# SMART GREEN JUST CITY ACTIONS VERSUS URBAN PLANNING IN EUROPEAN UNION

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***Abstract***

*Today's development is related to globalization and transition to digital economy as well as to growing pressures on the environment and the society. As the proportion of the urban population is rapidly increasing, cities are becoming more and more the focus of these changes and they are mutating consequently. To address the above challenges, several «smart», «green» and "just" solutions are promoted aiming at shaping smart, green and just cities, conceptualised in the global approach of "smart green just" city in this paper.*

*Most cities in the European Union (EU) are increasingly promoting smart green just actions, trying to learn from the experience of more advanced cities in this field. These actions obviously affect urban strategies and urban planning implementation. However, the rapid promotion of "digital city" solutions creates the feeling that these solutions alone will lead to a sustainable city future and urban planning will drastically shrink. Thus, there are some fundamental questions here: have the implemented smart green just interventions adequately addressed the urban planning objectives? How can this degree of correspondence be evaluated?*

*In this context, the paper starts from: (a) A critical presentation of the concepts of smart, green, and just cities and the complementarities and interconnections among them (b) The analysis of the thematic areas as well as of the evaluation's criteria and indicators of the smart green just urban actions (c) A discussion of the role of digitalisation, mainly driven by private investments, to the urban actions. On the basis of these three points, we discuss the interaction of the above specific actions with urban planning; then, we further specify this discussion in the frame of EU's policies.*

*The paper highlights the necessity to enhance synergies between the implementation of smart green just urban actions in the EU and urban planning; to this end appropriate adaptations of both the actions and urban planning are necessary; priority should be given to further supporting the existing tools and procedures ensuring synergies as well as promoting new ones.*

***Keywords****: sustainability, smart city, green city, just city, planning objectives, European Union*

## Introduction

Today's cities are increasingly affected by globalisation and the transition to the digital economy, which are linked to growing pressures on the environment in relation to climate change as well as increase of economic and social inequalities. Cities are the focus of these general changes to the extent that the proportion of the population living in urban areas is constantly rising (Angelidis & Drakouli, 2019).

To meet the above challenges, strategies and packages of goals and interventions in the cities have been thoroughly developed, especially in recent years. Most of them are articulated around the concepts of *"smart city", «green city» and "just city"*. Next, we will explain the

interconnection and complementarity of these concepts, therefore *when we will refer to them together* -in a holistic (global) approach- *we will use the term* **"smart green just" city**.

*The implementation of interventions that are part of this approach* affects more and more the *planning of cities*. Why? Because the authorities and the bodies of most cities promote smart green just actions at a growing rate, aiming at solving their problems. As expected, they try to learn from the experience of more advanced cities in this field. However, any urban actions are implemented in the frame of urban planning.

Nevertheless, **smart solutions**, essentially **digital**, for cities are promoted nowadays by private companies at an impressive rate. Undoubtedly, these solutions could potentially improve "smart" (and "smart green just") development of cities. However, we should stress out that the aim of private companies is to profit regardless of the strategies and actions for cities, irrespective of urban planning.

*So, several questions logically arise here: Were the smart green just actions already implemented effectively? Did they adequately answer the problems of the cities? Further on: How, and based on which criteria and measurable (as far as possible) indicators could their effectiveness be evaluated? What "kind" of cities achieved the best results? Do the actions comply with urban planning objectives? How EU urban policies affect this relationship?*

In this general context of questions, the paper starts from: (a) A critical presentation of the **concepts** of smart, green, and just cities and the complementarities and interconnections among them. (b) The analysis of the thematic areas as well as of **the evaluation's criteria and indicators** of the smart green just urban actions (c) A discussion of the role of **digitalisation**, mainly driven by **private investments**, to the urban actions. On the basis of these three points, we discuss the **interaction of the above specific actions with urban planning**; then, we further specify this discussion in the frame of **EU policies**.

The paper concludes with **proposals** for a better match of smart green just urban actions with urban planning.

## 1. Actual challenges for cities and smart green just development

As we have already noted, the **main global developments** are increasingly linked to cities. As our planet is becoming more and more "urban", cities are the focus of interest of local, regional, and national authorities (Angelidis & Drakouli, 2019). A big share of the urban population increase is on the one hand due to migration from rural areas to cities in the hope of a better standard of living: finding a job, better education, and care opportunities, accessibility to public services, etc.; on the other hand, migration from poor countries or countries with social and military conflicts to developed countries. According to UN estimations, the world's population will continue to grow in the coming years and is expected to reach around 9.7 billion in 2050 (United Nations, 2019a). In 2018, 55% of the world's population lived in cities, while by 2050 this figure will have risen to 68% (United Nations, 2019b). The share of the urban population in total is even higher in the European Union (EU). This proportion is projected to rise to just over 80 % by 2050 (European Union, 2020).

The main current **challenges of cities** are related: (a) both to globalization and the transition to the digital economy, (b) to increasing pressures on the physical environment: environmental degradation, air, land, and water pollution etc. (also linked to climate change) as well as the built environment: land use, buildings, urban form and, (c) to widened social inequalities and social exclusion (indicatively: increasing poverty), migration and unemployment. According to (Eurostat, Statistics on European cities, 2021b): "…within individual cities it is possible to find people who enjoy a very comfortable lifestyle who are living in close proximity to others who face considerable challenges". We should note here that the economic crisis at the beginning of the decade of 2000 had a considerable impact on cities - see for detailed analyses, among others, in: (Angelidis M. , 2017) (Angelidis & Tsigkas, 2017).

Even more important are the effects of the Covid-19 pandemic crisis on cities and on the implementation of sustainability-oriented EU actions.

## 2. The smart green just cities conceptual framework: strengths and weaknesses

### Concepts definitions, interconnections and complementarities

To confront the above new challenges, we need to formulate new strategies and measures for the cities - see, among others, in (Angelidou, 2016). The analysis of the challenges as well as the elaboration of strategies relates necessarily to new concepts and terminologies. In this frame, we should understand the creation of the concepts of smart city, green city and just city.

**Smart city** is related to the "smart development" concept, a development based at first on the exploitation of the Innovation and RTD (Research-Technology-Development) towards the digital economy - see, among others, in: (Komninos, 2018).

On the other hand, under the influence of the rapidly increasing, in our times, awareness towards the environmental issues and the elaboration of strong global and European environmental policies and more specifically urban environmental policies, the concepts of "green development" and **"green city"** were created. We can estimate that green development and the green city set some more precise and more ambitious environmental targets, in line with the theme of climate change.

Also, concepts on "(socially) inclusive development" and "inclusive city" were also promoted during the last decade, so that, along with the "smart" and "green" concepts, they support new development strategies and especially new urban development strategies. In this frame, the term **"just city"** is used in relatively more recent reports of UN or EU. A broader discussion on just city was initiated earlier -see indicatively, among others, in (Fainstein, 2014). In general terms, just city refers to urban social justice. Indicatively, IHC Global (SMART CITY. JUST CITY., 2021) details just city as follows: "… It focuses on enhancing access to institutions, services, and infrastructure for all. A just city invests in affordable housing, public services, fair taxes and charges, and good jobs for everyone. The just city engages communities through a broad understanding of public input and ownership of strategies." Here, we need to make an important methodological point. Although we consider the discussion on "just" as important as the ones on "smart" and "green", it is not possible to discuss "just city" adequately in this paper since it is relatively short. We will confine ourselves to a shorter discussion of "just city", without considering in any case that the social aspect of cities is less important.

In this paper we assume that smart city, green city and just city concepts are not equated but interrelated to a considerable degree; more precisely, **while smart city integrates green and just dimensions, green city integrates smart and just ones and, finally, just city integrates smart and green dimensions.**

Starting from the **smart city**, the *term* appeared in the late 20th century and was primarily associated with the application of user-friendly information and communication technologies in cities. As we will see next, the concept has been extended to refer to a more general "smart development" of cities; However, *there is no commonly accepted definition of a smart city* (Angelidis & Drakouli, 2019). In 2014, the International Telecommunication Union analysed many definitions of smart cities and proposed the following: "quality of life, efficiency of urban functions and services and competitiveness, while ensuring that it meets the needs of present and future generations in terms of economic, social and environmental aspects" (United Nations, Economic and Social Council, 2016). The development of smart cities generally leads to the adoption of **digital practices** to optimize urban flows, facilitate the provision of basic services to citizens through digital communication and address the negative environmental impacts, utilizing modern technology (Angelidis & Drakouli, 2019**)**.

A second conceptual path, which is at the centre of this paper is *the* **path from the environmental challenges to the «sustainability» set of concepts and, a bit further, to the concepts of sustainable city and, later, of the green city and the just city.**

As we know, the concern for the environment and more specifically for the urban environment has been building up considerably for five decades now. In search of a new model of development that will serve humans and treat the environment as a development asset, the concept of "sustainable development" was proposed in the early 1990s by the UN «Brundtland Commission» report (Brundtland, 1987) and became universally accepted. This report defined as sustainable the development that covers the needs of the present without compromising the ability of future generations to meet their own needs.

The delineation of "sustainability" in the case of cities has led to the development of many approaches to "sustainable cities" - see, inter alia, an extensive discussion of this issue in: (Angelidis M. , 2004).

Here we need to point out that smart development, "especially environmental development" and just development are in fact **interconnected** and should be seen in the frame of a **holistic (global) approach** of development which includes an economic, an "especially (per se) environmental" and a social aspect. "Green" has replaced in fact the above mentioned "especially (per se) environmental" aspect of sustainability.

At this point, we consider it useful to *further discuss the genealogical mutation of the relevant terms*. The UN «Brundtland Commission» started from an approach focusing on environmental issues, but *because it sought to make its work effective to implement policies*, it has also included developmental and social issues in a wider holistic approach of «sustainable development» (Brundtland, 1987) - Figure 1.

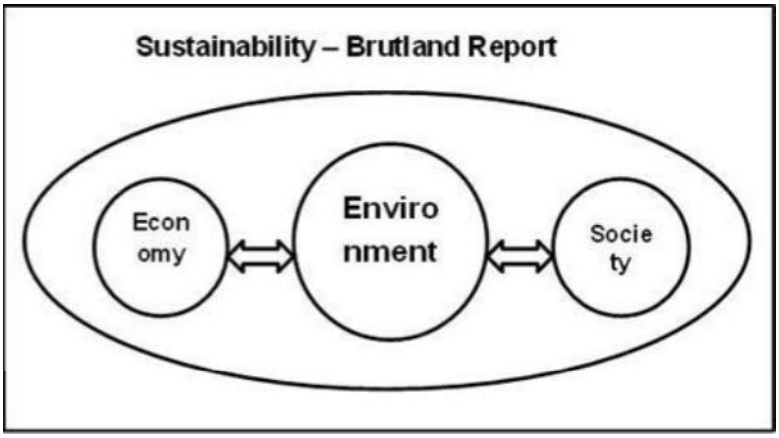


*Figure 1: Sustainability in the «Brundtland Report»*
*Figure author: Minas Angelidis*

Following the same logic of *holistic* approach, which wants to emphasize that *everything in the economy and society interacts with the environment*, United Nations (among other international bodies) has put under the umbrella of "**sustainable development goals**" all economy / development, environment, and society goals. According to the above, economy goals, environment goals and society goals, belonging to a total (seen globally) are interconnected but at the same time complementary, more precisely they have common areas of interest with each other - Figure 2.

Specifically, this holistic approach was adopted in 2015 by the UN 2030 Agenda for sustainable development which has proposed seventeen **(17) Sustainable Development Goals** (SDGs), to achieve by 2030 –see (United Nations, 2015) and (United Nations, The Sustainable Development Goals Report 2020, 2020) – Figure 3.

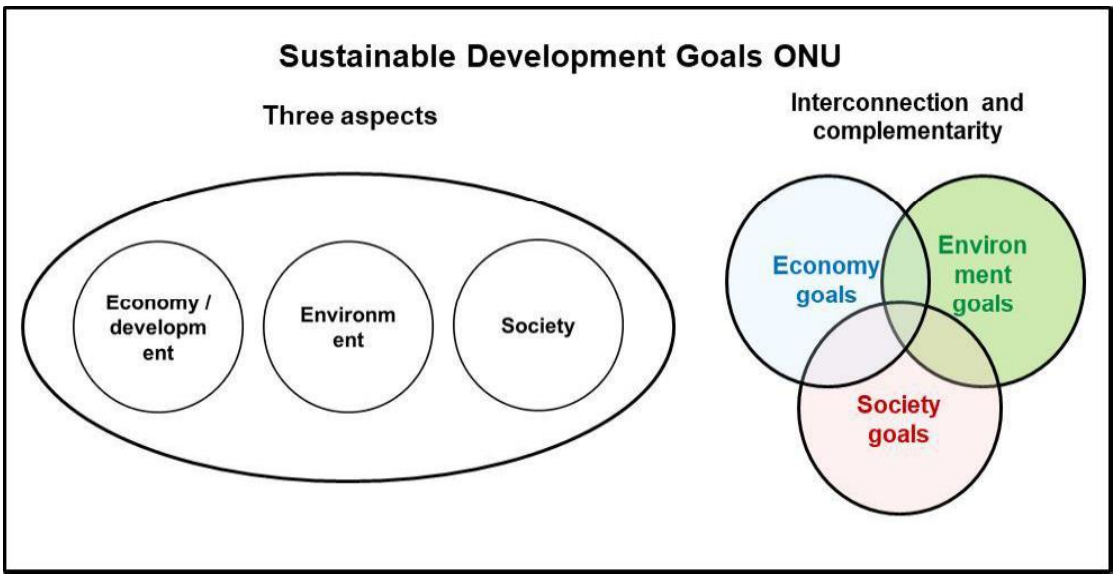


*Figure 2: UN Sustainable Development Goals: Three aspects - Interconnection and complementarity Figure author: Minas Angelidis*

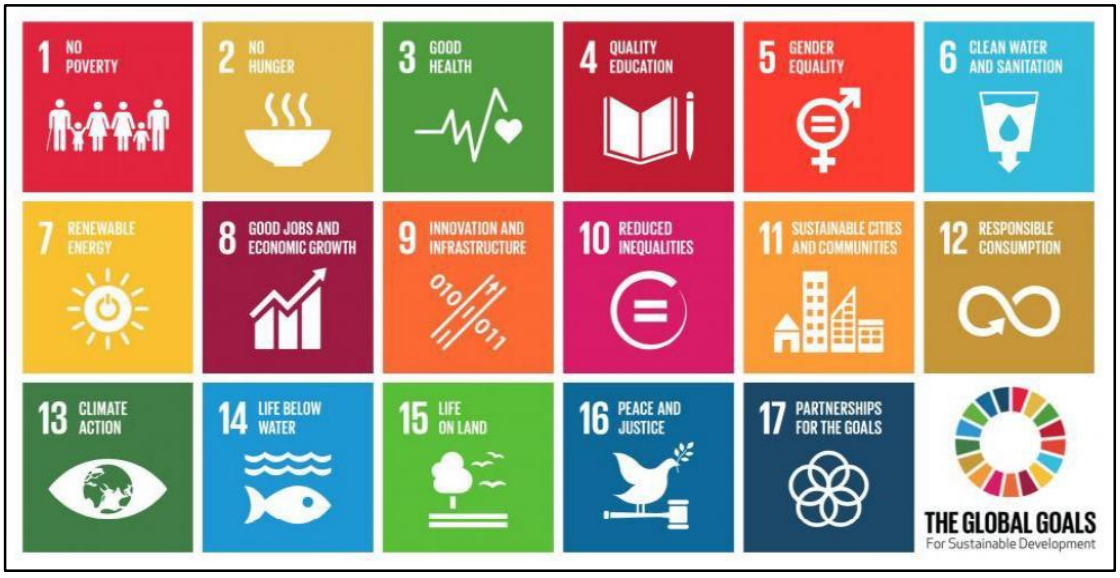


*Figure 3: UN Sustainable Development Goals (2015) Credit: https://www.un-page.org/page-and-sustainable-development-goals*

The **European Union** has adopted in 2010 as similar to UN global sustainability conceptual approach (but not identical) with «Europe 2020» report (European Commission, 2010) promoting smart, sustainable and socially inclusive development (inclusive is close to just -but not identical); aspects pertaining to a whole (seen globally) but also interconnected and complementary, having common areas of interest with each other -Figure 4.

It is worth noting here that the EU has been consistently implementing the 17 SDGs policy until today and monitoring the implementation through appropriate indicators. On the results of the implementation of the **SDG 11- Sustainable cities and Communities** which interest us by priority -see in (Eurostat, SDG 11 - Sustainable cities and communities, 2021a).

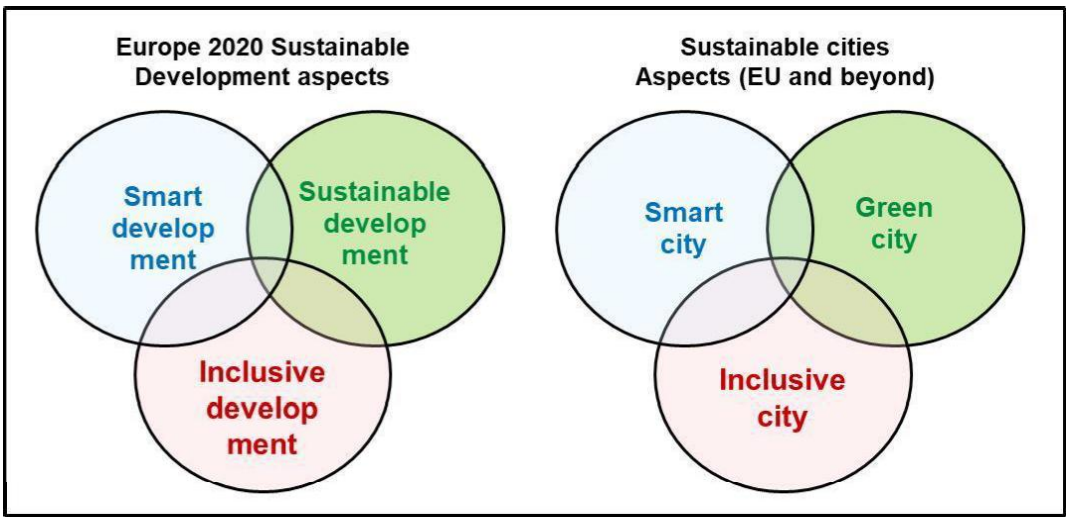


*Figure 4: «Europe 2020» (2010) sustainable development aspects and sustainable cities aspects Figure author: Minas Angelidis*

It is reasonable that *the EU approach to sustainable cities follows a similar "tripartite" division: smart city, sustainable / green city, inclusive / just city*; again, the different aspects belonging to a whole, are interconnected but at the same time complementary; to be more specific they have common areas of interest with each other (Figure 4). Furthermore, a similar approach is followed by scientists and stakeholders. It refers to all territorial levels: local, national (all countries) and international.

Here, we should emphasize at first *that the sustainability set of concepts is complex and holistic* since de facto the changes in the economy, the society and the environment are more and more interrelated. Second, while it is expected that scientists and policy makers involved in *individual areas of sustainable development* (as for example, the physical environment) will pay more attention to these areas, we should keep in mind that *scientific analyses and policy proposals should consider the holistic nature of sustainability or of sustainable city.*

It is interesting to mention the following comment of (Huovilla, Bosch, & Airaksinen, 2019) with which we agree: "the concept of sustainability, as originally introduced in 1987, with its three pillars of social, environmental and economic sustainability … could be criticized of being partly outdated as the needs of the highly digitalized society have quickly changed». However, the reason for which we insist here on using the concepts of sustainability and urban sustainability with their respective pillars is that due to their widest acceptance by scientists but also by policy makers, **it helps us in the formation of reliable and more comprehensive reasoning that relates to urban planning**.

**Common fields of smart, green and just urban actions**

As already mentioned, it is particularly interesting in this paper to see if the smart city approach includes a wide range of common areas of action with those of the green city and just city. In the following, we will start with a list of "Main areas of smart city action" described in 2007 by the widely accepted on this matter report of the Vienna University of Technology. As this list obviously includes many common areas of action with green city and just city, we will then present these common areas. We will not present the common areas of action of the green just city to shorten the entire discussion.

**Main areas of smart city action**, according to, indicatively: (Vienna University of Technology / VUT, 2015) and (Vienna University of Technology / VUT, Smart cities Ranking of European medium-sized cities, 2007) are*: Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living and Smart Governance.*

These areas include several respective sub-areas. In this ranking, indicatively, SMART ECONOMY (Competitiveness) includes the following sub-actions: Innovative spirit, Entrepreneurship, Economic image & trademarks, Productivity, Flexibility of labour market, International embeddedness, Ability to transform. In the same ranking again, SMART ENVIRONMENT (Natural resources) includes: Attractivity of natural conditions, Pollution, Environmental protection, Sustainable resource Management. SMART PEOPLE (Social and Human Capital) include Level of qualification, Affinity to lifelong learning, Social and ethnic plurality, Flexibility, Creativity, Cosmopolitanism / Open-mindedness, Participation in public life. SMART LIVING (Quality of life) includes Cultural facilities, Health conditions, Individual safety, Housing quality, Education facilities, Touristic attractivity, Social cohesion.

*Let us see now which specific Smart city actions have green and just effects.*

**Smart actions that have green effects.**

In the field of **Energy,** the goal is to reduce the consumption of energy and re-sources, their rational management, the implementation of smart "supply chain" procedures and the use of smart networks and intelligent systems for monitoring / measuring energy flows (production, storage, and energy consumption). *Smart energy actions* concern the energy upgrade of buildings, the use of renewable energy sources for heat production and cogeneration of electricity, "smart" urban lighting, and development of energy district network for heating and supply of electric power in cars.

In the field of **Mobility,** the objectives are to improve the accessibility, economy and security of transport systems, the shift of citizens to integrated transport systems that are environmentally friendly, the reduction of "harmful" movements by promoting compact urban development and rebuilding of transport policies. A more specific smart action in the transport sector is *the use of "intelligent" systems of control, monitoring and managing of movements*. The *green effects* of this smart intervention include reducing energy consumption for travel, improving air quality due to reduced carbon dioxide emissions, and reducing noise pollution. Other smart actions with green effects are the Intelligent Parking Management System and applications for "car sharing".

Improving **air quality** can be achieved by using special devices for environmental measurements which are displayed in real time and allow benchmarking and identification of trends that could lead to preventive and remedial measures.

In the field of **waste**, their smart management includes, in addition to the modernization and creation of treatment facilities before their final disposal, various other intelligent management applications using ICT (Information and Communication Technologies) tools, such as the use of sensors to inform the collection centre in real time on the completeness of the bins. The aim is to optimize the paths and frequency of the itineraries and the immediacy of collection.

The utilization of technology and especially the electronic charting of the functional characteristics of the **water supply** network, the development of specific management software and the integration of sensors and automation, form a powerful and innovative tool for the management of the water supply networks, achieving higher quality water supply.

In the field of **"governance",** which includes the participation of citizens, changes in the procedures of administration - coordination and planning are promoted through the encouragement of public participation, cooperation between competent authorities and "opening" in business. A particularly important goal is to make public digital data widely accessible.

**Smart actions that have just effects.**

This issue is more complicated as it is more difficult to clearly define the field of just city action. As we have previously noted, just city refers to the access for all to institutions, employment, housing as well as to health, education and other services and infrastructures. But it

also implies fighting poverty and integrating the migrants. Finally, it relies on the participation of all citizens in urban governance decisions. In general terms, the smart / digital and green components of just actions remain comparatively weak, while the urban actions oriented towards social inclusiveness grow fast in numbers.

Next, in Figure 5, we present the flagship Smart Urban Renewal project at Simmering, Vienna as an illustration of the complementarity of smart, green and just urban actions. The project is reported as smart (it contains, among others, innovations on ICT); however, it includes green dimensions (e.g. energy) but also just dimensions as it is addressed to "citizens with migration backgrounds", with low level of education etc.


***Figure 5:*** *Smarter Together: Simmering Smart Urban Renewal*
Credit: Implementation Report of Smarter Together Vienna 2016 - 2019)
https://www.slideshare.net/PavlnaDraveck/simmering-smart-urban-renewal

**Simmering, Vienna: basic features of the project area**
Simmering, Vienna's 11th district in the south-east, is characterised by its working-class history, a diverse building stock with a high share of municipal and subsidized housing. With an above average percentage of citizens with migration backgrounds and below-average levels of education, the project area is a perfect testbed for a real-life implementation of innovative solutions that are relevant for replication. In total, 21.000 inhabitants will directly benefit from smart solutions in the areas of refurbishment, energy, mobility and information and communication technology.

## 3. Smart green just actions and urban planning: a relationship requiring flexibility but also compatibility

As we have already stressed out, t*he implementation of smart green just actions* affect more and more the *planning of cities*. To examine the relationship of these actions with urban planning, we need to take into account some specific characteristics of urban planning - which often differ from those of smart green just urban actions.

In short, urban planning must contain strategies, objectives (sectoral and territorial) and actions as well as means and tools of implementation; *it starts by a ''declaration of intent'' which should be really and effectively applied*. The application of the plan is realised through urban governance which necessitates horizontal and vertical cooperation among the interested stakeholders and participation of the population. See for the shift from government to governance at local level, among others, in (Nunes Silva & Syrett, 2006).

It is worth noting that urban planning becomes more and more flexible and "open", however in any case it should be effective; it should produce the results announced in the respective "declaration of intent". To do so, the thematic (and territorial) and trans-thematic actions should have a clear meaning (they should be uniquely defined) because they should be implemented by respective existing sectoral (or territorial) actors; for example, transport actions should be (basically) applied by transport actors. This is clear enough in case of the application of a program which extends in a timed period i.e., the Programming period of the EU Cohesion policy 2014-2020.

Several of the above-mentioned urban planning constraints do not appear to exist in the case of the smart green just urban actions. Therefore, to match the given actions with urban planning at first, the respective conceptual frameworks should be compatible (to a considerable degree, if not fully). We should further discuss this.

At first, urban planning should be closely related to the city's real life, which is examined by the urban analysis; therefore, the concepts used in urban analysis should be compatible with those used in urban planning. From this point of view, the concept of smart green just city is proper, because it is one of the few *concepts that refer simultaneously to urban analysis and urban planning* - as such a spatial concept is that of the "growth poles" of Perroux (Darwent D. F., 1969). So, this fact helps in the discussion of the smart green just city in relation to the planning, which we are attempting here.

We also need to point out here that smart green just development requires global actions, e.g., Directives for energy in buildings in all parts of the world or in all buildings of the EU places but also actions in individual categories of countries, in separate countries and different types of areas as well, such as the urban areas and the countryside. Also, smart green just actions would be achieved at international and national but also at regional and local levels.

Therefore, successful implementation of such actions requires good urban governance and planning. Thus, *implementation should be adapted to governance and planning and vice versa: urban governance and planning should be adapted to better serve the implementation of the given actions.*

More: Smart green just urban actions as urban actions of any kind, need continuous evaluation to be effective, to ensure that they really serve the goals that they are supposed to serve. Similarly, urban planning needs continuous evaluation to ensure that it serves the respective goals which were announced. *Obviously, to ensure that smart green just urban actions' evaluation is compatible with urban planning evaluation, the conceptual framework of the given actions should be compatible with that of planning. At least, the thematic structures of the two frameworks should be compatible.* However, it seems that this is not usually the case since smart green just city actions are usually set up independently of urban planning.

As we will see next, very often the evaluations -including ratings and rankings- of smart green just cities and city actions end up to "strange" and contradictory conclusions. For

example, a city figures in high position according to one ranking while it figures in low position according to another ranking. Even more important: a city action figures as extraordinarily successful according to one evaluation, while it figures as moderately successful according to another. All these create confusions and drastically limit the usefulness of the evaluations of smart green just city actions. Even more, they limit the compatibility of the given actions with urban planning.

*All these have a serious impact on the use of evaluation' criteria and indicators.* Therefore, to avoid using criteria that are heterogeneous and incompatible with urban planning, *it is necessary to use a properly argued conceptualisation of smart green just city; this could act as a kind of "common theoretical denominator".* This helps us a lot to make use of the evaluations' results (rankings and ratings) in a more reliable and useful way.

Next, we will use these first conclusions to further examine some of the most important systems of evaluation of the smart green just cities and the respective rankings.

## 4. Strengths and weaknesses of the evaluations of smart green just cities and actions

Let us see what exactly is going on regarding the evaluations' criteria and indicators, the data used and the overall models of evaluation of smart green just cities and actions.

**Systems of criteria and evaluation indicators**

The development of smart green just cities has made it necessary to evaluate the measures taken in this direction through appropriate analyses, most of which used *criteria and indicators systems*. In general terms, the systems of indicators provide a focal point for the formulation of policies and action plans, while they are also the basis for informing citizens at the local level. See, indicatively, a discussion of "taxonomies" for Analysing Smart Cities Developments in (Alexopoulos, Charalabidis, Vogiatzis, & Kolokotronis, 2018).

However, it is particularly important to **examine criteria and indicators in depth** *as they are used to evaluate the effectiveness of smart green just urban actions already implemented* and based on the respective results, *contribute to define the objectives of future actions* and, more generally, *to guide the decision-making process* in this direction.

A first attempt to develop a comprehensive system of indicators for measuring the progress towards urban sustainability, i.e., assessment of whether cities turn green, was the European Commission program "European common indicators" on which a respective report was based: (European Commission, 2000).

In recent years, many efforts have been made to develop key performance indicators for smart green just cities, to be used in the formation of respective universal rating / ranking indexes (e.g., international standardization organizations, research teams / researchers, applications, programs funded by European Union, market analysis organizations, etc.). Here are some of the most important of these efforts. See in more detail in (Angelidis & Drakouli, 2019).

The standard *ISO 37120: 2014 "Indicators for city services and quality of life"* (ISO/TC 268 Sustainable development of communities, 2014), which was revised in 2018, concerns the measurement of service efficiency and quality of life, sets seventeen key indicators for evaluating the performance of cities: economy, education, energy, environment, finance, fire and emergency response, governance, health, leisure, security, housing, solid waste, telecommunications and innovation, transport, town planning, sewage, water supply and sanitation.

A second relevant, highly influential model, developed by the *research team at the University of Vienna -"TUWIEN" group-*, identifies six key categories that characterize European smart cities: Economy, Mobility, Governance, Environment, Living, People (Vienna University of Technology / VUT, Smart cities Ranking of European medium-sized cities, 2007).

The *CITYkeys program* (CITYkeys; Bosch, P; Jongeneel, S; Rovers, V; Neumann, H-M; Airaksinen, M; Huovila, A, 2017), funded by the EU HORIZON 2020 program, has developed and validated, with the help of cities, key performance indicators and data collection procedures for shared and transparent monitoring as well as the comparability of smart actions in European cities. The evaluation of smart cities focused on five main categories: People, Planet, Prosperity, Governance, Dissemination, including their subcategories.

**Databases, indicators, and indexes on smart green just cities**

For the most effective implementation and evaluation of any smart green just urban actions, in addition to the creation of widely accepted relevant criteria and evaluation indicators, relevant scientific databases should be created and constantly expanded. There are two categories of such databases: (a) for cities and (b) for smart and / or green urban actions.

(a) From a database of cities, data can be obtained that make it possible to compare cities, both nationally and globally, as well as to assess the progress made within them over time. A first attempt to create a database is the "Urban Audit" which is implemented with the support of the European Commission and concerns the quality of life in many European cities. At the same time, Eurostat produces other urban data in addition to those of Urban Audit. See for a more detailed discussion of this topic, among others, in: (Angelidis M. , 2010). (b) Several databases for smart and green actions in EU cities have already been set up. They are usually integrated in comprehensive *"Smart Cities Information System (SCIS)"* – see in more extent, among others, in (Angelidis, M., & Drakouli, E., 2019).

**Quantitative analyses of smart green just cities and actions**

*Overall quantitative analyses of urban green nature* have initially emerged in Europe; In 2009, a *Green City Index (GCI)* was calculated for 30 European major cities (EIU / Economist Intelligence Unit & Siemens, 2009). The project proceeded with the calculation of the GCI for many large cities of the other continents. See more details at (EIU and Siemens 2009). According to the ranking obtained from the evaluation of European cities by the EIU, in the first places for their overall performance as green cities were cities of Northern Europe, while low performance was recorded mainly in Balkan cities.

Indicatively, in terms of cities with a high level of "smart" actions, based on the results of the VUT survey for 2014, Luxembourg ranked first in smart economy policies, while, respectively, Sweden's Eskilstuna in the field of society.

An overview of most European smart green just city *ratings* shows that: (a) Regarding *the countries where the cities evaluated are located*, the Nordic countries and the countries of Central and Western Europe are ahead, followed by countries of Southern Europe, while the countries of Eastern Europe have lower performance (b) As for *the cities themselves*, despite the differences that appear according to the field of action, the same cities appear consistently in high-ranking positions: Copenhagen, Stockholm, Oslo, Vienna, Amsterdam, and a few others.

**Discussion**

Focusing on the questions regarding the smart green just city and planning relationship, we provide here a more substantial assessment as to *which EU cities have promoted the most important actions in key issues to meet widely accepted smart green just goals.*

More actions referred to ICT, Energy and Transport, comparatively less to other sectors; among others, this is due to the fact that EU support was higher in digitalisation and energy issues; also, it was easier to have digitally driven effects in ICT, Energy, Transport, and some other sectors; it was less easy and proper to have such effects in actions referred to "just".

More: Cities which had further developed systems of implementation of city actions have achieved better results: flagship actions which could serve as comparatively better examples. These were mainly cities of North – Northwest Europe. We see here a spatial distribution which for most follows the spatial division in EU between more developed and less developed

countries / regions / cities. Of course, there have also been successes in less developed regions and cities. Where there have been fewer actions are in cities that have not tried hard enough to take EU funded actions. These were mainly cities overall less developed. Thus, *pre-existing inequalities among cities remained to some extent*. This is contradictory to the overall EU target to achieve territorial cohesion at all territorial / urban levels. This is obviously a major problem to address. But it also means that smart green just actions have so far diverged from the objectives of the urban planning.

We have pointed out that confused conceptualizations of smart green just cities and actions limit considerably the reliability and the usefulness of the evaluations. This was demonstrated toa large extent in this section. As we have seen, all the above rankings and ratings of smart cities, green cities and just cities and actions *taken separately include almost the same range of issues, with different grouping of thematic areas* depending on the policy priorities set by each evaluation method.

The already reduced reliability of criteria and indicators is further decreased by weaknesses regarding the technical structuring of the indicators used; weaknesses regarding the data used should be considered, as well. All the above reduce reliability of the quantitative models of evaluation.

Findings of this nature have been made by many. Indicatively, (Zafeiriadis, 2017) points out that the creation of the cities' databases as well as of index systems "includes the process of "choices", introducing uncertainty issues, such as the selection of data, their possible inaccuracy, the methods used to estimate their weight, their normalization and collection methods".

More generally, we consider that, *in terms of evaluation*, for all the above reasons, *models can give only "strong indications" and not complete evidence*. However, these indications are particularly useful in trying to improve compatibility of the smart green just actions with urban planning. The insistence of several researchers on producing more and more sophisticated quantitative models for the evaluation does not adequately enhance the accuracy of the evaluations if the conceptual framework of evaluations is not improved.

**5. Private investments on digital city innovations and urban planning**

*Do impressive private investments on digital innovations lead automatically to sustainable cities? Do we still need urban planning?*

It is worth mentioning that the dynamics of **investments, mainly digital and mainly private, to city matters** are much stronger than ever before and it is predicted that they will increase impressively in the future. According to several consulting companies, indicatively: (a) spending of smart cities in technology will rise from 96 billion dollars in 2019 to 327 billion dollars in 2025 (Frost and Sullivan Company, 2021) (b) cumulative 2019-2028 revenue for the global smart city technology market is anticipated to reach 1.7 trillion dollars (Guidehouse Insights, 2019) (c) global spending on smart cities initiatives will total about 124 billion in 2020, an increase of nearly 19% in 2019 (IDC, 2020). Independently of the differences in the terms "investments" or "global spending" used in these sources, this is an extremely strong dynamic. Dynamics of total spending, including private and public, in smart cities actions, estimated by the European Investment Bank (EIB Economics Department: Kollar, M.; Bubbico, R.L.; Arsalides, N.;, 2018) are quite lower, but strong.

We should stress out here that, while digital city investments are already especially big and digitally driven urban actions are numerous and rapidly growing in numbers, *they cover only a small part of the spending and effort for cities which are regulated by urban planning.*

Undoubtedly, digital innovation solutions for cities, especially those which are driven by private investments, contribute to confront several city problems; the fact that private companies can more easily develop initiatives towards potentially sustainable orientations can

be of help. However, *we should answer the question: do the "mainly digital and mainly private" investments lead automatically to sustainable cities? Do they contribute in any case to the achievement of sustainable goals for cities, as contemporary urban planning aims?*

As we have already stressed out, the smart green just city concept has been formed in connection with new developments in the world and at the same time *locally, in cities.* The respective actions are required to contribute to the sustainability of cities by achieving bigger savings in resources and effort compared to «traditional» methods of intervention in cities and especially to «traditional» urban planning.

However: *the aim of urban planning is to improve all aspects of cities in a balanced way, by simultaneously reducing spatial economic, social, and environmental inequalities; On the contrary, the digitally driven smart green just city actions can at present reduce inequalities only in some specific thematic areas;* they do not affect several inequalities; they increase some other inequalities; thus, *they can serve only several objectives of urban planning, not all the objectives.*

In addition: The declarations of intent accompanying the above actions promising increased efficiency in saving resources and effort to achieve urban sustainability may end up being much lower after implementation. Thus, *while the above actions promise to achieve several specific goals of urban plans which are included in a sustainability strategy, the benefit may be much smaller after implementation.*

It is worth stressing out here that, in our view, many researchers and stakeholders *overestimate the effectiveness* of using high technology / smart urban actions. However, many in-depth studies have shown that the use of technology (including information technology and telecommunications) in cities, since it is closely related to the prevailing economic and social conditions, can only help to confront specific urban problems (Castells, 1992). See also for other interesting critics to smart city in (Allam & Newman, 2018) insisting on the need to redefine the Smart City paradigm focusing on metabolism, culture, and governance aspects of the city.

The very recent New Leipzig Charter (in fact: EU Urban Agenda 2030) (Ministers on Urban Matters - EU, 2020) makes a particularly useful assessment of the *relationship between digitalisation and sustainable urban development*: «digitalisation is a major transformative, cross-sectoral trend affecting all dimensions of sustainable urban development. In many ways it offers *an opportunity for urban transformation*». But he points out that, while digitalisation could have a positive impact on the city («digital solutions can deliver innovative and high-quality services to the public and businesses»), it could at the same time have a negative impact ("digitalisation can trigger a further spatial and social divide with risks to the protection of privacy"). Consequently, "*digitalisation needs to be shaped in an environmentally sustainable, inclusive and fair manner*".

**Further discussion and proposals**

*Shaping digitalisation in a sustainable manner can be done through appropriate options of territorial and urban planning which could choose the digital solutions which are most useful for the city and avoid the ones that could have a negative impact*. In other words, it is necessary to *identify the "smart" actions that could have the most substantial and most sustainable impact on a specific city* and, furthermore, to combine the "appropriate" smart actions with "traditional" actions to define best urban planning strategies and actions. In this sense, digital actions should be included in a holistic approach of urban sustainability (covering smart green just) regarding both the analysis (for planning) and planning (per se, itself).

In practice, these means that *it is necessary, before applying "smart green just" actions*, **to perform a feasibility / efficiency assessment** which should take into account, among others, (a) the integration of the specific city in the spatial plans of its wider region and the country, (b) the existing plans of its spatial and urban development, including the existing strategies, (c)

the goals and means of implementation of the latter and, (d) finally, the policy priorities of the wider transnational region.

## 6. Smart green just urban actions in the frame of EU policies

*Good news: EU proposes particularly ambitious sustainability strategies and goals.*

EU has adopted and promoted smart green just development goals more than any other mega-region of the world. Starting from objectives of Urban Agendas of European Commission and / or other EU bodies, EU implemented these objectives for most through the support of pilot innovative sustainable urban actions -see, among others, in (European Commission L. author: Rampton J., 2021). Just for an illustration, we present below Figure 5 demonstrating the relevance of a range of Urban Innovative Actions (UIA) projects (supported by EU) with the thematic objectives of European Regional Development Fund (ERDF).

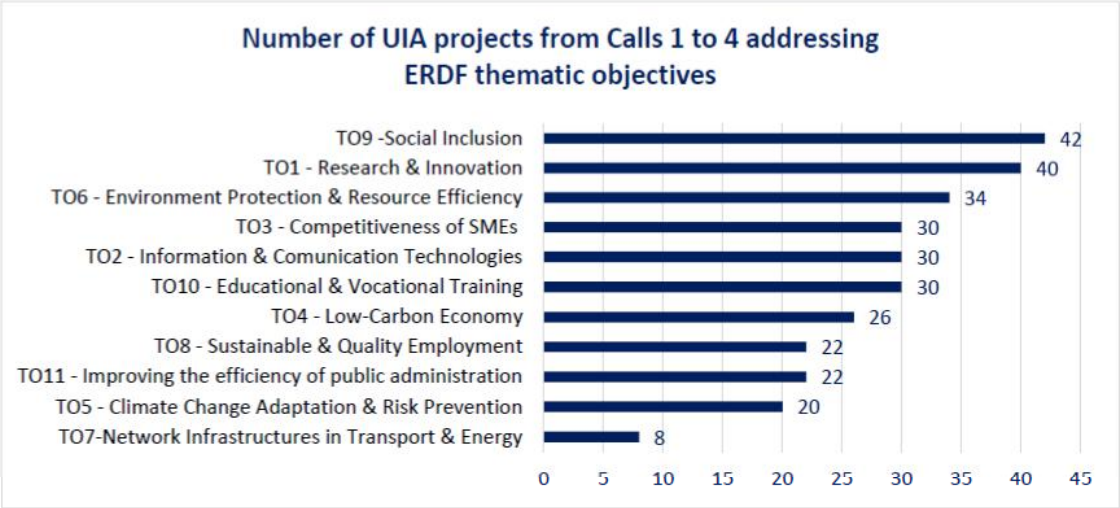


***Figure 5:*** *Relevance of Urban Innovative Actions (UIA) projects to European Regional Development Fund (ERDF) thematic objectives*

Credit: European Commission L. author: Rampton J., 2021 Figure 18

Also, just for an illustration, we present in next page a Map on the participation of 650 European cities in European and global city initiatives related to climate-change adaptation - Figure 6.

Obviously, it is at first remarkably interesting to look at how the 17 UN / EU Sustainable Development Goals (SDGs) -with priority to the SDG 11- "Sustainable cities and Communities" (see in Section 2) are implemented in the case of the EU.

In the following, apart from the presentation of the respective EU policies, we consider it appropriate to **separate, as far as possible, the "declarations of intent" from the "real" policy implementation.**

A key reference of the Community approach to smart green and inclusive / just development is the **«Europe 2020 strategy»** proposed in 2010 (European Commission 2010, op. cit.) -which was already mentioned in section 2. This strategy gives a clear priority to "smart, sustainable and inclusive growth".

The EU has in recent years given high priority to the policy of moving towards a Low Carbon Emissions (LCE) economy. The Community institutions (European Commission, European Council, European Parliament, etc.) have followed successive steps regarding this issue in recent years. The transition to the LCE economy is an especially important aspect of the whole effort of the international community and, in particular, the EU, to tackle climate

change. This is not, in a sense, a single goal, but one which is part and stage of the entire strategy to tackle climate change.

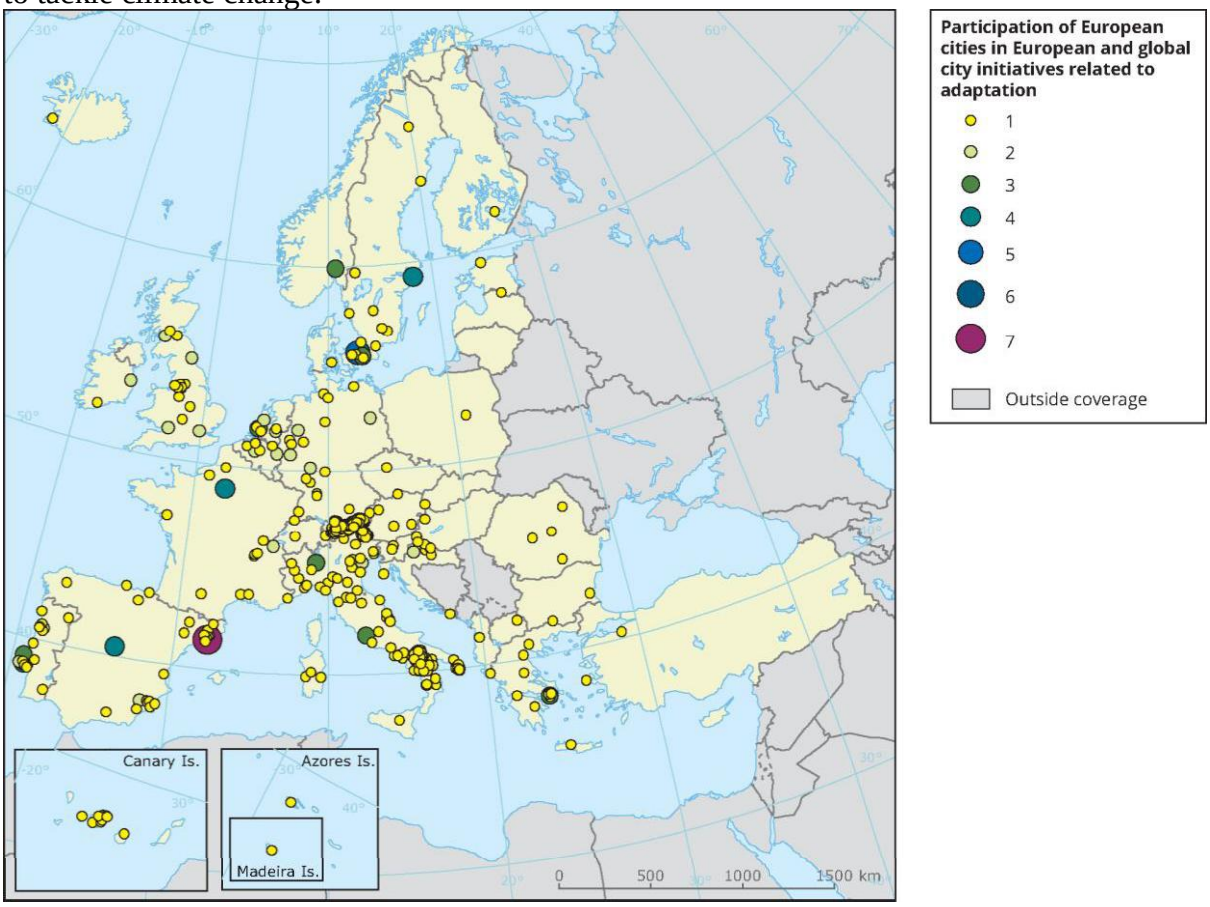


***Figure 6:*** *Participation of European cities in European and global city initiatives related to climate-change adaptation.*
Credit: https://www.eea.europa.eu/data-and-maps/figures/participation-of-650-european-cities-2

In particular, European Commission (EC) has incorporated in 2015 the transition to an LCE economy in the EU in the more general "**Energy Union Strategy**", which includes strategies for a competitive, circular and LCE economy. Energy Union Strategy has already (2020) been significantly promoted (European Commission, 2020a) and is expected to be promoted even more in the future. Also, a "New **Circular Economy** Action Plan For a cleaner and more competitive Europe" (European Commission, 2020b) is promoted in 2020, included in the new EU policy framework called "**European Green Deal - Europe's new agenda for sustainable growth**" (European Commission, 2019). We point out here that **Cohesion Policy**, *a place-based to a considerable degree policy*, was considered that it should play an important role in supporting the EU's transition to an LCE economy -see, among other, in (European Commission, 2020a).

We should recall -see in section 3- that all the **initial statements on strategies** constitute **declarations of intent**. This is also the case regarding the above strategies.

A declaration on strategy is followed by an action plan aiming to the implementation of the strategy. It is particularly important that, in several cases, for different reasons, the action plans are not properly defined to really implement the respective strategies. So, in these cases, before the application of plans even starts, it is certain that the "**real effects**" of the plan implementation will differ from the strategy aims (as they were declared). In other words, there

is a need to include in the action plans proper financial and other means and tools as well as proper governance arrangements. Also, *making preliminary assessments* (to see for instance if the different proposed actions comply with) *to ensure necessary synergies is of crucial importance*. From this scope, we will present in summary the initiatives of the EU to implement its agenda on smart green just cities in relation to its general and specific to cities strategies and plans in which urban planning is included.

**Fast growing EU support to digital / smart green just city action**

*During the last twenty years, EU supports a growing number of cooperation initiatives on smart green just city* developed by the Member States and even more by groups of interested cities. The latter take sometimes the form of *cooperation initiatives in which the role of EU stakeholders as for example the JRC (see in next) is strong*. As the number of these initiatives is remarkably high, we will be limited to mention only some of them: (a) The *European Innovation Partnership for Smart Cities and Communities* (European Commission, 2021a) is an initiative launched by the European Commission in 2012 aiming at boosting the development and use of smart urban technologies. (b) *Initiatives on Urban data and studies* - Indicatively: Smart Cities Information System (SCIS) collecting information about the cities on various platforms – see previously, in Section 4. (c) Inclusion of certain subsidized research programs, conferences etc. for smart cities in the *Horizon 2020* program. (d) Support - reward "good practices" followed by local government and other authorities in specific cities.

It was in this context that the idea for the *European Green Capital Award* (European Commission, 2021b) was born, with the aim of recognizing and rewarding local efforts to improve the environment, the green economy, and the quality of life in cities. Respectively, the idea of the *Green Leaf Award* was presented, which is addressed to small and medium-sized European cities and recognizes the commitment to achieve better environmental results, with special emphasis on promoting green development.

The *EU Covenant of Mayors for Climate & Energy* (Covenant of Mayors / European Commission, 2021) is an important European movement involving local and regional authorities, which voluntarily commit to increase energy efficiency and the use of renewable energy sources in their regions with a view to achieve and exceed the EU target for reducing CO2 emissions and mitigating climate change.

**The Covid-19 pandemic effects on cities and the recovery strategy. Towards more "Green" and "Digital"**

Covid-19 pandemic had important effects on health issues and on the overall economy and society at world level but also at EU, national and regional / city levels. The urban dimension of this crisis was particularly important.

To face the health and the overall crisis, EU countries agreed to implement a radically new policy for the recovery and beyond. The core element of this policy was a €750 billion temporary recovery instrument called "**NextGenerationEU**" "to help repair the immediate economic and social damage brought about by the coronavirus pandemic". More interesting for us: they stated that "*post-COVID-19 Europe will be greener, more digital, more resilient and better fit for the current and forthcoming challenges*" (European Commission and Parliament and Council, 2021). Evidently, there were minor changes of this policy which will not be presented here. What is important to mention is that *NextGenerationEU implementation facilities prioritize "Green" and "Digital", supporting the European Green Deal and the Digital Transformation "as the twin transition to recovery*". In our view, both transition targets (Green, Digital) as well as the necessity to be implemented quickly and successfully in the frame of NextGenerationEU should accelerate the changes towards a better match between

smart green just city actions and urban planning in EU. Why? Because this match will contribute to producing "real effects" corresponding to the strategies.

**Latest territorial / urban Agendas advocate on more synergy between digital / smart green just urban actions and urban planning**

In 2019 and 2020, the EU strategies and goals related to (more or less) smart green just urban planning were further adjusted and expanded. Of the numerous relevant documents, we find it most useful to refer to the two very recent (2020) Agendas: the «**Territorial Agenda 2030** A future for all places» (Ministers for Spatial Planning - EU, 2020) and the **«New Leipzig Charter** (policy for the common good, integrated approaches, multi-level governance, place-based approaches, participation and co-creation)» (Ministers on Urban Matters - EU, 2020).This is because these two documents focus more on issues of smart green just urban planning and in particular, emphasize the importance of integrating smart green just urban actions in territorial and urban -*place-based*- planning - which is at the heart of the argumentation of the present paper.

Regarding the strategic orientation of smart green just urban planning, the *Territorial Agenda 2030* (TA 2030) states, among other things: «sector policies, municipal, regional, national, EU and other authorities, as well as various society groups need to come together. They must cooperate to balance inclusiveness, sustainability, competitiveness and resilience through participative and innovative integrated territorial development».

For more specifically urban issues, TA 2030 refers to the *New Leipzig Charter (NLC)*. The last stresses out, already from its title, that the transformative power of cities should be used, by priority, *for the common good*. It, then, states that «… urgent global challenges…» «…may also intensify disparities in our societies. In addition, digital technologies are drastically transforming society, creating potential political, social, ecological, and economic benefits. However, these technologies also trigger profound new challenges such as the digital divide, lack of privacy, security issues and market dependencies …», issues we have already argued for previously.

In the same line, it stresses out the role of governance, on the necessity of «… urban governance aiming for the common good» to «transform all cities into just, green, and productive urban systems» (Ministers on Urban Matters - EU, 2020). In the same line, NLC stresses out that national and regional urban policies should be strengthened to empower cities and contribute to consistent implementation of sustainable urban development at local level. Also, it emphasizes the need for cities to take advantage of EU financial instruments - which, in our view, could be used to counterbalance the one-sided orientation towards which the private companies promote digital solutions. *Cohesion Policy could by preference be used for this purpose, as it could by definition support «place-based approaches for local and regional urban projects».*

**Conclusions - proposals**

The smart green just city actions are based on a conceptual framework which includes initially three components: smart, green, just. This framework becomes even more complex from the fact that digital innovation ("digitalization") influences the first three components leading to a *holistic framework* including digitalization / smart green just. The use of this framework often in a fragmentary and non-balanced way has created confusion and has drastically limited the usefulness of the evaluations of the actions for the urban planning which should be comprehensive. The same applies when evaluation criteria and indicators are used on the basis of different definitions of smart green just city. Of course, differences in the technical structuring of indicators decrease even more the comparability of the different respective

evaluations of smart green just urban actions. *Evaluations of the actions are of course useful, but they are for most useful for each separate group of themes: digital, smart, green, and just.*

Concluding: *it is necessary to use a properly argued "common theoretical denominator" for the digital / smart green just city analysis and action.*

The objectives of urban plans are determined by the overall needs of the city's economy, society, and environment, so they differ from those of the smart green just city actions, which are partial. But there must be *synergy* between the two sets of objectives. Why? Because the implementation of comprehensive urban planning requires an urban governance promoting horizontal and vertical partnerships; this kind of governance *ensures synergies among the thematic sectors* (smart, green, just) whether the latter are "digitally driven" or "traditional" (not yet digitally driven).

More generally, the smart green just actions must "cooperate" with urban planning. *To achieve this, they both need to adapt appropriately*. Especially:

**Urban planning needs to be more flexible and adaptable**. It should specifically adapt to include potential smart green just city actions; priority should be given to those which may have more immediate massive effects on improving urban sustainability; thus, urban plans should incorporate the most effective, the most feasible, in this sense, actions. More: the evaluations of the effectiveness of the smart green just actions (including digital innovation) need to focus not only on the narrow consequences of the actions, but also on the impact they have on the whole economy, society, and the environment of the city as well as on its wider region. Thus, *each comprehensive urban plan should include a separate analysis and proposal module for the use of smart green just city actions.* The implementation of this guideline depends obviously on the hierarchy of urban plans and the specific content of each by level applicable in each specific country.

Therefore: A **feasibility assessment** must be carried out prior to the implementation of "smart green just" actions. The assessment should consider, among others: (a) The integration of the specific city in the spatial plans of its wider region and the country, (b) The existing strategic and structural plans for the city and its wider region (by structural plans we mean the plans defining the allowed land-uses, the spatial configurations of the infrastructures etc.). (c) The implementation means of the latter. (d) Finally, the policy priorities of the wider transnational region -in our case, the European Union- and the eligibility criteria for funding countries and cities to promote sustainable urban actions.

All these guidelines are intended to improve synergies between smart green just actions and urban planning. These synergies could be supported, indicatively, by relevant *"observatories" for analyses and proposals on smart green just actions* at municipal and / or regional / national level. The observatories could also stimulate dialogue on these issues supporting the citizens participation in the matter. Of course, there are other possible stimulating actions supporting the synergies. Their discussion exceeds the limits of the present paper. But it is important to advance research on these issues related to the fast-growing and promising sector of smart green just city actions.

*European Union's support* of digitally driven sustainable urban actions is undoubtedly especially important. The older as well as the newer EU's Urban Agendas were implemented mainly through the support of pilot urban actions implemented at local level. During the last years and looking towards the future recovery after the Covid-19 pandemic, EU puts at the forefront the digital / smart green just strategies and actions. What is crucial for these policies is how to proceed from the "declarations of intend" to a successful implementation of the strategic objectives. For this purpose, the enhancement of the synergies between smart green just actions and urban planning is particularly important. There are already several appropriate tools (as for example URBACT) and procedures intended to ensure the necessary synergies at

different territorial levels. However, there is a need, for the immediate future and beyond, for more powerful tools and better procedures. These should be primarily more effective!

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