In addition to this number, two or three excellent international Academic Visitors participate in the activity of the Centre for 2 – 12 months every year. The Centre aims at being a point of reference for the science of smart cities, integrating different expertise to promote a new approach for city planning in its widest perspective.



REPROGRAMMING THE CITY  
<http://reprogrammingthecity.com/>

*Reprogramming The City: Opportunities for Urban Infrastructure is a global overview of ways in which existing urban infrastructure is being re-imagined, re-purposed and re-invented to do more in the city.*

The promoter of the exhibition is the American urban strategist Scott Burnham, who launched the initiative in Boston in June 2013 with the goal of collecting *ideas of how cities can do more with the structures and systems they already have*. After the incredible success of the first edition, a new expanded version of Reprogramming the City has opened at the Danish Architecture Centre, in Copenhagen, in October 2014.

The exhibition at DAC offers a great number of new projects mainly located in Denmark and Scandinavia, with a particular attention to those aiming at repurposing urban infrastructure for food production, such as the *BuzzBuilding* project, by Belathew Labs in Stockholm, that wants to use different infrastructural elements, such as traffic roundabouts, for producing food, or *Growing Underground*, in London, which aims at transforming not-used underground tunnels in safe environment for the future production of food; if we think at Expo Milano 2015, whose title is *Feeding the Planet, Energy for Life*, it seems that the theme of nutrition is exceptionally fashionable at the moment.

The US version of the exhibition is scheduled to open at the Virginia Center for Architecture in Richmond at the beginning of 2015.

The website dedicated to the exhibition collects a description of ten international projects – subdivided in structures, surfaces, systems – that have modified present urban infrastructures in order to re-use them in a smarter way.

Those are the projects presented in the first exhibition, that of Boston, while the ones offered these days at DAC will probably be part of the website in future.

The projects illustrate how today sustainability can be reach just re-thinking existing infrastructure, using new skills, new technologies and new materials. They provide very interesting ideas that can be proposed in different contexts with a relatively small investment.

For example, in Cambridge, the large gray metal boxes often found on street corners have been used to install retractable seating that people can use to rest and observe what's going on around; in Swedish city Umea, instead, with the *Light Therapy* project, the city's energy company replaced the existing lights in some of the city's bus stops with phototherapy anti-SAD (Seasonal Affective Disorder) bulbs, so to mitigate the negative effects on mood due to the dark winter months; in New York, the nowadays rarely used public phone boxes will be transformed in touch screen cabins for all kind of information, both for transportation news, emergency, tourist assistance, etc.

In this time when sustainability has become a necessity and it is important to start using what we already have instead of realizing new urban projects, Reprogramming The City represents a very interesting inspiration for those who want to collaborate for transforming our cities in better place to live in, because much can be done just re-thinking the existent heritage of our urban centres.



SEM – SMART ENERGY MASTER  
<http://smartenergymaster.unina.it>

The project *SEM – Smart Energy Master for the energy management of territory* is carried out by the Department of Civil, Architectural and Environmental Engineering (DICEA) of Federico II University, in Naples, and it has been financed by PON 04a2\_E R&C Axis II.

It addresses the ever present theme of energy efficiency using an integrated approach which takes into account the different aspects of the city: urban activities, mobility, environmental sustainability and citizens behaviours. The aim is to identify and propose best practices inclined to energy saving and efficiency and to create a mathematical model that correlates the built environment, natural context, user behaviours and energy consumption to develop a decision support system for local administrations that wish to promote strategies, actions and operations to improve the energy efficiency of urban systems and correct social behaviours that influence energy production and use.

A dedicated website describes the project in details; the navigation through the website differs depending on the profile of the user: you can choose between five different profiles (Professional, Institution, Company, Researcher and Family).

Once you have selected your profile, you can surf the site picking one of the four areas of interest corresponding to the main activities within the project, which are Research, Experimentation, Dissemination and Education.

Each activity has its own products; for example, the Energy Efficiency Database is one of the Experimentation's products and it collects over seven hundred documents, including scientific publications, international and national datasets, laws, best practices and much more about the issues of energy efficiency, smart cities, urban sustainability and resilience. It represents a useful tool for those who are interested in these topics and want to know something more.

The section Diary describes the evolution of the project by showing the video of the meetings attended by all members of the research group, which counts almost forty senior and junior researchers. The group's structure is presented in an organizational chart followed by a brief biography of each researcher.

One more interesting section of the website is the Mediateca, the Audio-visual library, a collection of tv videos, interviews, events and press review attesting the work done by SEM's researchers in Italy and outside the national territory for the dissemination of the results of the project.

SEM officially started in February 2014 and it will end in May 2015, little more than a year to meet ambitious targets in the field of energy sustainability.

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## IMAGE SOURCES

The images are from: [http://commons.wikimedia.org/wiki/File:Singapore\\_Skyline\\_at\\_Dusk.jpg](http://commons.wikimedia.org/wiki/File:Singapore_Skyline_at_Dusk.jpg);  
[https://www.flickr.com/photos/re\\_birf/69485977/](https://www.flickr.com/photos/re_birf/69485977/); <http://www.ucl.ac.uk/cpc/?p=35>;  
<http://reprogrammingthecity.com/>; <http://smartenergymaster.unina.it/index.php>.

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## SMART CITIES CHALLENGES: PLANNING FOR SMART CITIES. DEALING WITH NEW URBAN CHALLENGES

### REVIEW PAGES: BOOKS

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In this number

### SMART CITY PLANNING: WHICH APPROACHES AND TOOLS

The targets set by European Union for 2050 are almost ambitious: about 90% reduction in greenhouse gas emissions and the achievement of a near-zero carbon energy system. As assumed in several documents and debates, urban areas, responsible for most total energy demand, are the strategic places for intervention, in order to transform them into resource efficient and low carbon systems. Therefore, such a demanding and important transition requires changes in planning and decision making process and this approach is encouraged by the European Commission that pushes for the integration of the environmental, energy and climate change policies with land use ones. The problems generated by the current urban population growth and rapid urbanization processes cannot be tackled by a sectoral approach, but it is rather useful adopting an holistic one, considering cities as urban energy systems whose production and consumption of resources can become more sustainable and efficient by implementing synergic strategies and actions. In this building process of more efficient and sustainable cities, the paradigm of smart city has been developing, meaning as a city capable of integrating different dimensions of development, managing carefully natural resources and ensuring a greater transparency and participation to decision-making processes (Papa, Gargiulo, Galderisi, 2013). The smart city approach could provide the possibility of a new understanding and management of the city problems, on the one hand, and define new tools for the city transformation government, intended as a laboratory for innovation, on the other. In other words, the topic of smart city should be considered as an opportunity to reflect on the basic concepts of urban development, through a conscious use of ICT, supported by an urban community capable of revising its lifestyles, according to the sustainability and energy saving targets. According to these brief considerations, this section proposes three documents that help to better understand and plan the city: the first collects the latest experiences and knowledge on smart city, as a smart city should inevitably require contexts able to support its realization; the second benchmarks the future competitiveness of cities, as a city needs to improve its smart quotient in order to be more attractive and so more competitive (Papa, Gargiulo, Franco, Russo, 2014); the last one analyses the rules and codes that allow to facilitate the implementation of ICT in the smart cities.



**Title: Towards Smart City – a scientific approach**

Author/ editor: AA VV

Publisher: ARACNE

Download: n.d.

Publication year: 2014

ISBN code: 978-88-548-7024-6

The publication of this volume has been driven by the aim of deepening the content, the opportunities and the potentialities that the new paradigm of the smart city is able to provide. The building of smart cities is a process still in progress and requires, therefore, the development of researches, reflections and experimentations, through which defining the context in which policy makers, planners and technicians have to operate. This volume collects a selection of the papers published in the TeMA Journal in the period 2011-2013, as well as some unpublished studies that deal with the relationship innovation-city within the perspective of smart city. Although there is not a univocal and shared definition of smart city yet, nor is possible to decline the urban dimension of this concept, there is a broad consensus that smart cities are characterized by the use of ICT to improve the quality of life. In this perspective, the volume can represent an important point of reference in order to offer a multidisciplinary framework paying special attention to the four components of the smart city: mobility, energy, security and sustainability, any of which is described from different points of view. The papers about transport aim at studying, on the one hand, how the use of ICT can help improve the efficiency of this sector, and on the other, what strategies and actions should be put in place to increase sustainability. If thanks to new technologies several benefits in terms of safety, viability and productivity can be achieved, it is also necessary to inquire how and to what extent the change of behavior and travel patterns contribute to the environmental sustainability and energy goals established by the EU. In addition to mobility, the building sector is another area responsible for a significant share of consumption in urban areas (40% according to EU data) and energy management for the built environment, building and architecture continues to be a theme of great interest in both research and practice in urban planning. The papers related to the energy component of the volume tackle the different levels of actions (the building element, the entire building, the neighborhood) and possible integration between urban planning and energy issues, through the description of some Italian best practices. Urban resilience is the underlying theme of the papers about the safety component. These contributions compare the different theoretical approaches for the study of urban resilience and the different strategies and actions implemented at national and local level, in order to identify the main properties and adaptability capacities that should characterize an urban resilient system. The last component of the smart city described within the volume is the sustainability and it has been studied in relation to the cultural heritage as a public good, to the urban evolution models and to the possible changes in lifestyle. The summary of the main contents of the papers that make up the volume allows to assert that the paradigm of the smart city is characterized by a holistic approach that allows to deal with the recent urban challenges, on the one hand, and to know how to exploit the advances offered by ICT on the other. Therefore, if the components and development opportunities can be defined, the effort required should be to create a «real shift in the balance between the power of ICT use by business, government, communities and ordinary people who live in cities» (Hollands, 2008).



**Title: Hot spots 2025 Benchmarking the future competitiveness of cities**

Author/ editor: AA VV

Publisher: The Economist

Download: <http://www.citigroup.com/citi/citiforcities/pdfs/hotspots2025.pdf>

Publication year: 2012

ISBN code: n.d.

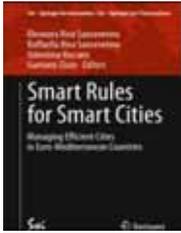
The 2025 City Competitiveness Index benchmarks the competitiveness of 120 cities across the world at today and in 2025 to identify those cities that best embody a growing economy, good infrastructure, a good legal system, an inviting and productive culture and good policy that determine long-term stability and success and, based on projections, where they will at the quarter-century mark.

This EIU's (Economist Intelligence Unit) latest report examines 32 indicators for each city and these indicators are grouped into eight thematic categories and assigned weights: economic strength (including GDP), physical capital (infrastructure equipment), financial maturity (the strength of a city's financial institutions), institutional character (including the fiscal autonomy), human capital (e.g. education), global appeal (including quality of higher education), social and cultural character (including crime rates), and environment and natural hazards. The eight category scores are calculated from the weighted mean of these indicators and scaled from 0-100, where 100 is the most favorable. The City Competitiveness Index includes a total of 27 qualitative and five quantitative indicators.

According to the report, North American and European cities are among the world's most competitive ones and are likely to retain their advantage until 2025. These cities will continue to attract capital, tourists and talent, despite concerns over aging populations, infrastructure, and lingering impacts of the financial crisis. However, the Eurozone crisis will impact cities in Southern and Eastern Europe, creating a '<<competitiveness divide' in the region>>'. For instance, Madrid (joint 46th), Rome (68th), and Bucharest (80th) fall in the rankings from 2012 to 2025.

Among the top 25 most improved no Chinese city is ranked and, according to the report, it is due to the progress that many Chinese cities made during the first decade of this century. By 2025, China will have surpassed the United States as the world's largest economy, thanks to strong growth, rapid urbanization and rising productivity. China and India are fast growing countries and their combined GDP is expected to exceed that of the major seven (G7) economies by 2025. The cities that top this list (e.g. New York, Tokyo, Paris) are among the wealthiest ones, because tend to be economically strong: in fact, five of the top 10 most competitive cities in both 2012 and 2025 are in the top ten for GDP. Most top ten cities have high scores in terms of both international attractiveness and accessibility, in addition to a rich and socially diverse culture. All these factors are important to attract talented people who often value working in a city that is different from the other ones in terms of entertainment and opportunities.

There is much greater change among cities outside of the top 10: much of the competitiveness growth in the next 13 years is expected to take place in Asian cities, such as Doha (Qatar) and Mumbai (India). Meanwhile, cities such as Madrid and Rome are expected to fall significantly from 2012 to 2025, mostly due to a weakened European economy. Summarising, this EIU research helps both enhance understanding which factors are driving urban competitiveness and illuminate how the highest performing cities continue to create competitive advantages.



**Title: Smart Rules for Smart Cities: Managing Efficient Cities in Euro-Mediterranean Countries**

Author/editor: Riva Sanseverino E., Riva Sanseverino R., Vaccaro V., Zizzo G.

Publisher: Springer

Download: n.d.

Publication year: 2014

ISBN code: 978-3-319-06421-5

This book proposes a methodological approach to provide local administrations with a smart building code, taking into account the current European regulatory framework (directives and technical norms) and evaluating the economic feasibility of the suggested measures, by studying as case study a large Mediterranean city in Italy. It is assumed that modern cities need new rules and codes dealing with environmental and energy issues and that should be characterized by an integrated and bottom up approach.

In this perspective Italy is considered as a paradigm of the evolution of cities, between historical heritage and bureaucracy. The first two chapters are oriented to deserve an overview of the meaning and the key features of the smart city and of some smart experiences developed in European cities. Smart governance, smart mobility and smart energy are defined as the main pillars of a smart city, because a smart city means a city where the participation is the requirement for all decision processes, where there are public, innovative, low environmental impact and efficient transportation modes and where energy efficiency and saving characterize all the activities.

Even though these three components represent the *conditio sine qua non* a city cannot be smart, the authors point out that the smartness involves the change of people's habits towards sustainability and sharing and saving resources.

The importance of the energy issue is remarked since the very first pages of the book, endorsing the need to integrate energy and climate policies with the planning and management territory ones.

According to the authors and to the aim of the book, the municipal building codes can represent an efficient tool for achieving the goals both of reduction of energy consumptions and increase of renewable energy.

The building sector is a central point in the energy policy of Sicily region (the case study region analysed within the book) where more than 80% of buildings show a very low energy performance and where the existing building codes are not updated to the new quality control system.

In order to improve the energy performance of buildings, through the revision of the municipal building regulations, the guidelines for the definition of the energy annex to the municipal building codes are described. These guidelines are articulated into four areas that are composed of different articles: environmental sustainability and context appraisal, energy performance of building envelope, energy performance of technical systems and renewable energy systems.

After illustrating this concrete example of the definition of guidelines, the authors analyse the economic impact of some measures for energy efficiency, both active (Building Automation Control, Technical Building Management) and passive measures (passivhouse standard), in a single-family house located in Palermo. Definitely this book, on the one hand explores rules, codes and the economic impact of building automation and passive measures for energy efficiency, providing an evaluation both at Italian level and regional one, but only for Sicily region; on the other, offers some brief causes for reflections on what should be the urban smartness: the joint point among innovation, sustainability, participation and governance.

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## SMART CITIES CHALLENGES: PLANNING FOR SMART CITIES. DEALING WITH NEW URBAN CHALLENGES

### REVIEW PAGES: LAWS

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In this issue

### MEASURES ON TRANSPORT, BUILDINGS, ENERGY AND ENVIRONMENT TO CORRECT ITALIAN MACROECONOMIC IMBALANCES

The European Union's economic governance framework set up in 2011, named "Six Pack", has placed a greater emphasis on prevention and correction of macroeconomic imbalances for the European Member States. With the Regulation N.1174/2011, "on establishing enforcement measures to correct excessive macroeconomic imbalances in the euro area", and 1176/2011 "on the prevention and correction of macroeconomic imbalances", the European Union established an alert mechanism for detecting and correcting macroeconomic imbalances and provide for sanctions applicable if a Member State repeatedly fails to comply with the recommendations made at European level.

Each year, usually in November, the Commission prepare "the Alert Mechanism Report" comprising an economic and financial assessment based on a scoreboard that contain specific economic indicators for the detection of macroeconomic imbalances. The Alert Report identifies the Member States who are at risk of macroeconomic imbalance and that are expected to be subject to a more detailed analysis (the so called In Depth Review - IDR). If the IDR reveals that there is a country in serious economic imbalances, the Council adopt a recommendation asking the Member State to submit the "Correction Action Plan" with the identification of specific policy actions and specific terms of implementation.

On Novembre 13th 2013, adopted the third Alert Mechanism Report (EC 2013) adopted by the European Commission, recommends an in-depth review of economic developments in 16 Member States, including Italy, which have different challenges and potential risks that could spill over to the rest of the euro area and wider EU. As the European procedure stated, on 5 March 2014 the Commission published the results of its in-depth review for Italy concluding that Italy is "experiencing excessive macroeconomic imbalances, which require specific monitoring and strong policy action. In particular, the persistently high level of the public debt coupled with weak external competitiveness on account of sluggish productivity growth, and further exacerbated by protracted dismal growth, warrant decisive policy action and attention" (EC 2014a). Above all, the Commission stressed that the major impediments to the materialization of reforms' beneficial effects on the economy are represented by the bottlenecks of institutional nature and that the effective implementation of policy measures adopted recently and in previous years remains the country's Achilles' heel.

In April 2014, Italy submitted its Stability Programme and National Reform Programme (NRP), respectively outlining updated fiscal targets and planned policy measures to restore economic growth and help unwind imbalances (EC 2014 b).

In July 2014 the European Council published eight specific recommendations for Italy (the so called CSRs), targeted at the correction of the imbalances identified (high public debt and weak external competitiveness). The CSRs addressed to Italy concerned a wide range of policy domains: public finances, taxation, public administration, financial sector, labour market, education and network industries. Here the main content:

1. Reinforce the budgetary measures for 2014 in the light of the emerging gap relative to the Stability and Growth Pact requirements,
2. Further shift the tax burden from productive factors to consumption, property and the environment, in compliance with the budgetary targets;
3. As part of a wider effort to improve the efficiency of public administration, clarify competences at all levels of Government.
4. Reinforce the resilience of the banking sector and ensure its capacity to manage and dispose of impaired assets to revive lending to the real economy;
5. Evaluate, by the end of 2014, the impact of the labour market and wage-setting reforms on job creation, dismissals' procedures, labour market duality and cost competitiveness, and assess the need for additional action;
6. Implement the National System for Evaluation of Schools to improve school outcomes in turn and reduce rates of early school leaving;
7. Approve the pending legislation or other equivalent measures aimed at simplifying the regulatory environment for businesses and citizens and address implementation gaps in existing legislation. Approve the pending legislation or other equivalent measures aimed at simplifying the regulatory environment for businesses and citizens and address implementation gaps in existing legislation. Foster market opening and remove remaining barriers to, and restrictions on, competition in the professional and local public services, insurance, fuel distribution, retail and postal services sectors. Enhance the efficiency of public procurement, especially by streamlining procedures including through the better use of e-procurement, rationalising the central purchasing bodies and securing the proper application of pre- and post-award rules. In local public services, rigorously implement the legislation providing for the rectification of contracts that do not comply with the requirements on in-house awards by 31 December 2014;
8. Approve the list of strategic infrastructure in the energy sector and enhance port management and connections with the hinterland (EC 2014 c).

A first step to reach these goals, and in particular the seventh one, is represented by the Decree law 133/2014, the so called "Unlock Italy", "Urgent measures on the opening of construction sites, the execution of public works, the digitalization of Italy, bureaucratic simplification, the hydrogeological emergency and the recovery of production" recently converted with amendments by Law no. 164 of November 11th, 2014.

This regulatory provisions, representing the effort put in place by Renzi's Government to revive the Italian economy, after it returned to its third recession in five years, is examined in depth in the next paragraph.



## THE "UNLOCKED ITALY" LAW: MEASURES AND FINANCIAL FUNDS TO REACTIVATE ITALIAN ECONOMY

The measures contained in the Law no. 164 of November 11th, 2014 are aimed at relaunching Italian economy simplifying procedures and releasing financial resources to restart sectors such as: infrastructure, transport, construction, environment and energy, as well as support business and territorial authorities. The main measures introduced by the "Unlock Italy" law are explained below according to the first five sectors previously identified.

### *Measures on Infrastructure and transport (art. 1 - 16)*

This first group of measures are aimed at promoting the implementation and the completion of public infrastructures, providing on the one hand administrative and procedural simplifications and, on the other hand, allocating funding for the projects.

In the period 2014-2020, the resources allocated to the development of public infrastructure and transport networks works amount to 3,9 billion. The initiatives implemented concern:

- The use of derogatory mechanisms than the ordinary rules governing the award and the appointment of special commissioners for the realization of high-speed railway axis such as the railway Naples – Bari, the rail axis Messina-Palermo-Catania, the rail axis Verona-Padova, and so on;
- The allocation of about 5,000 million euro for the development of the national railway network in addition to 220 million euro for the existent railway network's extraordinary maintenance. Additional resources for 335 million euro are allocated for unlocking works ready to start within certain dates including: the completion of the railway of Turin and of the metropolitan Line 1 in Naples;
- The exclusion from the Stability Pact in relation to some unfinished work by the municipalities;
- The investment of 200/250 million euro in ultra-wideband telecommunications networks in the next 5 years;

As observed by the Commission of the Chamber of Deputies, the conspicuous use of derogatory mechanisms, such as the appointment of special commissioners and special procedures for interventions for prevention of seismic and hydrogeological risk only on the basis of the "extreme urgency", was not always fully effective in the past, with negative impact on time and cost in the phase of execution.

A lot of transparency is then required (Camera dei Deputati 2014).

### *Measures on on building stock (art. 17 - 27)*

Many measures are introduced to stimulate the activity of the building sector and to steer development towards sustainable choices: administrative streamlining; incentives to the enhancement and restoration of existing buildings stock, both public and private, rather than its further extension; facilities for the support of the rental market. The main changes are made to DPR 380/2001 and concern:

- the possibility to split an apartment in more apartments or merge more apartments with a simple "Comunicazione di Inizio Lavori" (CIL), and no longer on request of the building permit, thereby shortening time and costs;

- the issuance of the building permit notwithstanding planning instruments for building renovations and urban restructuring implemented in abandoned industrial areas, and not only for buildings and public facilities;

With regard to the tax benefits, for those who buy accommodation and places it to rent for the next 8 years there will be a deduction on taxable personal income tax equal to 20% of the purchase price of the property.

#### *Measures on environment and energy*

Chapter VIII of the law introduces a series of measures aimed at regulating the procedure for environment reclamation and urban areas regeneration that are defined by their characteristics of “national interest” (eg. the areas of the ex industrial site in Bagnoli Coroglio). First of all, the regulatory text specifies that the provisions related to the process of reclamation and of the transfer of the areas, as well as the process of development, approval and implementation of the program of environmental rehabilitation and urban regeneration, are the exclusive competence of the State as stated by the Article. 117 of the Constitution.

The identification of the areas of national interest takes place by resolution of the Council of Ministers. For each area will be prepared a document of strategic urban regeneration and a specific program of environmental reclamation whose development and implementation concern to a Special Commissioner of the Government and an Actuator Subject. To accelerate the implementation of the programs the new law also provides for the halving of the terms of Legislative Decree no. 163/2006 for the completion of the public procurement procedure and the transfer of the areas of national interest to the implementing body.

In the same Chapter, a special attention is given to measures aimed at the construction of energy recovery starting from municipal and special waste, considered strategic infrastructure of national relevance in order to implement an integrated and modern waste management, achieve self-sufficiency at national level and overcome the European infringement procedures.

The legislator's attention to the measures on energy (Chapter IX) is justified by the growing political instability in some of the countries that are among the main Italian suppliers of energy commodities.

From the energy point of view, in fact, the measure recognizes as strategic the prospecting, the exploration and the production of hydrocarbons and the underground storage of natural gas in order to reduce the national energy dependence. It is expected that when those activities involve the change of planning tools, the authorization is granted to take effect in urban variant.

The legal provision also carries the revision of incentives for the purchase of low-emission vehicles overall provided for in Articles 17 to 17-k-decies of Decree. 83/2012, and the thresholds for recognition of the contribution.

In conclusion, the legislative initiative continues in the footsteps of many previous regulatory interventions that have introduced punctual and episodic measures related to different sectors and not framed in an organic reform plan. As noted in a recent report by the Chamber of Deputies., the most delicate phase will cover “the enactment of the second rank legislation to which the law refers the implementation of many measures; in the recent past this stage it is in fact proved to be one of the main weaknesses of the reform interventions” (Camera dei Deputati 2014).

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## IMAGE SOURCES

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SMART CITIES CHALLENGES: PLANNING FOR  
SMART CITIES. DEALING WITH NEW URBAN CHALLENGES

## REVIEW PAGES: URBAN PRACTICES

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In this number

### URBAN DENSIFICATION: THREE CASE-STUDIES

According to the United Nations Population Fund, in 2009 the proportion of the global population living in urban settings exceeded 50% for the first time in history, with an estimated 3.4 billion people living in urban areas, more than the entire global population in 1960. This trend is expected to continue, with urban areas absorbing all of the expected population growth over the next four decades (UNFPA, 2014).

The city's population growth is naturally related to the world's general growth in population. Lower rate of mortality and a higher level of fertility are the principal drivers of growing of the population. However, statistics do not only indicate a general growth in cities' population due to the natural increase, the share of urban dwellers related to the total world population is increasing at another pace, not proportional to the natural growth but higher (UNFPA 2013). Indeed a growing share of population is moving to cities and towns in search of employment, educational opportunities and higher standards of living. These demands of living standards require an urban society where conditions like density, scale and economies of scale exist, conditions that are not present in rural areas (UNFPA 2013).

While cities are attracting a growing population, they have become a source of environmental concerns. Cities are responsible for 67% of the total global energy consumption and more than 70% of greenhouse gas emissions and these trends significantly intensify the severity of some of the two great challenges of our time: climate change and energy security (Hoorweg et al., 2010).

These trends in urban demographics impose a new challenge for contemporary cities: the need to accommodate a diverse and growing population within a limited land area in a more sustainable and resource efficient way. This challenge is even greater for those cities characterized by a strong economy, a culture of innovation, or a high quality of life, as the ones described in this contribution, whose population is growing at a faster rate, especially following the recent economic crisis.

In order to answer to this new urban challenge, many European cities have promoted the concept of 'compact city', which promotes high density and mixed land-use, on the basis of environmental arguments. Advocates of this approach present several attributes of the compact city (Dempsey et al., 2010; Vallance et al., 2010; La Rocca, 2010). It contributes to the preservation of rural areas outside of the city like farmlands and forests. In addition, it improves efficiency of transport systems and its profit due to an increase in the public transportation use (Newman & Kenworthy, 1989). Furthermore, in a compact city, the closeness enables

people to live near their workplaces. This is believed to reduce the overall transport emissions, as movement by foot or bike becomes a realistic alternative (La Rocca, 2011).

Many cities are currently promoting policy initiatives aimed at creating high-density mixed-use urban forms as a means to ensuring more sustainable development patterns. In this contribution, we present three European case studies: i) Helsinki (Finland); ii) Munich (Germany) and iii) Amsterdam (the Netherlands).



## HELSINKI (FINLAND)

Helsinki, the capital of Finland, has a population of approximately 620,000 and an urban population of 1.2 million, making it the most populous municipality in Finland and the world's northernmost urban area among those with a population of over one million ((www.scb.se). The surface area of Helsinki is 214 square kilometre, spreading across a number of bays and peninsulas, and encompassing a number of islands. The inner city area occupies a southern peninsula where the population density in certain parts can be as high as 16,500 inhabitants per square kilometres but, as a whole, Helsinki's population density of 3,050 per square kilometre ranks it as quite sparsely populated in comparison to other European capital cities. Indeed, much of Helsinki outside the inner city area consists of post-war suburbs separated from each other by patches of forest. Helsinki has experienced strong growth from the end of World War II up until the 1970s consisting in a massive exodus of people moving from the countryside to the city. After that period, due to an increasing scarcity of housing and the higher costs of living in the city, many residents began to move to neighbouring Espoo and Vantaa, where population growth has since soared. This dramatic movement of people from the city to the satellite neighbourhoods pushed the municipalities of greater Helsinki into more intense cooperation in such areas as public transportation, land use planning and waste management.

Today Helsinki is one of the fastest growing urban regions in Europe (IGEAT, 2010). The City of Helsinki pursues an explicit densification policy both through the assigning of brownfield sites to new development and by the promotion of smaller infill projects where practicable. These measures are often referred to as 'consolidation' or 'defragmentation' in a similar manner to the national level guidelines where the respective principle can be translated as either. These consolidation strategies have been defined in a number of planning documents. The principle of consolidation/defragmentation was agreed upon by the City Council in its Strategic Programme in 2009. It is also one of the key principles in the agreement that the municipalities of the Helsinki region made with the Finnish Government in 2012 in order to improve coordination of the land use relevant decisions made within the region. The principle of consolidation is also the fundament of the New City Plan, a long-term land use target condition extending to 2050. According to it, the population forecast for 2050 is 850,000 people, that means that the city will accommodate in the next years about 250.000 people and about 130.000job, which equals, according to the plan provisions, to about 18 million square meters to be built, i.e. 350,000 square meters a year. The Helsinki of 2050 will be more densely populated in all areas than that of today. New construction will be mainly located around the suburban railway stations.

The downtown area will also expanded from its current size. Space for new construction in the downtown area will be taken from along the motorways and motorway-like streets of today. Some parts of the motorways may have been covered or turned into tunnels. A strict system of planning rules and a particular situation in land owning are the key successful factors that are paving the way to a more compact and sustainable city. Indeed, the city of Helsinki owns about 65 % of the land within the municipal area of Helsinki. In addition to

this, the state owns about 13.6 %, which means that nearly 80 % of the land in Helsinki is owned by the public sector. The municipality can use the power derived from preserved ownership and strict guidelines to ensure for example infilling projects by demanding the developer to do a certain amount of infilling as a condition for building there, which might not be done if the developer owned the land since it is not always feasible for the developer. Finally, another important successful conditions is the coordination of all the densification initiatives under the same project called “Densification project” which is a project aiming to coordinate all projects in Helsinki that are being developed inside the existing building structure.



## AMSTERDAM

Amsterdam, the capital and most populous city of the Kingdom of the Netherlands, has a population of approximately 814,000 within the city-proper, 1.1 million in the urban region and 1,6 million in the greater metropolitan area ([www.cbs.nl](http://www.cbs.nl)). It comprises much of the northern part of the Randstad, one of the larger conurbations in Europe, with a population of approximately 7 million as well as one of the top financial centers in Europe. The city surface area is 219 square kilometre, spreading across 90 islands, which are linked by more than 1,200 bridges, crossing about 100 kilometres of canals. Despite its unique morphology, the city is intensely urbanized. Indeed, the city proper has 4,457 inhabitants per square km and 2,275 houses per square km. Parks and nature reserves make up 12% of Amsterdam's land area.

Amsterdam has shown the fastest population growth rate among major Dutch cities, which in turn have grown three times faster than the 1% average of the Netherlands as a whole since 2009. Amsterdam increased by 25,000 people between 2009 and 2011, compared to an increase of less than 1,000 per year in the previous decade. ([www.cbs.nl](http://www.cbs.nl)). Accelerated growth in Amsterdam is due to foreign and domestic inflow into the area. Since the seventies, concepts for compact forms of urbanization have played a major role in the city planning system. Amsterdam's Municipality started working towards a Compact City since 1978, when the citizens contested the transformation of the city core in a central business district and the relocation of the inhabitants of the city center in the periphery (Morbelli, 1997). As a result, the City Council, which was facing with the task of finding space for new developments, switched its planning policy and opted for the promotion of a 'compact city' in opposition to the 'fragmented city'. The new City Plan promoted the mixed-use, the diversity and the intense use of space to enhance spatial and functional efficiency and to fight social imbalances and the bad economy that have influenced the attractiveness of the inner city.

The concept of the compact city has been further confirmed with the publication of the report 'De compacte stad gewogen' (The Compact City Evaluated, NPPC, 1985) in 1985, which motto was 'the city in the centre', and with the 'City Central Structure Plan', that promoted the process of reversion of the de-urbanization in favor of developing a compact urban structure. The Amsterdam Structure Plans, 1991, 1996, 2003, were adopted by the City Council that implemented the 'compact city' as the basic principle by introducing also policies for social renewal that were meant to provide a solution for socially disadvantaged people. New policies to reduce the commuter traffic has been also introduced, by increasing the connections with the most important employment areas with bus, tram and trains and by developing a new system of good urban cycle routes linked with public transports.

Urban densification represents one of the six spatial tasks contained in the new city master plan named Structural Vision Amsterdam 2040 (City of Amsterdam, 2011). According to it, more intensive use of the space in the city will make it possible to accommodate many more people and businesses. This will increase the customer base for amenities, which will make it possible to manage energy and transportation more efficiently and remove the need to infringe upon the landscape. In concrete terms, the plan includes measures to realize an additional 70,000 dwellings between now and 2040, with the corresponding amenities such as schools, shops and sports facilities. Furthermore, as a component of densification, various monofunctional business parks will be transformed into areas with an urban mix of residential and business functions.



## MUNICH

Munich is the third largest city in Germany, after Berlin and Hamburg and represents one of the European powerhouses of the rapidly expanding knowledge economy. With a population of around 1.49 million, the city forms the core of a fast growing urban region of 5.6 million inhabitants ([www.destatis.de](http://www.destatis.de)). The city surface area is of approximately 310 square kilometers spanning across the elevated plains of Upper Bavaria. With an average population density of 4,500 inhabitants per square kilometers, Munich is the most densely populated city in Germany.

Since 1950, population in the city has grown from 823,892 to about 1.49 million. Consequently, the built-up area as well as the space taken up by infrastructure has increased considerably. Space demand per capita for both living and working has grown continually and is still increasing; at present, no limit is visible. Currently the city is experiencing the strongest population increase in Germany. The population of the city of Munich will grow further according to recent forecast by 5 percent until the year 2020, mainly by immigration from other parts of Germany and Europe; the region even more by more than 10 percent. One of the city's top priorities in housing is to annually complete 6'000 to 7'000 units ([www.destatis.de](http://www.destatis.de)).

The City of Munich pursues an integrated urban development strategy that explicitly tries to countervail urban sprawl and to densify existing build up areas. The principle of consolidation is one of the pillar of 'Perspective Munich', the city's strategic development plan. Its guidelines define new urban development aims and directions and consists of ten guidelines with objectives of economic, social, spatial and regional development. Key to countervail unwanted urban sprawl is two transversal strategies of 'Perspective Munich': "internal expansion" and "urban, compact, green". In the interest of sustainability, the use of previously undeveloped, unsealed land will be sharply reduced when new residential areas are being developed. The focus of 'internal expansion' lies on concepts designed to reuse and restructure existing build up areas fallen out of their use, for instance former industrial or railway land and former military barracks that lie within city-limits. The abundance of such type of areas close to the city center represents a big opportunity for the city to pursue its densification objectives. Indeed, for most users it is very attractive to concentrate activities on these restructuring areas since they are embedded in existing infrastructure, available and partly reusable buildings and mostly have rather good integration into the public transport network. The already existing urban context offers the chance to ameliorate neighbouring areas by new housing, more open space and a better social infrastructure.

'Compact, urban, green' as one of Munich's key strategies for spatial development combines dense urban land use for all purposes with the promotion of mixed use developments whenever possible instead of mono-

functional commercial or housing areas. Together with the polycentric system of district-centers that spread over the entire city, the mixed-use approach will also secure a density of social life and short distances for many citizens to get to their jobs, schools and shops. This will help to increase walking and cycling and using public transport instead of private cars for the everyday mobility. The notion of “green” in this context implies that parks and green open spaces in the city must not only be safeguarded and enhanced, but also significantly augmented in quantity.

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SMART CITIES CHALLENGES: PLANNING FOR  
SMART CITIES. DEALING WITH NEW URBAN CHALLENGES  
REVIEW PAGES: NEWS AND EVENTS

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In this number  
URBAN CHALLENGES

In the recent decades the urban areas, especially the metropolises are interested to the growing of the resident population. According to data provided by the Department of Economic and Social Affairs of the United Nations Secretariat (UN DESA), the resident population of the urban areas is increased every year approximately of the sixty million. Currently there are some countries, like the US, Brazil, Mexico, France, Argentina and Belgium, in which the rate of the urban population is already over 75%. The UN DESA expected that by 2050 the resident population of the urban areas will be over six billion. One of the continents affected to the high rates of urban population is the Europe, where according to the Statistical Office of the European Union (Eurostat), more than 70% percent of the population lives in urban areas. So in the near future will be greater the necessity of the new physical spaces and energy demand, that are essential for the conduct of all economic and social activities. The European authorities have introduced a series of political and financial instruments so the cities of the future will be able to: Adopt a global model for sustainable urban development; Solve those challenges by an integrated and comprehensive approach; Combine the approaches based on land and people; Alongside the formal structures the governance, other structures more flexible and informal reflecting the level at which the various challenges present themselves; Develop a governance system capable to create a lot of shared visions and goals reconcile conflicting and divergent patterns of development; Work together to ensure territorial development consistent and efficient use of resources (Gargiulo et al., 2013).

In this perspective of sustainable use of resources is part of the new vision of the Smart City, thanks to what makes it differ from 'sustainable cities' or 'ECO cities' is the use of Information and Communication Technologies (ICTs) in the process of creating a more sustainable city, but also the availability and quality of knowledge communication and social infrastructure (Papa, 2013).

So through the use of ICTs, which will allow to collect and analyze large amounts of data and information, it will be possible to better understand the needs of those who live and use the city. So to start the planning process that can improve the efficiency, equity and quality of life of citizens and the ability to cope the future challenges.

In this issue were selected some international events taking place in the coming months and that highlight the importance of paying particular attention to the analysis of the phenomena affecting the development of urban areas in view of the smart city.



## 7TH INTERNATIONAL CONFERENCE ON SUSTAINABLE DEVELOPMENT AND PLANNING

Where: Istanbul - Turkey

When: 19 - 21 May 2015

<http://www.wessex.ac.uk/15-conferences/sustainable-development-and-planning-2015.html>

The Seventh International Conference of Sustainable Development and Planning addresses issues of regional development in an integrated way and in accordance with the principles of sustainability and builds upon a series that started in 2003 in Skiathos, Greece, followed by other meetings in Bologna (2005), Algarve (2007), Cyprus (2009), New Forest, UK (2011), and Kos, Greece (2013). One of the main arguments discussed in this series of conferences was to give primary importance to all those studies that focus on how to encourage the development of new types of integrated planning between the different subsystems that affect the urban and rural development, and also the different subjects involved in decision making.

The accelerated urbanization has brought to the environmental degradation and the loss of quality of life. The urban development may also aggravate the problems afflicting in rural areas, such as forests, the mountain areas and the coastal areas, among many others. Taking into consideration the interaction between the different regions and the development of new methodologies for monitoring, planning and implementation of new strategies to avoid solutions that promote environmental pollution and unsustainable use of natural resources. The energy saving and eco-building approaches have become an important part of modern development that places special emphasis to the optimization of resources. The Urban Planning has a key role to ensure that these solutions and processes are incorporated in the most efficient. The Seventh International Conference on Sustainable Development and Planning aims to bring together scientists and other stakeholders from around the world to discuss the latest scientific advances in this field. The conference will also seek to highlight developments in management strategies and assessment tools for policy and decision makers.



## ICURHR 2015: XIII INTERNATIONAL CONFERENCE ON URBAN RENEWAL AND HOUSING REHABILITATION

Where: Venice - Italy

When: 13 - 14 April 2015

<https://www.waset.org/conference/2015/04/venice/ICURHR>

The XIII International Conference on Urban Renewal and Housing Rehabilitation, organized by the World Academy of Science, Engineering and Technology. It addresses to major academic scientists, researchers and scholars to present the experiences and results of their research on the issues that concern the urban renewal and housing rehabilitation. Also this constitutes an excellent opportunity for researchers, practitioners and educators to discuss with an interdisciplinary and multidisciplinary approach, the innovations, the trends and the issues on these themes.



## REGEN 2015

Where: Liverpool – United Kingdom

When: 18 - 19 March 2015

<http://www.regen-2015.com/>

The Annual Urban Regeneration conference and exhibition, now in its second edition, it becomes one of the main events on the themes of regeneration and economic development in the UK. During the two-day

conference will deal the latest issues in urban regeneration policy and implementation, highlighting the key successes made in major towns and cities, in areas such as city centre redevelopment and the development of the tourist industry. The theme of regeneration concerns about the people, the places, the economic growth and the investment that can create sustainable and resilient communities. The Conference will examine the challenges that face towns and cities, in terms of economic development and neighbourhood renewal, and will bring delegates to compare with the policy experts and the industry leaders on real-life case studies.



## INTERNATIONAL CONFERENCE ON TRANSPORTATION AND CIVIL ENGINEERING

Where: London – United Kingdom

When: 21 - 22 March 2015

<http://ictce.org/>

The International Conference on Transportation and Civil Engineering is opened to scientists, scholars, engineers and students from around the world and industry, and is an opportunity to present the researches in progress, and help start collaborations between the world of university research and industry. This conference provides an opportunity for the exchange of new ideas and experiences, to establish business relations or search and find new partners to start new collaboration. The main topics to be discussed during the two days of the conference concern the accessibility, the design for climate change, the designing the sustainable city of tomorrow and urban sustainability, the develop energy efficient buildings at design stage to secure long-term savings, the planning aspects for sustainable construction, the social inclusion, the transport and environment, the urban and regional planning and the urban design and development.



## UITP WORLD CONGRESS & EXHIBITION 2015

Where: Milan – Italy

When: 8 - 10 June 2015

<http://www.uitp.org/uitp-world-congress-exhibition-2015-call-sessions-and-papers>

The International Association of Public Transport (UITP) organizes the UITP World Congress & Exhibition 2015, at Milano. This organization represents 1,300 members of transport companies giving access to over 14,000 contacts from the fields of urban, local, regional and national mobility from more than 92 countries on all continents. The UITP has set the goal of doubling the market share of public transport by 2025 compared to 2005.

The conference examines how to public transport is called to change, taking into account the needs of both internal and the socio-economic context. So the topics to be discussed at this event, from the experts in the industry, are designed to develop a public transport system can work better, be more efficient, to meet the needs of users, contribute to the growth and all 'employment, make cities more competitive, attract investors and reduce congestion.

This very ambitious challenge was included by the organizers in the slogan of Milan 2015: "Smile in the City", where "smile" is the acronym of the five key words directly related to these challenges (Sustainability, Mobility, Innovation, Lifestyle and Economy).



## 10TH INTERNATIONAL CONFERENCE ON URBAN REGENERATION AND SUSTAINABILITY

Where: Medellin - Colombia

When: 1 - 3 September 2015

<http://www.wessex.ac.uk/15-conferences/sustainable-city-2015.html>

The 10th International Conference on Urban Regeneration and Sustainability (Sustainable City) will be held at the Universidad Pontificia Bolivariana in Medellin, Colombia. The conference addresses the multidisciplinary components of urban planning, the challenges presented by the increasing size of the cities, the amount of resources and sources required and the complexity of modern society.

This event follows a series of successful conferences starting in Rio de Janeiro in 2000 and then in different locations throughout Europe and Asia. The meetings always attract a substantial number of contributions from participants from different backgrounds and countries. The variety of topics and experiences is one of the main reasons behind the success of the series. The dynamic growth of Colombia and in particular the rapid development of Medellin, which has recently been designated the most innovative city in the world, led to its choice as the venue for the Sustainable City 2015 conference.

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