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Political Models of Smart Cities and the Role of Network Actors in Their Implementation (the Case of Vienna, Lyon, and New Songdo in Seoul)

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Abstract. The article examines the features of the formation and implementation of the smart city concept in various territorial systems. The article analyzes the models of political actors in the smart cities of Vienna, Lyon and New Songdo, which is a suburb of the Seoul metropolitan area; the significance and the role of some of them on the development of a smart city from the perspective of the theory of metagovernance. The article emphasizes the dependence of smart city development priority fields on the dominance of specific political actors such as public or private structures, public utility organizations, and a civil society in the regional smart city model. In conclusion, insights and generalization are drawn.

INTRODUCTION

Urban development is given a special place within the concept of sustainable development. The UN Sustainable Development Goals for the period up to 2030, adopted in 2015, set the goal of strengthening the openness, security, resilience and sustainability of cities and human settlements [2]. According to the prognoses, in 2050, 75% of the world's population will live in big cites. They will consume 80% of the energy and material resources produced and make up to 75% of all greenhouse gas emissions. The consolidation and further growth of urbanized territories places enormous demands on urban infrastructure, public utilities, management, and a civil society. Without high-quality modernization and new technologies bridging it is not possible to talk about the sustainable development of urban spaces [3]. One of the dominant strategies for sustainable urban development today is the «smart city» concept. It is seen as the vital activity of the city, in which new forms of government, economy and environmental protection are closely interrelated with the digitalization of the entire urban space [4]. The merging of these sectors (economy, ecology, management and urban infrastructure) into a single, holistic digital system serves as the main goal of the smart city strategy. However, the priorities for the development of certain sectors have their own geographical differences and depend on the dominance of certain groups of actors in the decision-making processes within the framework of the strategy. Several researchers emphasize the influence of technology concerns in the city design, while others focus on the role of the administration and the political system in the creation and implementation of smart city strategies [12, 15, 22, 19].

The purpose of this research is to determine the importance and role of individual political actors in the formation and implementation of the «smart city» concept, as well as to identify the main thematic fields, emphasis on urban development strategies. Three world cities, namely Vienna, Lyon and Seoul, which are included in the alpha and beta categories in the global cities index, were taken as the objects of the study. In addition, Vienna is the

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first in the ranking of global smart cities [24]. The smart city concepts implemented in these cities have significant differences in the content and priorities of sectoral development, which, in our opinion, reflects the cultural context of a given regional environment and a special constellation of functional actors, the degree of their influence on the formation of the concept and control over its implementation. The democratic legitimacy of the smart city projects depends on the sustainable development of the entire urban space and the features of the existing network of transnational, national and regional actors.

MATERIALS AND METHODS

The ideological content and practical implementation of the smart city concept depends on the influence of various political forces on its formation and development. The interacting political actors, their groupings, the balance of forces and the zones of influence of power structures form an original construct, whereby the ideas of the «smart city» find their implementation. The formation of a special «smart city» urban policy, which is defined as «the temporary stabilization of the content and features of the organization of a separate political field» [23], is influenced by actors, their coalitions, available power resources, formal and informal rules of the game, and from the discourse, which is «an ensemble of ideas, concepts and categories that are given special importance» [11].

The multilevel governance and metagovernance theory emphasize the intensifying importance in the process of policy development and implementation of various actors at different levels (B. Jessop, E. Soresen, B. G. Peters, Kooiman J., Tokareva P. D., etc.) [1, 14, 16, 18]. State actors of various levels (supranational, national, regional), as well as non-state actors (civil society, enterprises) have a huge impact on the formation of sustainable urban development concepts. The urban spaces ecological modernization, transformation into smart cities require political decisions, which are formed under the pressure of various interest groups at different levels. Management in such systems is exceedingly difficult. Therefore, metagovernance is required, as it was implied by B. Jessop as the organization of conditions for management. L. Muleman considered management of sets of situational preferences of various actors, consisting of the elements in the main leadership styles – hierarchy, market and network, as well as in some cases of self-organization [14, 18]. These trends are reflected in smart city policies in many parts of the world. The actors that interact in the concept implementation have unique functions. State actors can design and moderate the network, set the rules for the interaction of all actors, institutions, forms of accountability, conditions for the empowerment of weak actors, rules for coordinated actions of actors. Private actors (commercial organizations) have such unique functions as creating a regulatory framework and norms within the organization, channels for the dissemination and assisting non-governmental (non-profit) organizations. In turn, NGOs and other public associations take part in the information capital creation, namely, they conduct activities to raise awareness about the peculiarities of a particular territory, develop regulations and monitor the implementation of the existing ones [1]. The metagovernance theory allows to combine the ideal management styles and solving the problems of coordinating actors for the sustainable development of the cities [25].

The methodological basis of this article is formed by the structural-analytical and comparative approaches. The network structure analysis of the actors responsible for the formation and implementation of the smart city concept in Lyon, Vienna and Songdo (Seoul), as well as the preferred political fields of evolvement, allow to assess the individual actors impact on the development of urban policy and on the processes of environmental transformation of national structures.

RESULTS AND DISCUSSION

Smart City Vienna

The concept of a smart city in Vienna includes a variety of the «smart city» thematic fields, and is also marked by an integrated approach to their implementation with the involvement of many external and internal actors. The Smart City Vienna project has formed a special local nexus of diverse, but closely intertwined, interconnected network actors, which is considered to be a special form of «metagovernance» – a territorial self-organizing, management system [10, 337; 14;16]. The city government plays a key role in this and has a keen interest in the urban space economic, social, environmental and technological transformation, as well as in increasing the investment attractiveness of Vienna, strengthening its competitiveness and the international brand of the best global city for life.

Three functional groups of equal actors participate in the concept development and implementation strategies: state actors, business structures and research organizations. It is worth noting that decisions on the development and implementation of the smart city project are made privately by these actors and do not differ in the breadth of attracting the population to discuss them. This calls into question the democracy and legitimacy of the implementable project.

State actors in the creation and implementation of the project are represented by national and city organizations. First, it is the city government, which includes the city senate, the municipal council and the magistrate. National authorities are represented by ministries and State funds. The city capital functions, close cooperation between national and city structures ensures the promotion of the smart city of Vienna project and its financing at the EU level. Many Brussels officials see this project as a certain pole of development and as a «beacon» for other European regions [10, 334].

The leading positions among the business structures belong to the Austrian branch of the German company Siemens AG. The company is one of the «pioneers» in the urban space development «smart» solutions [26]. For the specific project «Seestadt Aspern», Siemens AG has formed a joint venture with several city companies and research centers, registered under the name «Aspern Smart City Research GmbH». The formed firm monitors and analyzes data on many fields of concern in this area of the city. The company is highly interested in the field of energy and accommodations heat supply, the study of energy and resource efficiency, in order to optimize and improve its models for the global activities of TNCs. Though, Siemens AG is the central link in the strategy for the development of a smart city in Vienna, utility companies still have the upper hand in the issues of infrastructure modernization and the construction of new facilities [21].

The analysis of priorities in the development of certain areas in the smart city Vienna concept and strategies shows its special place compared to similar global projects. The priority topics in Vienna have become climate protection and environmental modernization of the city and its transformation into a climate-neutral city until 2040 [27]. The second most important thematic field is social justice in housing affordability and social mobility. The problems of digitalization, although it is a priority, are on the second place in comparison with climate protection and social development.

Smart City Songdo (Seoul Metropolitan Area)

The Songdo Sustainable City concept is the most radical smart city project in the world. Its construction was carried out on the territory reclaimed from the sea. In 1994, the government of the Republic of Korea decided to create a new economic center of the country, claiming to become one of the most important «nodes» in the world economy network, like Hong Kong or Singapore. In the government's vision, the new «city of the future» should have the most advanced technical equipment, the best architecture and transport infrastructure in the world, combine the functions of production, accommodation, leisure, and be attractive and safe [7, 113]. The ubiquitous green spaces, canals running through accommodations, a wide range of services, offered to people, and a high quality of life were intended by the founders to turn Songdo into an international metropolis with a high concentration of the world's leading TNCs and global professionals. The full completion of all work on the smart city creation was planned for 2020.

There are two most significant differences between the smart city of Songdo and other similar territorial entities: first, the unique complex of the network of actors responsible for the concept development, implementation of the smart city strategy and its management, and second, the obvious dominance of digital development priority in comparison with other aspects of urban construction. The project of the American company Cisco «Internet of Everything» is absolutely unique [7, 117].

The modern constellation of responsible actors was formed in 2001, when the Korean government handed over the tender for the concept development and construction of Songdo to the American investment company Gale International in cooperation with the Korean construction company POSCO E & C. Later, the American IT concern Cisco and the architectural firm Kohn Pedersen Fox joined them. Large international companies (American) are fully responsible for the project development and its implementation, the smart city technical equipment, for attracting investors, for the objects sale, and for the smooth functioning of all the life-supporting systems of the city. National actors and city government play a secondary role in Songdo. Smart City is a technology platform where data about the operation of systems is collected, and it is in the hands of Cisco and its partners. Private investments in this project amounted to more than $ 40 billion in 2018 [7, p. 118]. The public and civil society are isolated from

decision-making on urban issues. Residents of the city are not involved in the processes of discussing the future development, which sharply distinguishes Songdo from the smart city of Europe.

The mass digitalization is central to the smart city sectoral development. Electronic sensors and measuring devices are integrated in residential and office buildings, in the communication system, electricity, heat and water supply, transportation of goods, garbage, etc. Thousands of installed video cameras continuously monitor the situation on the streets, recreation areas, playgrounds. Every resident of Songdo receives an electronic document that allows to access to the city's buildings, bicycle rental system and video surveillance. Information about «everything» flows to a central technology platform. Data analysis allows to further optimize the processes. Due to this, the electricity consumption in Songdo, for example, is 30% less than in similar urban formations in other parts of the world. Thus, Songdo serves as an experimental platform for the American companies responsible for the project, where they test new technologies and principles for their future international projects [9].

Other relevant issues such as the fight against global climate change, environmental protection, social life, culture, and mobility are not of a high priority here. As a result, the percentage of housing stock occupancy is low. Most of the residents are affluent Koreans. According to the observation of some researchers, the city does not have a «soul», and in the evenings there is no life, and it more resembles a science fiction «ghost town» than a stable city of the future [28].

Smart City Lyon

Lyon is a historic innovation center of France. Back in the XIX century important discoveries in science (physics, medicine) were made here together with revolutionary inventions such as cinema. Today, Lyon is considered to be the French Silicon Valley [10, 99]. The city has formed a unique ecosystem of interconnected innovative factors in the form of technology startups, research institutes, universities, financial funds and the city administration. All these structures are actively involved in the transformation of the city into a smart one [6].

The innovative development paradigm permeates the smart city urban concept. According to it, Lyon considers its urban space as a territory where social, economic and cultural values are imposed, and which is in a continuous process of renewal [7, 100]. Global and local challenges determine the vector of movement of these processes. Ecological and energy modernization, new forms of «transparent» mobility of the population, digitalization, innovations «from down under» are the most privileged areas of urban development [17].

The implementation of the concept varies in different areas of the city. The space of Lyon (as well as Singapore, author's note) includes several smart initiatives: Lyon Par Dieu, Lyon Gerlan, Lyon Confluence. Each of these urban areas is like an experimental platform for testing new forms of living, mobility, work, etc. The most famous smart city project is being implemented in the Lyon Confluence area. This is the largest smart city project in the European Union. It covers an area of about 150 hectares.

The central actor in the creation and implementation of the project is the project company SPL Lyon Confluence, specially created on behalf of the city government [17; 7]. This autonomous organization was established in 2012, and is linked to the city administration by a contractual obligation. Along with the design, construction and management responsibilities, the company's competence includes commercial aspects of smart city development: parcels purchase and sale, search for investors, and introduction of the latest technologies. The company can independently take decisions on contractors, and on alliances and strategic partnerships creation. The company has its own digital data management platform, which collects and analyzes information about the functional state of district systems. The information analysis allows the company to improve the urban life efficiency, reduce resource consumption, improve the quality of environment and life of population.

The priority areas of a smart city Confluence are the development of social sustainability and the provision of housing conditions for the citizens in need. In 2012-2018, about 12000 m^2 of modern housing were built, with positive energy balance and environmental renewal of old accommodation and office buildings. Since 2016, the district has been implementing a project of unmanned public electric transport, encouraging the development of other types of mobility (E-scooter, bicycle, etc.) [17]. What is more, the city is involved in discussions with the residents and new buildings tours. The information center has been operating since 1999. And in Lyon Coufluence itself, «La Maison de la Confluence» (Confluence Community Center) has been operating since 2006, where residents can make their own proposals for the area development and get answers to their questions [20].

CONCLUSION

The comparison of smart city implementation policies in Vienna, Lyon, and the Seoul suburb of Songdo allows to distinguish three different models of metagovernance. In Lyon, the main role in the smart city doctrine development and implementation has the SPL Lyon project company, established by the city administration. The company is in a relatively flexible network relations with other actors (city administration, small and medium-sized companies, foundations, etc.), among which the citizens of Lyon themselves occupy a special place. Information centers created in the city, as well as meetings held with residents, are intended to manage structures due to urban innovations acceptance among the residents, as well as finding and correction of possible lowlights and shortcomings in order to improve the urban systems effectiveness. Moreover, it allows to find new ideas and solutions for the city development.

A different smart city policy model has been developed in Vienna. The mosaic of network actors, created in the city, has a more rigid and hierarchical structure than in Lyon. The city administration leads and manages the transformation processes. Large TNCs (Siemens A. G.), government ministries, small and medium-sized national businesses, research institutes are engaged in the development of strategy certain fields: digitalization, mobility, environmental modernization. In Vienna, smart City politics combines tradition and modernity. Caring for the residents and a high social standard are considered to be the key to sustainable city development. On the other hand, the residents rarely participate in the smart city development discussions. This deprives Vienna of an important source of innovation and creates barriers to public acceptance and the entire project democratic legitimacy.

In the model of the «city of the future» of Songdo, a prestigious project of the Korean government, there is the dominance of large foreign TNCs with full power in formation and implementation of the smart city project, as well as the strongest emphasis on the technological side of the development, stands out sharply. The broad and pervasive digitalization of Songdo's public life is the main characteristic feature of this smart city. After all, Songdo serves as a «testing ground» for new technologies and social practices by American digital giants (Cisco) for their implementation in other regions of the world.

Thus, there is no single smart city policy. There are the same practices, models that have similar constructs of actors' constellation. In most smart city models, the city government is the initiator and the main factor in the city transformation. The central political fields in such cases are the climate policy, reflected in many environmental modernization aspects (eco-friendly transport, energy efficiency, resource conservation), as well as the improvement in the quality of life for all strata of the people. However, digitalization technological issues remain within the competence of TNCs. This is a certain risk of turning various smart city models into a purely commercial project. To prevent this trend, the city administration and residents must resist the concentration of power in smart city projects in the hands of TNCs.

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