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SELF - SUFFICIENT CITY

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Thank you,
Dr. Egin Zeka / Chair of the conference
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KEYNOTE SPEECH

COMPLEXITY IN PLANNING SUSTAINABLE CITIES

Antonio Acierno

1. SUSTAINABLE DEVELOPMENT CONCEPT AND ITS EFFECTS ON THE DEFINITION OF CITIES

In addressing the topic of the self-sufficient city, I propose to start with the concept of sustainability and understand its theoretical and applicative developments that have been determined over almost thirty years of debate. The concept of sustainable development became established as an interpretative category of the contemporary world beginning in 1987 with the Brundtland Report, named after Norwegian Prime Minister Gro Harlem Brundtland, who chaired the World Commission on Environment and Development (WCED) established in 1983 under a mandate from the United Nations General Assembly. In the Report, titled "Our common future," sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

The definition originally originated within the natural sciences as a search for balance between the economic demand for growth and the limits of the environment's tolerance in accommodating in a limited area the maximum crowding of individuals, beyond which ecosystems are no longer able to reproduce, the so-called natural "carring capacity" (Silvestri, 2015; La Camera, 2003). Along with the carrying capacity of ecosystems also comes the need to limit the exploitation of natural resources so as not to jeopardize the needs of future generations.

This conception evolved over time and particularly during the 1992 Earth Summit, the first UN World Conference on Environment and Development (UNCED, 1992), where two global reference documents were drafted: the Rio de Janeiro Declaration and Agenda 21.

The Rio Declaration takes up some of the points already developed in the 1972 Stockholm Declaration, based on 26 principles including the principle of intergenerational equity, which recognizes the ethical need for responsibility to future generations. The principle of intergenerational equity develops in parallel with the idea of sustainable development and characterizes its social value. It is not only about respecting nature but also about preserving appropriate environmental quality conditions for generations to come, limiting and redefining the goals of economic development. During the 1992 Conference in Rio de Janeiro, therefore, the concept of sustainable development is made more explicit by denouncing its multidimensional

character. The same concept is also reaffirmed more forcefully at the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, particularly through the Plan of Action from which emerges the triangle of sustainability based on the defense of ecosystems from the environmental point of view, the limited development of productive activities in defense of human rights, and the equitable distribution of resources to fight poverty.

In synthetic and communicative support of this global orientation, the image of the triple bottom line based on the three pillars of sustainability (environmental, economic and social sustainability) or also of the 3Ps (Planet, Profit, People) with intersecting spaces highlighting its challenges has become widespread (fig. 1). In the debate of the following decades, the scheme has sometimes been enriched with a fourth or fifth pillar, the cultural and/or governance pillar, highlighting the need for a cultural approach necessary to address the challenges of sustainability as well as the appropriate organization of regulatory processes and citizen participation in them (Basiago 1999; Pope et al. 2004; Gibson 2006; Waas et al. 2011; Boyer et al. 2016).
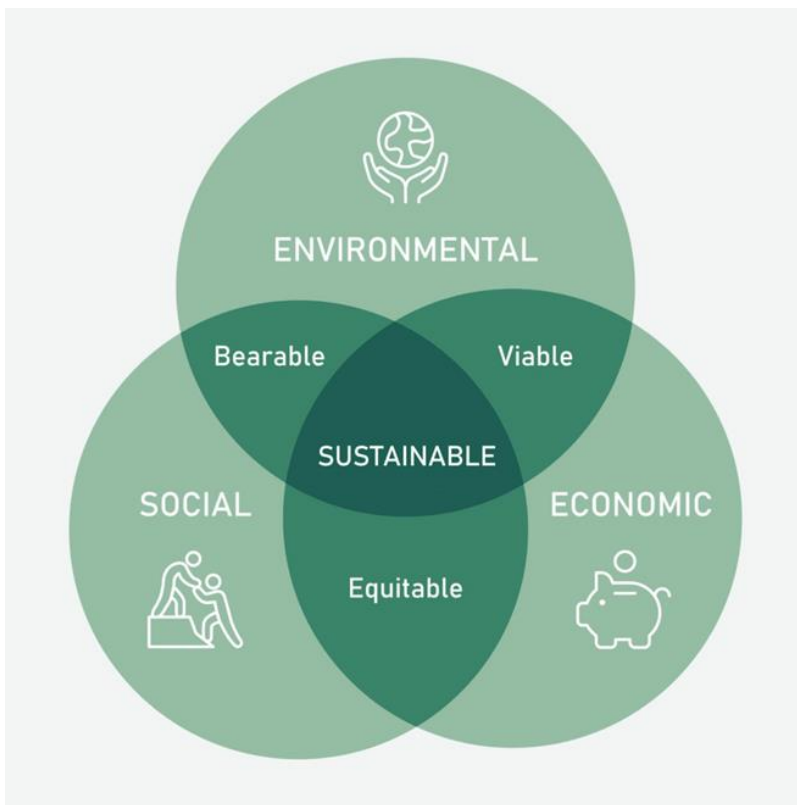

Fig. 1 – The triple bottom line of sustainability

We can affirm that although the conceptual image of the "three pillars" has become an accepted commonplace in the scientific literature, it is nevertheless not unambiguous. Beyond the additional pillars, such as the institutional (Spangenberg et al. 2002; Turcu 2012), cultural (Soini and Birkeland 2014), and technical (Hill and Bowen 1997), which have been referred to in numerous scholarly researches, in fact in none of the international documents mentioned above (Brundtland Report of 1987; Agenda 21 of 1992; World Summit on Sustainable Development of 2002) is explicit reference made to the triangle of environment, economy, and society (Purvis et al., 2015). Actually, international documents are much broader in addressing sustainability, and recently the SDGs of the 2030 Agenda make sustainability explicit in a complex and more integrated way, referring to the well-known 17 global goals from which additional subgoals and categories are derived that illustrate the articulation of sustainable development.

We can state that the image of the 3Ps evokes the complexity of the debate in an extremely concise way, but it also represents ease communication of an idea, which underlies an interpretative model of contemporaneity and appears to be easily achievable if behaviors are adopted that are based on: economic sustainability, ensuring efficiency and income for businesses while respecting the ecosystem; environmental sustainability, ensuring the availability and quality of environmental resources; and social sustainability, ensuring equal access to the benefits of sustainable action, namely quality of life, safety and health.

Sustainability presents itself as an appealing and affordable challenge, if rules, tools and models indicated, promoted and supported by public policy and international bodies are adopted. Sustainable development has, therefore, also become a point of reference for scientific debate in the field of urban planning by translating its interpretations to the sustainable city. The sustainable city becomes, in this background framework, both a goal and a framework within which to build sustainability. In thirty years of reflection, research, policies and programs we have observed the proliferation of new attributes alongside that of the city, which seek to progressively clarify the idea of the sustainable city putting in evidence the limits and opportunities of this new vision of the urban habitat (WCED, 1987 ; Kates et al. 2001; Komiyama and Takeuchi 2006; Purvis et al., 2019; Schoolman et al. 2012).

2. FROM SUSTAINABILITY TO THE MULTIPLE DEFINITIONS OF CITIES

Definitely, after more than 30 years of debate, it is acceptable to sustain that talking about sustainable city we are referring to established certain objectives to be pursued through specific actions: preserving nature, avoiding the indiscriminate consumption of resources, counteracting the effects of climate change, designing

cities with a significant presence of green areas, defending against natural disasters and in particular hydraulic risk and urban heat island, adopting nature-based solutions, make cities and communities more environmentally and socially resilient, encourage the use of renewable energy, adopt habits and behavioral responsibilities that limit consumerism, act in economic policies with respect for the precautionary principle, stimulate the business community to act according to green goals by balancing profit and public interests (Palermo, 2022; Cohen, 2018; Chatterton P., 2019).

If we analyze the urban planning literature of the past three decades, which has developed in the wake of the Brundtland Report, we will find a plethora of city attributes (fig. 2): sustainable city, green city, resilient city, low carbon city, eco-city, smart city, inclusive city, safe city, digital city, ubiquitous city, information city, knowledge city, self-sufficient city, livable city, walkable city, 15 minutes-city city, biophilic city, post pandemic city, regenerative city, etc.

Fig.2 – Multiple definitions of sustainable city in thirty years of debate

Recently, many researchers have developed extensive studies on the spread of such terms in the scientific literature, capturing nuances of different meanings and even total or partial overlap (de Jong et al., 2015).

The first question that arises spontaneously in reading the list is whether these terms are synonyms for sustainable city, and therefore interchangeable, or are there recognizable distinguishing features that differentiate them. I personally argue that there are different meanings constituting an attempt to better specify the concept of a sustainable city, sometimes emphasizing environmental aspects or those related to

social equity or economic gains. Moreover, reflecting on the opportunities for access to sustainability highlights social and spatial inequities, which do not allow for an equitable distribution of benefits to different communities, and especially how much it is guaranteed even through the application of advanced technologies, which are the preserve of only certain social classes or the most advanced countries, excluding a large part of the world's population.

Palermo in his recent book (2022) carefully investigates the sustainability paradigm, which he considers one of the most mature interpretive categories after 30 years of debate, along with other emerging ones that often overlap with it. His reflection highlights the need to understand the differences and especially whether there are real innovative reaches and not, as is often the case, mere rhetoric masking old problems with updated vocabulary. Has the resilient city rather than the smart, low-carbon, green or biophilic really introduced new issues or do they remain confined within technical-cultural limits still stranded on old, unresolved knots that prevent effective advancement of the discipline? The chronic dilemmas related to the regulation of transformation, visioning and urban planning do not seem to have found an accomplished solution for the goals of the modern city, bent on growth and morphological-functional organization amid difficulties in the exercise of planning tools and policy implementation. How can new challenges, especially environmental and social justice ones, be addressed by disciplinary knowledge not yet emancipated from old methodological approaches and operational models? According to the author, sustainability has the merit, unlike the other meanings of cities that turn out to be expressions of ephemeral cultural fads, of highlighting the necessary challenges to be faced in pursuit of change but also the risks, without hiding the difficulties and obstacles that may prevent implementation.

Analysis of the scientific literature shows that the attributes listed above are often used synonymously without highlighting their interpretive differences (de Jong et al., 2015). Although the attributes reveal an attempt to conceptualize aspects that have been progressively constituted in pursuit of the satisfaction of needs, and particularly the balance between environmental preservation, economic convenience, and social equity, the narratives on the idea of green, eco, smart, low-carbon, and biophilic cities often overlap and confuse.

The confusion in the use of terms would then demonstrate the existence of a larger scheme-umbrella that contains all the attributes of the late 20th and early 21st century city. Certainly, the triple bottom line challenge is very clear in its goals but not in the way to pursue them. Can sustainable development be pursued through the construction of the sustainable city as the physical place and host space for social and economic practices? Arguably, the city constitutes the node that best integrates the three dimensions of sustainability because through the adoption of bio sustainable building, the use of renewable energy, green transportation and slow mobility, green areas, reduction of land consumption as well as circular waste management, it can create sustainable physical spaces that best accommodate sustainable economic and social practices.

We cannot analyze all the definitions that underlie as many meanings and conceptual differences but can certainly dwell on those that are most trendy today. Among these there is the smart city, which in the past decade has surpassed sustainable city in the frequency and spread of the word in scientific and political debate.

A smart city is generally understood as a city that is able, using technology, especially ICT, to make our buildings, infrastructure, and cities more efficient, reducing polluting emissions, reducing fossil energy consumption in favor of renewable energy, and ensuring broad access to these benefits for the population. In fact, it appears to be a very ambiguous term more used in scientific and political debate than in actual practices. In the latter there are only limited and partial applications that are reserved for very small segments of the population. Moreover, they seem more like economic operations for the benefit of large multifunctional companies. Thus, one of the main criticisms of the smart city is that it has depoliticized the social and cultural debate, as citizens are ousted from decisions about the technology and consequently its benefits.

Fig. 3 – An evocative image of smart city

It can be argued that there are certainly differences in the meanings of the various definitions of cities that have developed over the past three decades, and that some of these have become more established in the debate than others because they have captured the priorities of social questions. The definitions of ecological, green, smart, and resilient cities appear to be those of most interest because they point to

the underlying issues. In sum, it is necessary to understand these terminological and conceptual nuances to clarify the needs for policy actions. Thus, as widely argued now, the triple bottom line is not sufficient by itself to render the complexity of sustainability but cultural issues, in terms of prioritized values and consequent policies, as well as the capacities to govern sustainability, expressed in governance and the role of institutions, are also crucial.

3. SELF-SUFFICIENT CITY

From the plethora of definitions of city, the "self-sufficient city" idea, sometimes has been mentioned but not always convincingly. A self-sufficient city means a city with a well-defined boundary within which the demand for jobs as well as resource conservation, the ability to produce clean energy for the local community is met. It is important to identify a spatial perimeter that defines the range of self-sufficiency within which the demand for energy, jobs, services, transportation, food, etc. can be met. The entire planet could then be made up of a network of self-sufficient facilities that talk to each other.

Self-sufficiency is not a new concept; indeed it was the foundation in the past but now resurfaces with contemporary values and meanings. Self-sufficiency was, of course, the rule in the pre-industrial world and especially in medieval and prehistoric times when villages were self-sufficient in terms of energy production, food production, and the objects useful for work and household activities. Today it no longer makes sense to speak of these realities but of self-sufficiency in the globalized world, seemingly two starkly contrasting conditions. Self-sufficiency implies the ability to meet one's needs in a well-demarcated geographic context while globalization evokes commercial, productive, and financial relationships developed on an intercontinental scale. However, the idea of self-sufficiency is particularly appealing and has consistently stimulated modern urban planning research in response to the crisis triggered by industrialization.

As is well known, in the 19th and 20th centuries there were attempts to implement self-sufficient settlements in response to the emerging problems and contradictions of the industrial revolution, seeking to provide answers to social demands first and foremost for a more equitable society that respects the needs of human life. The discipline of town planning was formed during the 1800s and at the turn of the 20th century was codified in principles and techniques precisely in response to these questions (Benevolo, 1968). The settlements of utopian socialists, such as Owen, Fourier and Godin, are examples from the early 1800s that aim to identify the optimal population threshold (1,200 inhabitants) for the food, productive, cultural and general social self-sufficiency of small settlements. The same with Howard's Garden City in the early 1900s establishing an optimal size of 32.000 inhabitants, as well as Le Corbusier's modernist dream with self-sufficient, satellite neighborhoods of large cities in terms of services or Abercrombie's Greater London Plan with the introduction of New Towns as satellite cities. In the early days of our discipline, the

influence of nineteenth-century positivist thought was prevalent with its belief in science capable of solving society's problems by building a housing machine and likewise the city. We understand this was not the case, and the modernist dream often turned into an urban dystopia.
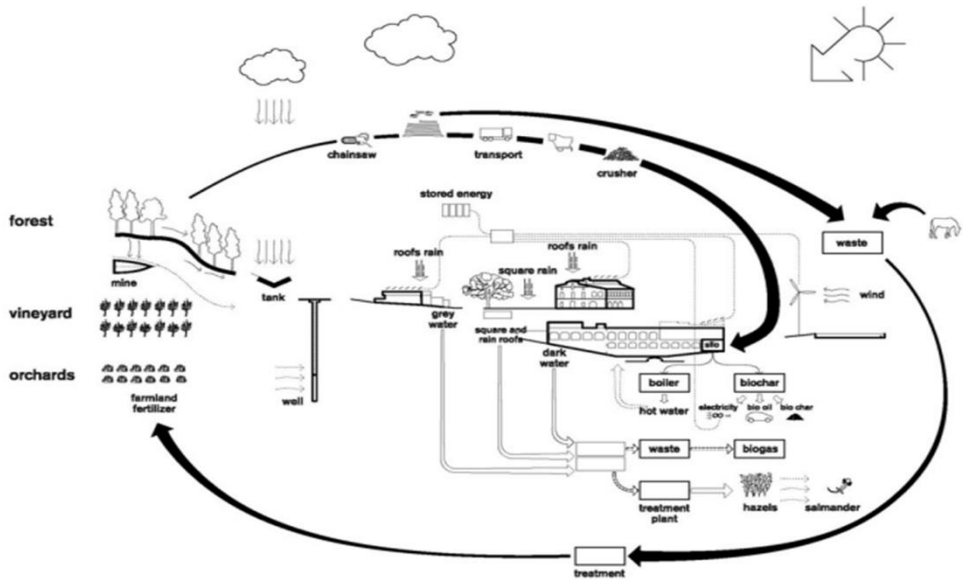

Fig. 4 – The self-sufficient habitat as a closed cycle represented in the Guallart's book

The self-sufficient city has seen some implementation applications of particular interest: an emblematic example well known to those in the field is that of the city of Barcelona, which for at least 10 years has been pursuing a policy to transform itself into a smart and self-sufficient city. This policy is supported by robust theory and concrete implementations that are transforming the city by highlighting, more than in other cases, the limitations, and advantages of this vision of the city.

The idea of the smart and self-sufficient city in Barcelona has been developing since 2012, with the election of a new mayor who decided to act on it. Also supporting this political will was the theoretical vision of Vincente Guallart, who was appointed chief architect of Barcelona by the city council.

Guallart in his book self-sufficient city describes his vision of the self-sufficient city that assimilates with the technological and digital networks themselves. Cities are composed of buildings, infrastructure, blocks, neighborhoods up to hyperconnected cities. Each node is self-sufficient and contributes to the self-sufficiency of the system.

The whole system must ensure self-sufficiency in terms of energy, recycling of materials, and ensuring community participation. This meta-narrative meets the political and even economic will of large ICT companies, which begin to invest capital in the construction of new buildings and the energy retrofit of existing ones and the transformation of brownfield sites.

In Barcelona, there are examples of buildings, neighborhoods, and blocks at the intermediate scale that can be described as self-sufficient. At the scale of the building, the Media ICT building is an example of a fully intelligent building that is able through its sensors and digital structure to self-regulate the internal temperature, manage indoor heating and cooling by connecting to the neighborhood infrastructure network. The building is a well-executed example of intelligent and self-sufficient architecture; however, it implies the gradual disappearance of the user and thus the citizen, in favor of a computer that can decide how to regulate the building's environmental parameters.

Fig. 5 - MEDIA-ICT BUILDING BARCELONA (Barcelona Growth Center): example of a smart-eco-self-sufficient building

Guallart's urban narrative redefines the city as a complex 'system of systems', diagnosing various 'urban pathologies' stemming from outdated planning methods. He proposes a remedy through embracing Information and Communication Technology (ICT) and self-sufficient solutions as crucial intervention points. His theories blend elements of urban and industrial ecology with concepts from the networked society literature, conceptualizing cities as organized akin to Internet topologies. This perspective views cities as networks of nodes (e.g., homes, neighborhoods) and flows (e.g., information, people), shaping a 'multiscale city' extending from households to the global scale.

Guallart advocates for a shift from centralized, hierarchical urban organization towards a distributed network model akin to the Internet. This 'Self-sufficient City' aims to reduce reliance on large-scale infrastructure by connecting similar entities and promoting decentralized management of urban systems. Such a transformation redefines urban life by emphasizing code, sensors, and protocols to optimize resource usage and enhance social cohesion.

Central to this vision is empowering citizens through technological advancements, allowing greater control over their lives. The integration of ICT and Internet structures promises increased efficiency and the emergence of new economic paradigms. Barcelona's city council aligns with this vision, aiming to transition towards an 'informational city' driven by digital technologies. Pilot projects will precede city-wide implementation, ultimately leading to a self-sufficient urban landscape powered by local production and global exchange.

In essence, Guallart's framework envisions a city where technology serves as a democratizing force, reshaping urban dynamics towards sustainability and citizen empowerment. Barcelona's roadmap reflects a tangible commitment to this vision, signaling a deliberate shift towards a future where digital innovation drives urban development.

The same logic extended to the entire city means entrusting decision-making power to large ICT companies, which are legitimized in their actions by the defense of environmental resources. In other words, technology succeeds in ensuring the intelligent use of resources, preserving the planet, and can make decisions on its own without social commitment and will. There are profound critiques of this approach that understand the smart city as an assertion of a new liberal capitalism of technology over cities. This remains a significant point of reflection on the applications of self-reliance, smart city, and sustainable city.

4. CONCLUSION. SELF-SUFFICIENT CITY IN THE COMPLEXITY PARADIGM

To conclude these findings on the evolution of the concept of the sustainable city, it is useful to introduce the concept of complexity, which has also been running through our disciplinary field for some decades. If the urbanism of the early 1900s, whose techniques and methodologies still influence our work as urban planners and

architects, derived from nineteenth-century positivism a deterministic view of problems and therefore of solutions, it must be pointed out that since the 1970s a complexity approach to scientific and social problem solving and therefore also to urban planning has been established (Bertuglia and Vaio, 2019). Complexity changes the scientific context and induces us to think about the complexity not only of the object but also of the subject, the observer of the system. In a nutshell, we can recall that there are at least 3 types of complexity when discussing the analysis and governance of cities: that of the analyzed system (the city), that of the observer (citizens, politicians, practitioners, and planners) who look and act from different perspectives, and finally that of planning itself, which has its own administrative and technical rules and procedures for transforming the city.

To understand the dynamic evolution of the sustainable city concept, it is useful to start from a systemic view of the territory and the city, which is composed of numerous interconnected elements (buildings, infrastructure, transportation, green areas, natural resources, citizens, social groups, individuals, economic interests, etc.) placed within a physical and relational space with a recognizable boundary. The systemic view shifts the focus from sustainability to the complexity of the city structure and its observer. Only by gaining this perspective does one have more flexibility to understand the nuances of the scientific, policy and operational debates and actions that are transforming our cities towards an actual sustainability.

Nowadays the main aim in planning sustainable city, and its multiple similar but not equivalent definitions, should be designing "regenerative cities" more than self-sufficient, since the latter appears to be a contradictory and socially inefficient process. The regenerative city represents a more flexible concept, progressively capable of ensuring sustainability, self-sufficiency, waste recycling and transformation, application of green infrastructure, clean energy solutions, and at the same time ensuring social equity and citizen participation. During the 5thICAUD (November 2023) conference, held at EPOKA University in Tirana in November 2023, many application examples of energy self-sufficient buildings and neighborhoods, inclusive and participatory social practices such as those depicted in the image are presented and discussed. My suggestion is to always keep in mind conceptual nuances, differences between categories of interventions, possible rhetoric, and hidden vested interests as I have attempted to illustrate in this article. And not least to apply a complex systemic vision to the narratives about transformations of the 'sustainable' city.

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