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The Inclusive, Resilient, Safe and Sustainable City: Models, Approaches, Tools

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INNOVATING BY INTEGRATING: POLICIES FOR RESILIENT AND ATTRACTIVE CITIES

Marichela Sepe

Abstract

In 2011, the European Commission publishes the "Cities of Tomorrow. Challenges, visions, ways forward" report, introducing the integrated approach to the urban policies, whose sectoriality has caused different problems further increased by the economic crisis. The threats identified within the report regard the demographic decline, the climate change, the social segregation, the difficult competitiveness caused by the economic decrease. Aim of this paper is illustrating the most significant parts of "Cities of Tomorrow" which remains one of the more futurist documents in that sense. In order to present a best practice, the description of both integrated urban strategies and design solutions which Rotterdam are currently carrying out, taking into account innovation and sustainability aspects, will complete the paper.

Keywords: sustainability, integrated policies, innovation

INNOVARE INTEGRANDO: POLITICHE PER CITTÀ RESILIENTI ED ATTRATTIVE

Sommario

Nel 2011, la Commissione Europea pubblica il report "Cities of Tomorrow. Challenges, visions, ways forward", ponendo le basi per un approccio integrato tra le politiche urbane, la cui settorialità ha causato differenti problemi ulteriormente acuiti dalla crisi economica. Le minacce identificate all'interno del report riguardano il calo demografico, il cambiamento climatico, la segregazione sociale, la difficoltà competitiva causata dalla crisi economica. Scopo del paper è illustrare i tratti più significativi di "Cities of Tomorrow", che resta uno dei documenti maggiormente "futuristi" in tal senso. Al fine di presentare una best practice, la descrizione dell'integrazione tra strategie urbane e soluzioni progettuali che attualmente Rotterdam sta portando avanti, prendendo in considerazione innovazione ed aspetti sostenibili, conclude il contributo.

Parole chiave: sostenibilità, politiche integrate, innovazione

1. Introduction

The creation of suitable urban policies represents a fundamental element which enables a process of transformation to start. Participation, which has to be activated from the initial stages of the process, assures the good development of the project. The engine of social change is not only technology, but how you live, work and play, and the places where these activities take place. In October 2011, the European Commission publishes the "Cities of Tomorrow. Challenges, visions, ways forward" Report, putting the basis for an integrated approach to the urban policies, whose strong sectoriality caused many problems further heightened by the economic and financial crisis. The threats that are identified within the report regard the demographic decline, climate changes, and social segregation caused by the economic decrease. Furthermore, strong attention is given to both the problems due to exhausting of natural resources and environmental questions (Carpenter, 2006; Van den Berg *et al.*, 2007). The European urban policies are addressed for over twenty years to the environmental policies devoted to the reduction of CO_2 emissions through different kinds of strategies (Sepe, 2009; 2013). Not always policies have found wide application where exclusively centred on the climatic risk. To resolve these problems, a new modality of actuation of the strategies of climatic adaption concerns the contemporaneous increasing in attractiveness of the interested cities. When both mitigation and innovation find a right balance, one taking advantages from the other, the adaptation policy to the climatic risk has many good results including: environmental sustainability, participation of the population, increasing of liveability and attractivity of the place. The creation of an urban environment which encourages setting up innovative activities requires, at the local level, the construction of a specialized production system and the establishment of an urban environment which can support the testing of consensual practice of regional government (Scott, 2006). In order to obtain this goal, new alternative strategies and urban policies should be considered. Cities are not just buildings and material structures, but also people, networks and intangible elements, such as memory, history, social relationships, emotional experiences and cultural identities. Indeed, the city is an organism; each element is inextricably interwoven and planning is based on how people feel the city from an emotional and psychological point of view. Its guiding principle is place-making rather than urban development (Carta, 2007; Landry, 2008). The transformation of cities has been accompanied by changes in the urban design and planning tools, modifying those already existing and creating new ones. These tools must be suited to interpreting new processes and should be sustainable in the three acceptions. The economic sustainability as a resource depends on a complex system of balances and social actors which may become decoupled as a result of an overly instrumental attitude towards the economic potential of culture (Sacco and Tavano Blessi, 2006; Zukin, 1995). Thus economic sustainability can be defined as «the ability to generate income, profits and work within a system of equal opportunities for all the elements of society, inside a model which enhances and increases land resources, and furthermore does not produce a collapse of the same in quantity or quality» (Ferilli and Pedrini, 2007). The characteristics of territory, seen as a complex system where tangible and intangible cultural resources become elements of a chain of added value, assume a key role in developing the local system. In this way a cluster, starting from the elements of territory and their enhancement and promotion, will be economically sustainable in the long term. Social sustainability is the ability to ensure welfare conditions and growth opportunities equitably distributed in society (Ferilli and

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Pedrini, 2007). Setting up a development model based on enhancing culture fosters social regeneration in the area, generating in people a perception of belonging, an increase in the social capital, the change in place image, and an increase in the level of education. Cultural production and use perform functions of generation and dissemination of creative thinking. Furthermore, this use provides tools for the growth of individual opportunities by creating a process for socially sustainable development. With respect to environmental sustainability, the area should be understood in its various historical and cultural values, and in its tangible and intangible capital. Territory is characterized by both types of capital and its identity cannot be considered separately from them. However, even if the consequences of resource depletion on the nature of territory are known, depletion of intangible capital is less evident, although just as important. It is therefore necessary to create a close relationship between production systems and central areas, so that companies interact in processes which generate value for the territory. In the climate change risk, achieving a sustainability in these three acceptions give the possibility to obtain a resilience not only to the environmental risk and a durable success of the whole operation of transformation (Brown, 2003; da Silva *et al.*, 2012; Davoudi *et al.*, 2013; Eraydin and Tasan-Kok, 2013; Stead, 2014; Juhola and Westerhoff, 2011; Moccia, 2011; Pearson *et al.*, 2014; Tyler and Moench, 2012). In the Report of the European Territorial Cohesion Policy "Towards an Integrated Urban Policy for the EU" (European Commission, 2014), there is confirmed that it does not exist an European integrated urban strategy devoted to the future. In this document, the importance of a white book containing an integrated urban policy with European rules concerning urban areas and cities is announced: to be competitive at international level, Europe needs both attractive and vital cities. The Committee observes that sometimes the EU norms produce a contrary effect. As regards, an example is supplied by the Committee in its opinion on the review of EU air quality and emissions, which points out that to achieve the desired results from the air quality policy it needs to harmonize the levels of ambition of the various EU directives on the environment and synchronize the timing of their implementation. The "Cities of Tomorrow" presents many statements that anticipate this orientation. In the following, some parts of this document - which still constitutes the most futurist European report in this sense - are reported (European Commission, 2011). Many cities are today adopting these strategies, including Copenhagen, Rotterdam, Bristol, etc.. The emblematic case of Rotterdam, strongly oriented in this direction, concludes the paper. By the illustration of this case a specific meaning of the concept of public will emerge, which is intended as citizens awareness of the climate change risk and the consequent collaboration to the strategies of mitigation.

2. Principles for an integrated approach

The "Cities of Tomorrow" report contains many principles, which outline the integrated approach to sustainability. All the declination of sustainability are considered, making in particular appear a strong attention to the social aspects. The first principle is that "all dimensions of sustainable urban development are taken into account in an integrated way". With respect to the environmental regeneration, there is affirmed that European cities of tomorrow are places of green, ecological or environmental regeneration where material resources are managed in a sustainable way and independent from economic progress. In the document is affirmed that European cities are places which have to be an high degree of social cohesion and with slow diversity within and between neighbourhood and a low

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degree of social segregation and marginalization, with a good access to the general services, health prevention and medical treatments. These are places where: elderly persons can conduct a both dignified and independent life and participate to the social and cultural life; neighboroughs are attractive both for young and elderly people; people with disabilities have independence and are integrated from social and occupational point of view; men and women are equal and the children rights are protected. These cities should have a high degree of energy efficiency and use of renewable resources, low carbon emissions and resilience to the climate change effects. Furthermore, these have minimum land consumption and Greenfield and natural areas are not exploited by the recycle of territory and are characterised by a compact city planning. Within the document is declared that environmental quality is part of an integrated approach to the place attractivity and well-being. The increase in the energy efficiency reduced the economic and energy vulnerability of cities. Innovation, technologies and services are important engines for a green local economy. In the same way, pedestrian and cycle with green spaces and high quality of the built space are attractive places for people and enterprises. Technology and social innovation have then be designed in harmony with urban development and environmental topics and have to consider demographic, social, economic, cultural and aesthetic aspects. These principles are translated in: green mobility which takes into account elderly and family with young children requirements as well as of shops and small businesses; renewable technologies with the use of solar panels and wind power which respect the architecture of the place. Cities, following the document directives, have to manage a set of environmental questions, such as air and water quality, energy, waste and natural resources. There are the place where many components of the natural ecosystem interact with those of the urban, political, cultural and economic system. In order to avoid segregation, green neighboroughs need to be convenient and allow a mix of functions and socio-economic groups. A gradual retrofitting of houses have to be programmed in order to reduce energy consumption and adapting it to the new environmental conditions. The retrofitting must not compromise the sustainability of the housing costs and must avoid migration fluxes towards suburban areas. A challenge for all cities is to be able to reconcile cultural and economic heritage with the touristic potential. The European cities of tomorrow are defined as places of attraction and engines of economic growth, where creativity and innovation are stimulated and knowledge is shared and diffused. The excellence is obtained through a proactive innovation, educational policies, on going formation for workers and technologies for communication used for education, employment, safety and urban governance. These have a high quality of life, architecture, users of public space, infrastructures and services. Within these, cultural, economic, technological and social aspects are integrated in the planning and construction, housing, employment, education, and services are mixed, attracting in this way the relationship between world of knowledge and world of industry and a qualified and creative workforce and tourism. Furthermore these are places of regenerated urban local economies, diversified local production systems, local labour market policies where endogenous economic forces in the neighbourhoods are used and both consume green local products and have short consumption circuits. Other central topics within European city of tomorrow report include the sustainable mobility defined a challenge for the city of future and public spaces. The sustainable transport is meant as non-polluting, accessible and efficient at urban, metropolitan and interurban scale. Sustainable mobility, including many components such as energy and efficiency should recover

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different dimensions: convenience of public transport systems, presence of suitable environment for non-car mobility such as walking and cycling and the consequent access to neighboroughs with these modalities; the connections between transport local, regional and periurban networks; integration between transport hubs and social, cultural, economic and leisure activities. A sustainable city should have attractive public spaces. The quality and aesthetic of urban environment and public spaces are important factors for the attractiveness of the city. Within the European city of tomorrow, presence of public spaces within a generally aesthetic environment can act as a symbol of a city and of a living together, and create a sense of belonging to the city in its population. In the document, it is auspicated that public spaces are multifunctional and multi generational, namely places of encounter for elderlies and of accommodation for children and have specific functions such as libraries, playgrounds, education, and so on. Mixed functions between buildings and public spaces can also facilitate communication, opportunity of work and innovation. The presence in the University of spaces where locate ex-students enterprises, can facilitate the transition from student to future work and provide opportunities for cooperation between young entrepreneurs. Finally, the European cities of tomorrow are places where heritage and historic value of buildings and public spaces are taken into account for the development and enhancement of urban scene, landscape and place and where local residents identify them selves with the urban environment.

3. Attracting by innovating sustainably

The proper balance between attractivity and sustainability, two factors in apparent contrast, a proper balance assures the success of an innovative process of urban transformation and results on the territory. The respect of the environment represents in this sense an occasion of development and improvement of liveability of a place, such as the creation of specific public spaces, the particular way of shaping the vegetation, and so on. As the literature shows us, the experiences of successful cities can lead to the promotion of areas of cities which base their competitiveness on local peculiarities related to the value of the "city brand" and also highlight the possibility of guiding evolution of urban systems in the city (Anholt, 2007). Such city areas become true creative clusters as a result of innovative initiatives, implemented within appropriate local development strategies based on territorial quality and excellence (Caroli, 2004). Different are the cases in Europe which are going towards an integrated approach obtaining interesting results. The Rotterdam case is one of the most emblematic in this sense, because the city is implementing a strategy which, starting from the climate change challenge, is making the city more attractive and innovative for citizens and visitors, involving these in the awareness of the environmental risks. The process of renewal is started by Rotterdam since previous years through strategies devoted at proposing a new image of the city, also in the framework of European events such as Rotterdam European Capital of Culture in 2001. The proposed image is a dynamic and creative city through projects interventions devoted both to carry out a new urban centrality able to connect the city with the waterfront area and obtaining an urban mixitè in order to prevent social segregation. An other aspect on which Rotterdam has focused its attention is the elimination of the concept of periphery and its negative effects on economic, social, cultural and infrastructural plan, powering railways lines in order to connect all the neighboroughs of the city with the centre and its main services (Carta, 2007). The objective on which the Administration has decided to focus itself is devoted to

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contrast the effect on climate change on its territory. Rotterdam is about 90% under the sea level and is wholly surrounded by the water with the consequence of a constant risk of flooding. Since 2008 the Administration has started a strategy of adaption to climate changes resulted in 2010 in the "Rotterdam Climate Proof" and "Rotterdam Climate Initiative" programmes with the aims until 2025 to make the city resilient and reducing the 50% of the CO_2 emission respectively. The objective identified in the Rotterdam Climate Proof document highlight a vision which goes beyond the climate change protection, considering these as a stimuli for the transformation able to involve in creative manner people and places: «the development of the city as a national and international centre of excellence for the knowledge on the water and climate changes; investments to make city and harbour more attractive for inhabitants, businesses and research institution; the development of innovative application to launch on the market and export» (Smart City, 2013). Municipality has decided to invest 31 million of Euro on the following objectives which will illustrated in detail (Rotterdam Climate Initiative, 2013a; 2013b).

The first objective is the "Conversion of raw materials in sustainable energy and biomass". Rotterdam intends use eolic energy, solar energy and biomass energy as alternative. In particular, it intends use biomass both as a raw renewable material for chemical industry and as a base for fuel and transforms the region in a "Bio Port". The objective is to make easier the transport and storage of biomass to encourage its use as a fuel and power generator and reach by 2025 a significant reduction of CO_2.

The second objective is the "Energy saving", respecting European climate target to reduce annual primary energy consumption by 20% by 2020. To obtain this objective, the Rotterdam business should save energy and improve the efficiency of the production by 2% annually also trough the opportunity of cooperation among different businessess. To this aim, were created modalities to obtain agreement between business and owners of houses or tenants for the energy saving were created, such as the realization of a wide heat network which connects all new buildings.

The third objective is "To increase the investments in sustainability and stimulate sustainable products and services", guaranteeing that as much of the growth as possible take place in Rotterdam. The modalities which are used by Rotterdam include stimulating leading businesses in the field of sustainable entrepreneurship to communicate the result in order to encourage other to follow their example and to drive the market toward sustainable products and services. In this way Rotterdam intends to present itself at international level as both a sustainable and an innovative port city with green roofs, water squares, alternative buildings or energy saving.

The fourth objective is "To increase the public support for sustainability and connect it with the education and research sector". This objective contains determinant factors for the future success of the operation of transformation of Rotterdam in green city.

Besides the public support, Rotterdam is taking agreement with colleges, universities and schools in order to insert programmes and courses on nature and environment and put the students of secondary school and University in contact with businesses and semi-governative institutions in order to introduce them to the concrete topics of sustainability.

Another objective is "More trees and green areas within the city". This objective includes green roofs and green facades in order to obtain more advantages together: to make more attractive the city, limit the rise in temperature, reduce the perception of the traffic noises, save energy and increase the life of the roof. Also in this case, the cooperation between

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residences and entrepreneurs is encouraged trough the creation of urban parks and gardens to develop ecological paths in the city surroundings which stimulate recreative and leisure activities, and for the production of healthy and sustainable food products.
Another important objective is the "Preparation to the consequences of climate change". The Rotterdam Climate-proof programme has been created to transform the climate change in opportunity more than threat. The programme is focused on the opportunity to create a more attractive city in which live, work, invest, and spend its own free time. For this reason, Rotterdam has carried out pilot projects to face climate changes concealing innovation and sustainability thanks to the collaboration between businesses, citizens, universities and schools: namely creating innovative floating buildings and water squares.
And, again, "To stimulate sustainable mobility and public transport", encouraging the use of cleaner forms of mobility and reduction of pollution caused by a non sustainable mobility. This goal will have transformed in: increase by 40% of means of transport use, by 30% of cycle use, by 10% of pedestrian number in many areas; car sharing, increasing in electric transport, use of cleaner fuels for lorries and inland shipping.
Finally, the objective "To stimulate the urban and regional sustainable development" with joined initiatives for waste collection processes, biodiversity, energy saving zones, renewable energies, sustainable mobility and public transport, noise control, park and gardens, air quality and conservation of water saving. All the measures are carried out trough a close collaboration between residents and local businesses. All these objectives are translated in a strategy adopted by the municipality to face the climate change: namely transforming the city in a sort of a sponge capable of absorbing but also recycling great quantity of water. Water squares, green roofs and storage basins constitute some of the design strategies carried out to resolve the period of flood of the whole city. All of this with a strong participation of people. In particular, water squares constitute public spaces that, in dry period, act as spaces with different use while, in case of wide quantity of water, coming from rains or floods, these become basins for storage to support the sewerage system and reuse the water when needed. The idea, presented in origin by De Urbanisten and Studio Marco Vermeulen in the framework of the 2005 Rotterdam Biennial of Architecture and updated by the technicians of the Municipality, is that of carrying out dynamic and attractive spaces capable of act both as flood risk mitigators and attractive places for people. In this way, founds devoted to infrastructures for management of water, which are non-visible because posed in underground environments, have been dedicated to implementation of such spaces.
These, designed to be aesthetically attractive, have improved the environmental urban quality obtaining a double effect: a major sense of belonging of citizens who participate to the battle to climate change from the local administration and transformation of the risk in opportunity. The squares change aspect and function dependently on the level of water, creating changeable urban landscape, but in controlled way: places for sport, break and play collect water from public spaces until the rainier ones. In this case, water squares collect water from both public spaces and roofs of close buildings, which after be filtered and threated in water chamber is run in basins of squares, assuring a clean and non-polluted water.
Among the examples of major interest in Rotterdam, the emblematic ones are constituted by Bellamyplein water plaza with a "floodable" area of about 300 mq and a possibility of collection of water until a 750 mc and the Benthemplein with a capacity until 1700 mc. The

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cost of this operation is 4 million euros including: larger underground infrastructures (pipes and waterpumps) engineering, tendering and communication budgets. The Benthemplein water squares is constructed with three basins devoted to sport, outdoor theatre and relax in different shapes. Two of these basins collect water from rain of surrounding areas and the third collect water only in the case of flood of the neighbourhood. In this last possibility, the square is transformed in a little navigable lake, ensuring the safeness of residents. A wide port area – Stadshavens – with a surface of 1600 hectares. To build 13000 waterproof housings, floating schools and offices has been provided for. The realization of roof gardens, started in 2008, is in course, with plantation of green roofs that will exceed 200.000sm by 2015.

Fig. 1 – Benthemplein water squares

Fonte: Sepe (2015)

To this end, the Municipality has previewed a sort of bonus tax for citizens with a reduction of 50% on the installation of green roofs and facades (Fig. 2). The general strategy for climate change involves also the smart technologies, through the creation of application for smartphones and tablets such as a "Game Climate" that shows the user a possible situation of risk and the behaviour to overcome it, making the citizen be more aware and actor of the process of change and strategies adopted. As affirmed by Urbanisten, in an intense

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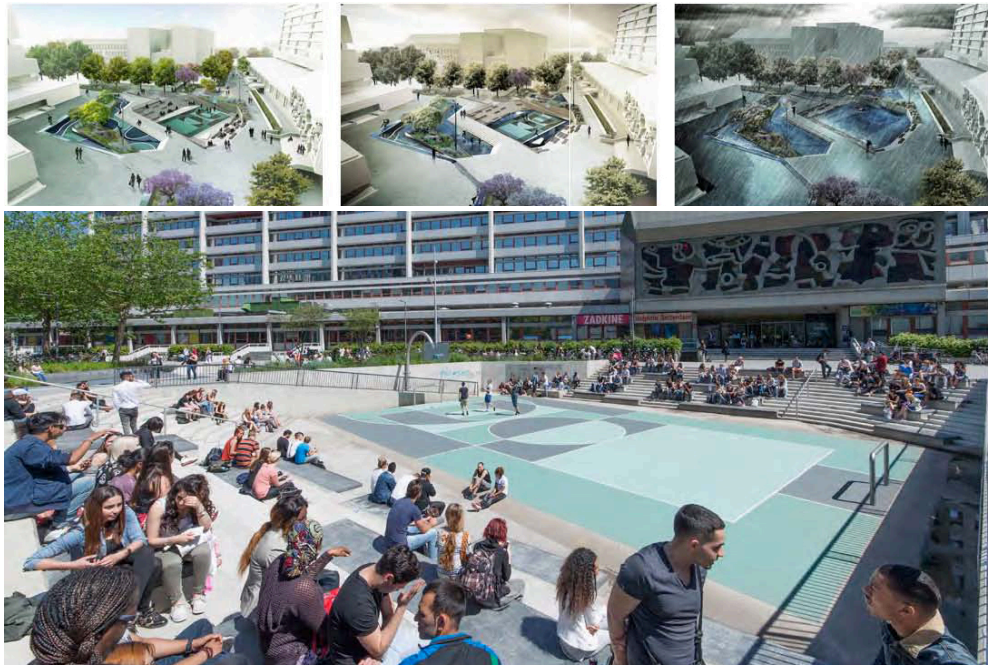
participatory trajectory with the local community we jointly conceived ideas about the square: students and teachers of the Zadkine college and the Graphic Lyceum; members of the adjacent church, youth theatre and David Lloyd gym; inhabitants of the Agniese neighbourhood, all took part. In three workshops we discussed possible uses, desired atmospheres and how the storm water can influence the square. All agreed: the water square should be a dynamic place for young people, lots of space for play and lingering, but also nice, green intimate places. And what about the water? This had to be excitingly visible while running over the square: detours obligatory! The enthusiasm of the participants helped us to make a very positive design (De Urbanisten, 2016).

Fig. 2 – Benthemplein water squares



Fonte: Sepe (2015)

4. Conclusions

The final part of the City of Tomorrow document reports that it needs to tend towards a more holistic model of the sustainable development of the city. In particular, in the document it is suggested that, to develop a green, healthy and attractive city, it needs to adopt a holistic approach to the environmental and energetic topics. To obtain this, it needs to go towards a balanced and innovative territorial development, safeguarding the characteristics of identity and connecting the economic growth with the sustainable use of the natural resources. The global competiveness has to be inclusive and favouring a local

economy, adopting an integrated approach to the urban planning and development, and involving together social, economic, environmental and territorial dimensions of the urban development. The white book in construction should to be referred to an urban policy capable to integrate a top-down approach with that bottom-up which, starting from the national government arrives to citizens, passing for the local government in a virtuous loop of sustainability, creativity, innovation capable to increase in people both the sense of belonging to places and civic sense. In line with this approach, the case of Rotterdam, together with many other including Bristol and Copenhagen, represents a best practice. Rotterdam is acting a strategy which, starting from the climate change challenge, is making the city more attractive, innovative and smart with a holistic approach (Sepe, 2015). Another fundamental ingredient is the economic incentive given both from cooperation between privates and citizens and from the tax incentives offered by the Municipality. Furthermore, a wide participation with the local community was carried out in the framework of three workshops, in which all the citizens and actors involved in the project took part. Finally, indirect benefits for people include the creation of jobs for the citizens of Rotterdam in the 'green-blue' economy, which are increasingly becoming the driving force for both the highly educated and the unskilled as well.

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