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REVIEW NOTES – Town Planning International Rules and Legislation

Policies and practices of transition towards climate-neutral and smart cities

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Abstract

Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always following a rigorous scientific in-depth analysis. This section of the Journal, Review Notes, is a continuous update about emerging topics concerning relationships among urban planning, mobility, and environment, thanks to a collection of short scientific papers written by young researchers. The Review Notes are made up of five parts. Each section examines a specific aspect of the broader information storage within the main interests of the TeMA Journal. In particular: the Town Planning International Rules and Legislation. Section aims at presenting the latest updates in the territorial and urban legislative sphere. The current challenges of the city can be enclosed under a single umbrella called "Smart city" which can be a useful approach to define new forms of organizing the complexity of urban life and in turn implement solutions in urban areas ranging from energy consumption to climate change to achieve environmental sustainability goals. In this direction, this review focuses on the involvement of local authorities in the development of urban strategies that focus on smart city objectives within of the Europe2020 strategy and the climate neutral & smart cities mission.

Keywords

Urban sustainability; Smart city; Climate neutrality; Urban Agenda.

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1. Transiting through smart cities

The "great challenges" of the future, such as climate change, the limited availability of resources, the lack of physical infrastructure, the increase in social inequalities especially for vulnerable groups of the population require a significant effort in the world where cities must be managed, governed and designed (Stilgoe, 2018; Orsetti et al., 2022). Added to this is the urbanization process which today occurs with diversified rhythms in the various territorial contexts, being considerably faster in developing regions than in developed ones. Recent studies carried out by the United Nations estimate that in 2030 about 60% of the world's population will live in urban areas and by 2050, about 68%. High urbanization indirectly generates high consequences on all the components of the urban system from that of the built, infrastructural, functional and environmental environment (Gargiulo & Papa, 2021). The continuous growth of the population is combined today also with the current standards of sustainability to which cities must aim with respect to the recent European and national objectives, above all there is an increasing need to move from traditional forms to more innovative and efficient forms of planning and urban management (Bibri & Krogstie, 2017; Gaglione & Etigo, 2022). The responses to face the current challenges can be enclosed under a single umbrella named "Smart city" which can be a useful approach to define new forms of organization of the complexity of urban life and in turn implement solutions for multidisciplinary problems in urban areas ranging from energy consumption, resource management, environmental protection, safety, quality of life, efficiency of urban operation and the availability of a wide variety of services. The term smart city appeared in the scientific debate around 1992 in a book entitled "The Technopolis Phenomenon: Smart Cities, Fast Systems, Global Networks" (Gibson et al., 1992). Since then, this concept research work has aroused several research areas, but also many stakeholders, from governmental organizations supporting the growing interest of the "Smart City" concept in the framework of global sustainable development (Patrão et al., 2020). A strong scientific interest is felt subsequently around 2010 including the multiple incarnations of the city, including the intelligent city, the digital city, the sustainable city, the ubiquitous city and the knowledge city (Han Kim, 2021). In the last decade there has been an exponential growth taking on different perspectives. In most of the studies the theme of the smart city is developed on four macro-areas of interest which are: the technological aspect, including the technological infrastructure (with a great emphasis on ICT) and the support network for the construction of cities intelligence, the sociocultural aspect, i.e. citizen involvement, the political-institutional aspect, such as government support and policies, and the economic-entrepreneurial aspect, i.e. business models and profitability. Indeed, we can identify two generations of smart cities. The first generation called "smart city 1.0" which was largely based on the diffusion of digital technology and the economic and business potential of smart city projects. Instead, smart city 2.0 has moved towards a decentralized and human-centric approach aimed at promoting collaboration and community engagement (Zhao et al., 2021). This in turn identified a paradigm shift of the smart city moving from a focus mainly centered on technology based on maximizing the efficiency of heavy urban infrastructures (e.g. example, transport, communications, waste, energy, water, etc.) to the adoption of a more global approach, in which the central role of people and soft infrastructures is recognized (institutions, data, social innovation, knowledge economy, justice, etc.) (Echebarria et al., 2021). By integrating the multiple dimensions on which the concept of smart city has moved, they can become an element of strategic transformation to increase competitiveness and quality of life and to aim at the objectives of environmental sustainability. In turn, the scientific research of reference has tried to define methods, indicators and decision support tools that could best define and measure intelligence at different scales such as regional, urban, neighborhood and building and therefore the necessary characteristics of different urban contexts (Aldegheishem, 2019). On the one hand, the scientific letter has tried to define the characteristics that identify the possibility of being able to make a city "smart" by trying to define the improvement interventions on the different territorial contexts and on the other to provide a framework of indicators and tools useful for the classification of smart cities (Romero et al., 2020; Deren et al., 2021). Some studies have

provided further details regarding the typology and thematic distribution of the indicators (Sharifi, 2019). In particular, the study by Stratigea et al. (2017) investigated and classified the different indicators on six areas of interest (economy, mobility, environment, people, life and governance) and found that most of them are related to the themes of "living" and of the "environment". Conversely, fewer indicators on "governance" and "people" have been defined. Instead, the study by Albino et al. (2015) provides an overview of the classification tools of smart cities examples the Intelligent Community Forum's Smart 21, the Global Power City Index, the Smarter Cities Ranking, the World's Smartest Cities, the IBM Smart City and the McKinsey Global Institute Rankings are also significant Studies by Akande et al. (2019); Li et al. (2019); Mohan et al. (2017) who have developed composite indicators of smart cities across different spatial contents such as Lisbon, China and India. Most of these studies aggregate the score of individual indicators to obtain an composite index that can be used to indicate the overall performance. Obtaining aggregated index scores often requires normalization of individual indicator scores. Commonly used normalization techniques are the 'min-max' technique and the 'z-score' method. In turn, both within the supporting tools and in the development of indicators different weights are assigned to different indicators to recognize their different levels of significance and incidence. If, on the one hand, scientific research has tried to define the most exhaustive cognitive scenarios, on the other, the institutions are making considerable efforts to ensure that the different territorial contexts aim in a synergistic way to become "smart" and neutral cities from a climate. The vision of urban space in relation to the general objective of an intelligent city is also an expression of innovation in territorial policy and in the use of resources and in environmental protection. However, concretely the problem arises of bringing the various smart interventions back to an overall vision of the city of the future that guides citizens towards an effective innovative dimension. In this direction, this review focuses on the involvement of local authorities in the development of urban strategies that focus on the smart city objectives within the Europe2020 strategy and the climate neutral & smart cities mission.

Europe 2020: the strategy of the European Union

This idea of a smart European city emerged in some specific references in intervention projects starting from 2000 and perfected in the 2007 Leipzig Charter, a programmatic document on the sustainable development of cities and on the promotion of integrated urban policies, up to the recent European strategies. One of the significant documents is the "Europe 2020" strategy for urban regeneration through energy efficiency, improvement of transport and renewal in the management of services and the objectives contained in the Territorial Agenda of the European Union 2020 in the form of energy savings and sustainability of the development of urban territories, of progressive reduction of soil consumption, according to an integrated vision that involves various sectors, administrative authorities, not only local authorities, and economic operators. The Europe 2020 strategy aims to ensure that the European Union's (EU) economic recovery following the economic and financial crisis is accompanied by a set of reforms that establish solid foundations for growth and job creation by 2020 while addressing structural weaknesses in the EU economy and economic and social issues, the strategy also considers longer-term challenges such as globalization, resource wars and ageing. To achieve this aspiration, the EU has set itself five major objectives to be achieved by 2020: (i) to bring the employment rate of people aged between 20 and 64 to at least 75%; (ii) invest 3% of gross domestic product in research and development; (ii) reduce greenhouse gas emissions by at least 20%, increase the share of renewable energies to 20% and increase energy efficiency by 20%; (iii) reduce the dropout rate to less than 10% and bring the rate of young graduates to at least 40%; (iv) reduce the number of people at risk of poverty or social exclusion by 20 million. One of the results of this strategy can be identified in the "Mapping Smart Cities in EU" which aims to define standards of the term smart city, a common model of intelligent city and a series of guidelines for the implementation of dedicated projects. In particular, the study was conducted for all urban areas divided into three population groups from 100,000 to 500,000 inhabitants) which had launched intervention plans in the following areas: public administration, governance, energy, social innovation, smart community, urban livability, sustainable mobility, smart economy, and protection/enhancement of the environment. Furthermore, it emerged that most of the large cities showed higher smart city indexes than the medium-small ones and that their distribution is fragmented and unequal among the Member States. As regards announced projects, two-thirds of these often remain on paper, due to bureaucratic, economic, and organizational limitations. In turn, the strategy has led to an

increase in EU sectoral actions (cities, environment, energy, transport, etc.) because of a specific European policy for smart cities. The most recent European guideline, on the other hand, decisively pursues the overcoming of sectoral policies and the involvement of local authorities in the elaboration of urban strategies that focus on the objectives of smart cities and on the European Urban Agenda, as an overall vision of intervention aimed at to cities and urban areas, to be implemented in the long term as an overall policy and discipline at European level.

Climate Neutral & Smart Cities

Compared to the policies issued in 2020, today the theme of the smart city has joined that of climate change. A significant example is the recent strategy issued by the European Union called "100 climate-neutral and smart cities by 2030". This strategy assumes that urban areas are home to 75% of EU citizens. They consume over 65% of the world's energy and account for over 70% of CO_2 emissions. To balance the emissions produced with those naturally absorbed by the planet, and reduce them to a minimum, it is necessary to undertake concrete actions such as those proposed by the EU Missions. The mission has as its main objective the reduction of the climate and that it depends heavily on urban action, in order to accelerate their transition to green and digital. In order for this mission to be implemented in a concrete way, the Cities mission also aims at the involvement and coordination between local authorities, citizens, businesses, investors, as well as regional and national authorities. In turn, the very ambitious goal of reaching 100 climate-neutral and smart cities by 2030 has a twofold purpose on the one hand to ensure that these cities act as centers of experimentation and innovation to enable all European cities to follow suit by 2050 and on the other hand to create synergies between existing initiatives and basing their activities on the real needs of cities as foreseen in the implementation plan. The mission finances a budget of 70 million euros on two themes. A first theme concerning co-designed intelligent systems and services for user-centred shared zero-emission mobility in urban areas, with an indicative budget of €50 million. A second theme, however, positive clean energy district (PED) digital twins, with an indicative budget of €20 million. Clean mobility, energy efficiency and green urban planning are the key topics for implementing common initiatives and enhancing collaborations in synergy with other EU programmes. The mission also offers networking opportunities, allows for the exchange of good practices between cities and supports citizen participation. The Commission will now invite the 100 selected cities to draft "Climate City Contracts" it will invite them to draft a plan for climate neutrality in all sectors, such as energy, buildings, waste management and transport, including plans of investment. The process will involve citizens, research organizations and the private sector. Among the advantages for cities are the possibility of receiving tailor-made advice and assistance from a dedicated mission platform managed by NetZeroCities, which will indirectly make it possible to give new possibilities and opportunities to obtain grants and funding and the possibility of joining major innovation actions and pilot projects. In the recent announcement by the Commission of the selected cities, nine Italian cities have been included in the European mission "100 climate-neutral and smart cities by 2030": Bergamo, Bologna, Florence, Milan, Padua, Parma, Prato, Rome and Turin.

The widespread interest in the smart city model also derives from the looming environmental problems such as climate change which are combined with the difficulties of combining public and private interests at stake; this justifies the constant attention of the Community institutions and European legislators to the most suitable instruments. The policy developed over the years, through concrete financial incentives, is aimed at a process of urban transformation that integrates, according to a systemic vision, the economic, environmental, social and "cultural" perspective; the evolution towards a smart dimension offers public administrations the opportunity to make the services provided to citizens more efficient and to encourage the introduction of innovative services, in order to improve competitiveness and the quality of urban life.

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