

IN THE LABYRINTHS OF THE «SUSTAINABLE CITY» CONCEPTS: THE META-ANALYSIS OF CONTEMPORARY STUDIES

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ABSTRACT

In the paper, the author conducts a critical analysis of the main discourses of sustainable cities, such as the "ecocity", "compact city", "low-carbon city", "green city", "sustainable city", and "smart city", based on the materials of meta-analysis of Russian and foreign academic publications. It is concluded that each of these concepts reflects a certain degree of socio-economic development of society, and the changing needs of its citizens. Despite the fact that there is no consensus among scientists on the conceptualization of these forms of urban sustainable development, different definitions of environmentally sustainable cities are not mutually exclusive. The author has established that the concepts of "eco-city", "sustainable city" and "green city" are symmetrical "umbrella-type" concepts. Narrower concepts such as "low-carbon city", "smart city" are concentrated on some individual dominant discourse of stability. At the same time, all the metaphors of urban sustainable development are "ideal types", and they are not lacking limitations, therefore the author concludes that it is more correct to comprehend the city in terms of "transition" to sustainability.

Keywords: eco-city, compact city, low-carbon city, green city, sustainable city, smart city, sustainable development, climate change, ecologization of a city, meta-analysis, growth machines, green urbanism, new urbanism, socio-ecological metabolism, ecological activism.

INTRODUCTION

The discourse of sustainable urban development began to manifest itself clearly in the academic community in the 1970s [1, 2, 3]. Prior to the United Nations Conference on the Environment in 1972, environmental degradation of habitat was viewed as a local problem. The conference has attracted considerable attention to the problem of environmental protection. As a result, the Stockholm Declaration on the Environment was adopted, the main leitmotif of which was the slogan: "Think globally, act locally".

This period is also characterized by a rapid process of industrialization and urbanization, which put on the agenda the topic of rapid economic growth without environmental damage. During this period, the world community recognizes the problems of urbanization and agrees with the idea of a balanced development of cities, but the term "sustainable city" is not yet generally accepted.

Since the 1990s, the paradigm of sustainable urban development has been recognized. It has become widely used in the "third way" policy to legitimize its agenda. In this respect, sustainable development has acted as an arbiter between economic growth and environmental security. It was a convenient concept for the "third power" policy that successfully solved the issues of conflict of interests in a new era of post-policy [4]. The growing reappraisal of the values of capitalism and the economic recession also served as an impetus for the search for alternative forms of socio-economic development of society.

Socio-economic processes in the countries have become the impetus for the emergence of new concepts of urban development, which are based on the principles of sustainable urban development, the main "mantra" of which was the improvement of the quality of life without harming the environment. The following concepts of urban sustainable development can be identified among the main ones as "eco-city", "compact city", "low-carbon city", "green city", "sustainable city", "smart city". These manifestations of "green

urbanism" (basic, but not exhaustive) comprehend different forms of interaction between a human capital and a natural capital and their manifestation in the urban environment [5].

This paper is aimed at a critical analysis of the main concepts of sustainable urban development in the time perspective, based on the study of transformation of the subject field in the city sociology. Much attention is paid to finding similarities and differences between the concepts, tracing their evolution and critical thinking.

METHODS OF RESEARCH

The main method of research was the meta-analysis of modern scientific articles published mainly in English-language. The author used to a lesser extent the articles in Russian refereed journals selected by keywords: "eco-city", "compact city", "low-carbon city", "green city" "sustainable city", "smart city", "sustainable urban development", "new urbanism", "green urbanism", etc. A total of more than 80 articles were analyzed in the period from 2000 to the present days. The meta-analysis was conducted in August 2017. The research is implemented under Russian Science Foundation grant "Russian megacities in the context of new social and environmental challenges: building complex interdisciplinary model of an assessment of 'green' cities and strategies for their development in Russia", project No. 17-78-20106

RESULTS

Analysis of literature has shown that there are many concepts describing the degree of ecologization of modern cities. Among the main ones there can be identified such as "eco-city", "compact city", "low-carbon city", "green city", "sustainable city", and "smart city". These metaphors of sustainable urban development reflect a different interpretation of the development of cities in the time perspective.

Sociology, economics, social geography, and ecology studying those concepts of cities, balance between theoretical debates and work on the development of social policy [6]. So, one group of scientists comprehends those cities in practical terms as a tool for changing a city [7]. In this respect, the notion of "participatory city" is often used, which describes the city as an arena of civic activism and inclusive democracy. These ideas are reflected in the movement of a new urbanism, the main idea of which is to "redo" a city and to "return" it to its inhabitants, to make the city accessible to all [8].

Another group of scientists interprets it critically as a tool for legitimizing the policy of "development" and growth machines when the reading of the concept of "sustainability" occurs in a neo-liberal way as the consistency of economic development (which still has a primary role) and environmental security [9, 10, 11]. For example, the World Bank recognizes the sustainability of a city only if it is economically efficient. For this purpose, the term "eco² city" ("ecological cities as economic cities") was introduced [12]. In this connotation, many criticize the very notion of "sustainable urban development" [13, 14]. Others note the generous rewarding of modern cities with the terms "eco", "sustainable", "green" as an element of attractive branding ("green washing" for pragmatic purposes of urban elites [14].

The first works devoted to ecological cities appeared at the beginning of the 20th century. They were devoted to the concept of "compact city" developed by D. Danzig and T. Saati in 1973 [18, 19]. A compact city is characterized by a relatively high density of construction and mixed land use. In fact, this project is the scientists' response to the post-war urban planning which adversely affected the development of urban communities. This type of city is based on an efficient public transport system with a focus on pedestrian and bicycle traffic, reduced energy consumption and environmental pollution. Numerous residents of the city are given opportunities for social interaction, as well as a sense of security, thanks to the visibility of the territories. Much attention is paid to the development of social interaction between citizens [20, 21]. Today, this concept is relevant for 13 Norwegian cities which are designed to move to the principles of compact urban communities [22].

The main criticism of this concept is that this type of a city cannot be adapted to cities with different structures, population density and location. Also, this concept does not consider conflicts for land within a city, therefore cannot explain complex social processes in cities, for example, the processes of growth of suburbs [17]. Indeed, not all citizens are ready to live in densely populated but compact territories; many prefer less populated suburban areas. A compact city may in fact contradict the principles of city sustainability, since they undermine the sense of freedom and personal space of citizens, and urban areas with a high population density may cause environmental pollution in cities [23].

In 1978, the concept of "eco-city" by R. Register appeared [24]. In the understanding of R. Register, "eco-city" is an urban ecological system in which incoming resources and outgoing waste are minimized. However, the primary understanding of ecosystem by R. Register was narrow, today it refers to the arrangement of the city in relation to environmental requirements and socio-economic conditions. In modern tradition, eco-city is understood to be an economically efficient city with developed infrastructure which is environmentally friendly and healthy for residents [25, 26, 27]. This interpretation reflects the essence of many similar modern concepts of urban sustainable development, many of which were formed as a response to new environmental challenges.

One of these challenges was global climate change. Inclusion of the discourse of climate change in the concept of building of environmentally sustainable cities occurred with the ratification of the Kyoto Protocol (1997). Holding the United Nations conferences on climate change (Copenhagen, 2009), and the Paris Conference (2015) stressed the responsibility of cities for reducing carbon dioxide emissions [28]. As a result, the concepts of low-carbon cities began to appear [29, 30]. According to scientists, this type of city should become fully self-sufficient and independent of non-renewable sources of energy. For this, the city should rely on such energy sources as sunlight, organic waste, geothermal energy, diffused heat. It also provides for the use of rainwater, treatment and recycling of waste water, and desalination of sea water.

The main criticism of such cities is the absurdity of the idea of creating wasteless cities in terms of the principles of socio-ecological metabolism [31, 32, 33]. Despite critical attacks towards the practical implementation of such concepts, on the whole, scientists note that, scientifically, the concept of a low-carbon city has significantly enriched the discourse of urban sustainable development. Many new terms have been introduced, such as "low-carbon city", "carbon neutral city", "carbon footprint", etc.

In the early 1990s, the United Nations Sustainable Cities Program was approved [39]. In 1999, the UN Guidelines for the Creation of Institutions for the Management of Ecological Development of the City were published [40]. At this time one of the most widespread concepts of today for urban sustainable development, "sustainable city", has appeared [34, 35, 36]. A sustainable city is a city where a strategy for long-term harmonious social, economic and logistical development is chosen; where environmental resources are rationally used; and where acceptable levels of negative impact of harmful factors on the environment are established [37]. The UN Guidelines set out the basic principles for creating environmentally sound "sustainable cities": broad stakeholder participation, inter-sectoral and inter-organizational cooperation, focus on specific problems, emphasis on practical benefits and real improvements, etc.

A little later, the "green city" concept appeared which is hybrid, and reflects the components of different discourses about sustainable urban development. The concept of a "green" city is such a development of a city, which is aimed at increasing the competitiveness, accessibility and sustainability of the urban environment [41, 42]. According to some scientists, on the whole, it is close to the concept of "sustainable city", but with a big focus on environmental safety [17]. This concept successfully solves the problem of the duality of the theoretical approach and social policy, containing components from both spectrums [43].

Finally, starting from 2007, the academic world began to talk about a new modality of a sustainable city - a "smart city" [44, 46]. A smart city can be defined as a city that spends resources efficiently, using

information and communication technologies within the framework of environmentally friendly integrated solutions. A smart city is often equated with a sustainable city with regard to the use of modern information tools and green technologies in order to reduce the burden on the environment. Since 2012, the volume of publications on a smart city has outstripped the discourse of such popular "green" or "sustainable" cities.

The discourse of sustainability is understood as an application of information and communication technologies, digital involvement of citizens in the management process and more convenient for living in an urban environment [17]. However, critics of the smart city concept believe that the ecological component is secondary for this type of city, not to mention the digital inequality generated by these cities and other related problems.

CONCLUSIONS

In the last decade, in the socio-ecological sciences there have emerged new concepts of urban development, which are based on the principles of sustainable urban development, aimed at improving the quality of life without compromising the environment and natural resources. The author of the article made an attempt to critically analyze, compare and systematize the main concepts and discourses of sustainable urban development on the basis of analysis of Russian and foreign literature.

Changing the paradigm of growth machines to balanced development led to a change in priorities in city planning. This led to the emergence of new forms of urban development: eco-city, compact city, low-carbon city, green city, sustainable city, smart city. Each of them is the product of a certain historical development of society, and the changing needs of its inhabitants.

Despite the impressive scientific background on this topic, an analysis of literature has shown that there is no consensus among scientists and practitioners on the definition and characteristics of these concepts. However, different definitions of environmentally sustainable cities are not mutually exclusive. At the same time, there is a firm opinion in the academic community that the concepts of "eco-city", "sustainable city" and "green city" are symmetric. They are also "umbrella-type" concepts, which are understood as harmonious social, economic and material and technical development where resources of environmental resources are rationally used and acceptable levels of negative impact of harmful factors on the environment are established.

DISCUSSIONS

It was noted in academic discourse that such forms of cities as "sustainable city", "green city", "eco-city" are the most widespread and complete forms of sustainable urban development. These concepts also successfully solve the problem of the duality of the theoretical approach and social policy, containing components from both discourses. In the future, their fundamental nature and the need to find permanent compromises between the environmental, social and economic sustainability factors turned out to be a "trap" for them. As a result, narrower concepts began to appear, such as the "low-carbon city", "smart city", which concentrated on some single dominant discourse of sustainability.

Do not forget that these concepts are "ideal types", theoretical constructions that serve as scientific tools for measuring the degree of greening of urban space. The designing of this type of cities is always an inclusive discourse of developed countries that have not only financial resources and supporting infrastructure, the latest technologies for the implementation of similar cities, but also a high level of post-material values of the citizens themselves who are willing to sacrifice and invest their savings, time and energy for the sake of achievement of a certain level and quality of life. In this respect, the author agrees with those scientists [17] who suggest comprehending a city in terms of "transition" to sustainability, since it is obvious that not all components of "sustainability" are equally significant and formed even in the most ideal urban environment.

ACKNOWLEDGEMENTS

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University. The research (methods, analysis and results) is implemented under Russian Science Foundation grant “Russian megacities in the context of new social and environmental challenges: building complex interdisciplinary model of an assessment of 'green' cities and strategies for their development in Russia”, project No. 17-78-20106

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Sustainable cities, urban sustainability, or eco-city (also "ecocity") is a city designed with consideration for social, economic, environmental impact (commonly referred to as the triple bottom line), and resilient habitat for existing populations, without compromising the ability of future generations to experience the same. These cities are inhabited by people whom are dedicated towards minimization of required inputs of energy, water, food, waste, output of heat, air pollution - CO₂, methane, and This paper systematically presents the information about a sustainable city and the process of putting forward, developing and evolving the concept, and it...[Click here to see the statistics on "Chinese Journal of Urban and Environmental Studies"](#) . Comments from sciform.

References (5). Show/hide references. Cited by 2 articles. Show/hide lists. For questions or feedback, please reach us at support___at___scilit.net Â© 2019 MDPI (Basel, Switzerland) unless otherwise stated Terms and Conditions. This paper begins by outlining the concepts of the sustainable city. There then follows a description and analysis of morphological keys for understanding the sustainable city. Finally, the concluding part covers application of these keys to the city of Nantes, which hosts several sustainable development projects and will assume the mantle of European Green Capital in 2013. Keywords: urban morphology, sustainable city, Nantes, multi-scale. Keywords.