

# Is the Smart cities of hybrid model of local government - The type III cities: Four possible answers

Valerii LOGVINOV

*Odessa National Polytechnic University, Odessa, Ukraine  
egov.tc@gmail.com*

Natalia LEBID

*Odessa National Polytechnic University, Odessa, Ukraine  
nmitrofanova3@gmail.com*

## Abstract

Using historical analysis and practice, this paper finds that the past many years structural modifications and adaptations by world cities have generally followed the mayor-council and council-manager cities theories, increasing their administrative efficiency more or later. At the same time, fewer cities are now either distinctly mayor-council or council-manager in form, but most cities using in the many case a fuzzy structures, constituting a hybrid model of local government or the type III city. What is it the model? What new elements or components and philosophy have this model? And, what is a new in this model? Are the cities of the type III - the “smart cities” ? The answer is, there is no universally accepted definition as a smart city, so and the city of the III model.

The search of these answers is very important for Ukraine, where the initiative to build smart cities comes mainly from the local community of active young people, for whom the smart city is seen as a tool that allows them to take part in the government, to solve the issues of life of the city together.

The focus of the study and representation of the results in this paper is search of answers on the main questions of the construction of the city governance model based on the researches and experience of the world’ cities leaders.

Raising the questions and searching for the answers will serve as a guide to some researchers and the search for other possible answers, encourage scientific research by young researchers, students.

More important than the science abstractions, there are possible application results and conclusion of this paper to city governments that hold potential for improving the quality of city governance.

**Keywords:** local authorities, municipal structure, public services, technologies, sustainability.

## 1. INTRODUCTION

Searching for answers to the question “Is a smart city a model of the third type city” raised in the title of this article, we consider it reasonable to act backwards and examine the existing approaches to understanding the definition of the “smart city” and other similar terms and how this understanding affects the construction of a city management system model and how it differs from the existing two main models of management of “mayor-council” city and “council-manager” city (Jered B. Carr, Shanthi Karuppusamy, 2009; What is the difference, 2015; Legal Definitions & Legal Terms Defined; Forms of Municipal Government, 2017).

One of the goal of this paper is on the base of analysis the multiple definitions of ‘Smart Cities’ and study of the main governance city models, based on open literature, be propose a definition for the term Smart City which specifically highlights the managerial,

not technological, aspect in construction such cities. Although there is abundant literature available on smart cities, there is no standardized, commonly accepted set of terminologies which would help to aptly describe a “Smart City”.

## 2. DEFINING ‘SMART SUSTAINABLE CITY’ AND ‘SMART CITY’: THERE ARE DIFFERENCES?

### 2.1. SMART SUSTAINABLE CITY: SMART TECHNOLOGY, SMART PEOPLE OR SMART COLLABORATION?

In ITU Report (Smart sustainable cities, 2014) approximately 116 existing definitions of Smart Sustainable Cities (SSC) were studied and analysed by using as a guideline the key attributes: (1) sustainability, (2) quality of life, (3) urban aspects, and (4) intelligence or smartness. Core themes for Smart Sustainable City include: (1) society, (2) economy, (3) environment, and (4) governance.

Key categories and indicators (Smart sustainable cities, 2014) were established and a list of 30 key words which should be included in a standardized definition were also identified. Such an approach has provided a diverse set of definitions and supplied a sense of “completeness” or comprehensiveness to the term as illustrated in the Table 1 (Author’s changes in the table). Based on the above analysis “A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects” (Smart sustainable cities, 2014).

Table 1.  
Definitions, keywords, source of ‘ Smart Sustainable City’

Definitions	Keywords
<p>“A city well performing in a forward-looking way in [economy, people, governance, mobility, environment, and living] built on the smart combination of endowments and activities of self-decisive, independent and aware citizens.” Giffinger, R., (2007)</p>	<p>Economy, people, governance, mobility, environment, quality of living, forward looking, aware citizens, self-decisive citizens, independent citizens.</p>
<p>Smart sustainable cities use information and communication technologies (ICT) to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint – all supporting innovation and the low-carbon economy. Cohen, B (2012).</p>	<p>ICT, cost efficiency, energy efficiency, energy savings, quality of life, environment, improved service delivery, innovation, low carbon economy.</p>
<p>Hitachi’s vision for the smart sustainable city seeks to achieve concern for the global environment and lifestyle safety and convenience through the coordination of infrastructure. Smart Sustainable Cities realized through the coordination of infrastructures consist of two infrastructure layers that support consumers’ lifestyles together with the urban management infrastructure that links these together using information technology (IT). Hitachi (2012).</p>	<p>Coordinated infrastructure, lifestyle safety, lifestyle convenience, urban infrastructure, IT.</p>

Definitions	Keywords
<p>“We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.” Meijer, Albert (2013)</p>	<p>ICT, high quality of life, natural resource management, participatory governance, transport infrastructure, communication infrastructure, economic growth, sustainability.</p>
<p>Replacing the actual city infrastructures is often unrealistic in terms of cost and time. However, with recent advances in technology, we can infuse our existing infrastructures with new intelligence. By this, we mean digitizing and connecting our systems, so they can sense, analyse and integrate data, and respond intelligently to the needs of their jurisdictions. In short, we can revitalize them so they can become smarter and more efficient. In the process, cities can grow and sustain quality of life for their inhabitants. IBM. “India Needs Sustainable Cities.” (2014)</p>	<p>Technology, connecting systems, analyse data, integrate data, responsive, efficient, growth, quality of life, sustainability.</p>

Source : Smart Sustainable City,2014

These five general definitions from the analysed 116 definitions concern the term “smart sustainable city”. Below we provide some definitions of the “smart city” typical for this term and determine whether there are differences in the definitions of the “smart sustainable city” and the “smart city”.

In our opinion it is interesting that the words “governance”, “management” and “administration” were used only in 10% of the definitions. Some logical word groupings were made as illustrated by Table 2 in order to better understand the relative importance of the different keywords and categories.

Table 2.  
Logical groupings Smart sustainable city definitions

Category	% Occurrence
Quality of life and lifestyle	6%
Infrastructure and services	17%
ICT, communication, intelligence, information	26%
People, citizens, society	12%
Environment and sustainability	17%
Governance, management and administration	10%
Economy and Finance	8%
Mobility	4%
<b>Total</b>	<b>100%</b>

Source : Smart Sustainable City,2014

## 2.2. THE VISION OF A SMART CITY

Authors of paper (Dameri & Rosenthal-Sabroux, 2014) assure that the definition of “Smart City” depends on the desired outcome of different stakeholders. Therefore proposed definitions are different and is one of the reasons why there is no universally agreed definition on this term up till now. But, in the host of definitions as laid down in literature, the definitions share some similarities, based on the philosophy of using ICT as

the enabling platform for the interaction of authorities and citizens, the provision of services and the driver of change in urban development.

However, emphasizing the role of citizens in the formation of a Smart City 3.0, as stakeholders who influence the definition of an Smart City, stand out (Urban Planning Strategy, 2015) only three main stakeholders, namely business sectors, government and academia.

Examples of business sectors can be IBM and Cisco. They suggest that Smart City is to capitalize on innovative technologies to enhance services, boost systems efficiency to solve urban issues (IBM, 2008; BIS, 2013).

The governments in general propose that Smart City is to leverage on ICT technologies to improve citizen's quality of life, optimize resource usage and maintain sustainable development (Dameri & Rosenthal-Sabroux, 2014).

The Academician institutions emphasis on co-creation of a city by empowering citizens with technologies and the necessary skillsets, facilitating information sharing and more good the relationship between the government and city's stakeholders (URENIO, 2015; UN-Habitat, 2015).

We can see, the Smart City definitions as presented by the three main stakeholders shows the evolution of Smart City concept which the. echoes with the three generations of Smart City development framework, as put forwarded by Boyd Cohen (Cohen, 2015).

The fact that the fourth stakeholder are citizens in many definitions of a smart city for some reason is not mentioned.

Although, in determining the 'Smart City 3.0' it is said that "...cities need to continue to embrace the innovative capacity of their residents who are able to detect needs before the city administrators can, and who can collaboratively work to fix the problems and improve the city with rapid, cost-effective innovations. Cities must move from treating citizens as recipients of services, or even customers, to participants in the co-creation of improved quality of life" (Cohen, 2015).

In Cohen's proposed smart city wheel (Fig. 2) are indicators for which the current compilation of smart city ratings. These indicators are designed to reflect how a smart city has an impact on the quality of services provided to citizens, on the work of government bodies and business activities. Proceeding from what has been said above, it should be assumed that citizens are the fourth and main stakeholder in what should be a smart city, and therefore give it a definition, the main meaning of which can reflect not only the level of services received by citizens, but their participation in processes, aimed at the development of the city, as an interacting party in the system of decision-making for the development of the city: power-business science (technology) - community (citizens, public organizations).



Fig. 2. The smart city wheel presented by Boyd Cohen  
*Source: SCW, 2013*

There is no single consensus definition of a smart city, but there is some agreement that a smart city is one in which information and communication technology (ICT) facilitates improved insight into and control over the various systems that affect the lives of residents. Table 3 lists a range of definitions, with the ICT elements highlighted in italics.

In the context use ICT in the definition “Smart City”, the basis for the concept of development of Hong Kong (Urban Planning Strategy, 2015) was the following working definition of Smart City: “A Smart City utilizes information and communication technologies (ICT) and innovative applications as enabling platforms, with a view to enhance system operations, benefit service delivery and facilitate information sharing, aiming at improving people’s quality of life, upholding environmental sustainability, increasing city competitiveness and empowering citizens.”

In this case we can see the Hong Kong as a Smart City development framework encompasses the evolution of three phases of developments, as suggested by Boyd Cohen (Cohen,2015): from a technologically oriented development, to implementation of government-led smart initiatives, and ultimately to a co-creation of solutions to wrestle with social or economic problems. Boyd Cohen generalized Smart City development into three main stages, evolving from technologically driven to co-creation (Fig. 3).

Smart City 1.0 is the stage when there is a pursuit of technological progress and rendering citizens as recipients of services only.

Smart City 2.0 is the stage when city is aims at improving people’s quality of life, launching smart initiatives, upholding sustainable development and ensuring resource optimization, using ICT as the enabler to address urban issues.

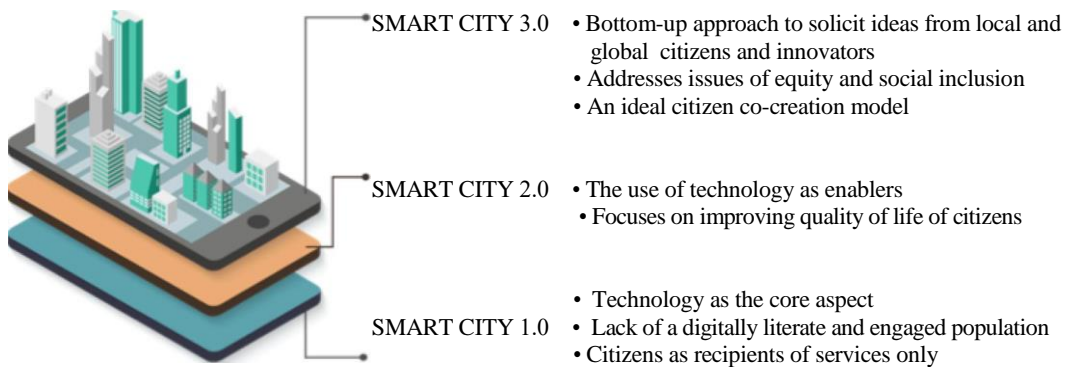


Fig. 3. Framework of the Three Generations of Smart City Development  
 Source: Cohen, 2015

Smart City 3.0 is the stage when citizens will be empowered by technologies, so that their innovative capacities can be stimulated. Elements that are indispensable in steering towards Smart City 3.0 include information sharing, data exchange, centering on a citizen-centric development, social equity and social inclusion.

Table 3.  
 Smart City Definitions

Source	Definition
(Humphries, C.,2013).	A wired, sensor-filled streetscape that uses <i>cloud computing and sophisticated software</i> to transform cities into intelligent machines that adapt to people’s lives and steer behavior... The ultimate vision is a city that is hyper-efficient, easy to navigate, and free of waste—and which is constantly collecting data to help it handle emergencies, disasters, and crime
Townsend (2013)	A city where <i>information technology</i> is being incorporated into services that affect urban problems
Gridaptive Technologies (2012).	A technology term that is inclusive of <i>smart grids, smart meters</i> , intelligent transportation, buildings, and other smart infrastructure that make up technologically innovative cities
Washburn, D. et al.(2010)	“The use of <i>Smart Computing technologies</i> to make the critical infrastructure components and services of a city—which include city administration, education, healthcare, public safety, real estate, transportation, and utilities—more intelligent, interconnected, and efficient.”
Cohen, B (2012).	...a broad, integrated approach to improving the efficiency of city operations, the quality of life for its citizens, and growing the local economy.
Giffinger, R. et al. (2007)	“A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens.”
Hall, R. E. (2000).	A city that monitors and <i>integrates conditions of all of its critical infrastructures</i> , including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens.
Harrison, C. at al. (2010)	An instrumented, interconnected, and intelligent city. Instrumentation enables the capture and integration of live real-world data through the use of sensors, kiosks, meters, personal devices, appliances, cameras, smart phones,

	implanted medical devices, the web, and <i>other similar data-acquisition systems, including social networks as networks of human sensors</i> . Interconnected means the integration of those data into an enterprise computing platform and the communication of such information among the various city services. Intelligent refers to the inclusion of complex analytics, modeling, optimization, and visualization in the operational business processes to make better operational decisions.
Harrison C, Donnelly I. (2011)	The expression “smart city” serves as a description for the application of compound systems to integrate the operation of urban infrastructure and services such as buildings, transportation, electrical and water distribution, and public safety.
Radovan Novotný et al. (2014)	A smart city can be described as a city that: <i>Allows real-world urban data to be collected and analyzed by the use of software systems, server</i>
Partridge, H. (2004).	“A city where <i>the ICT strengthen</i> the freedom of speech and the accessibility to public information and services”

*Source: Compiled by the authors*

The list shows near unanimity (in this very small sample) about the central role of ICT. The last entry is a notable exception, being more focused on the ends—efficiency and quality of life—rather than the means.

This view of a smart city is illustrated in Fig. 3, which shows various strategies and approaches as spokes on a wheel, with intermediate goals on the inner ring and the resulting smart city at the core. The wheel shows that ICT is a factor contributing to a smart city, but not the defining enabler.

So, the main point of the Hong Kong Smart City concept (Urban Planning Strategy, 2015) lies in the appreciation of the transactional relationship between urban systems and citizens, the importance of empowerment of citizens with the use of ICT which contributing to city development.

From this conceptual understanding of the smart city and the directions of its development we see that at the third stage of its development, the smart city is seen as a platform for seeking joint solutions for urban development issues, in which the authorities take part on the one hand, and the society (citizens, business, science, etc.) on the other hand. Therefore, in our opinion, it should be noted that conceptually the smart city combines four components: environment; technologies; society; management. If the first three components are described in reasonable details in various studies and they are implemented to varying degrees by different cities, then it is said much less about the fourth component of the smart city - the management system, about what sort of a model of city management can be in the conditions of the smart city concept implementation, and also if it is possible to consider the Smart City as a hybrid model of the III type city management.

### 2.3. SMART CONNECTED CITY: WHAT IS THAT?

In contrast to the term “smart city,” the term “connected city” implies a focus on the electronic, physical, and even human infrastructure (The Smart/Connected City, 2014).



The term “smart/connected city” this is with the understanding that:

- A connected city is one where all relevant city systems are capable of communicating with each other.
- A smart city is one where the government and citizenry are using ICT and other available means to achieve their shared goals, including economic development, environmental sustainability, and improved quality of life for citizens.
- To be “smart,” a city must be “connected.” to city’s infrastructure.

The smart/connected city model use mostly ICT and suggest that smart/connected city concepts will become more important in the future.

So, smart connected city applications encompass environmental monitoring, street lighting, traffic management, waste management, utilities metering, information signage, surveillance and more (Fig. 3).

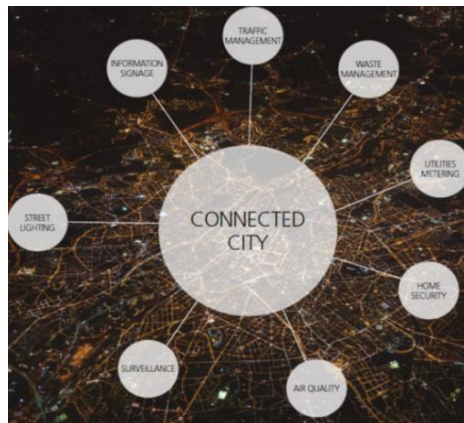


Fig. 3. Smart connected city applications  
*Source: Connected City,2016*

It is increasingly evident (Greener Cities Partnership, 2017) that in order to solve urban challenges need a stronger emphasis on integrated and inclusive policy-making and management.

The next concept, The Ubiquitous City-Songo (U-City, 2014)), can be defined as a city that applies a substructure of “ubiquitous computing” to the functionality of its urban systems, and can be contextualized as the integration of information systems with social systems: every device, component, and service within the city is linked to an information network, largely through wireless networking channels. This coordination between the various components allows for greater efficiencies and synchronization to be realized.

We see, many of the visions of a smart or connected city highlight a future world of rich interconnected services, where traffic systems are connected to a city infrastructure, such as roads and parking spaces and even street lights act as wireless hubs. But, a smart



city's infrastructure (Connected City,2016,) relies on collaboration with key stakeholders at each point: ICT providers, citizens and government (Fig. 4).

Summarizing the above, we can state that smart cities are made up of “smart people”, “smart solutions”, “smart governance”, “smart urban planning”, “smart use of technology”. And it's a result not only because that use new technologies, and because all this is done thanks to the “smart” policy of the authorities and the “smart” management of the city, as well as the “smart” behavior of citizens and business.

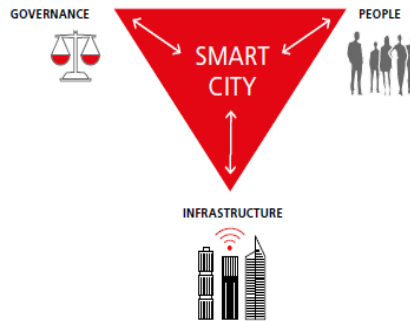


Fig. 4. Smart City – A triangle of opportunity, three corners of challenge  
*Source: Connected City, 2016*

At the majority of the definitions of the “Smart City” given earlier (Table 1, Table 2), the term “management” not used, but without which the city itself can't become “smart”. Therefore, in our opinion, if we use the term “smart” to cities in which technologies are used intelligently and various services are created to improve the quality life, then **“Smart City is a city management system, based on the use of innovative technologies in the field of ICT, networking, computer communications, big data and spatial planning, implemented (embodied) in the form of a specific model of the organizational structure of city management, which ensures the participation of society (citizens and all stakeholders) in the decision-making processes in key issues in city development”**.

A similar to our definition is definition (Harrison, C. & Abbott Donnelly, I., 2011) of a smart city as “Urban Systems models that are capable of helping citizens, entrepreneurs, civic organizations, and governments to see more deeply into how their cities work, how people use the city, how they feel about it, where the city faces problems, and what kinds of remediation can be applied”.

Somewhat similar in its focus is the definition of a smart city (Chernyshev V., 2013), as a complex of software solutions and organizational measures that are aimed at the effective use of all types of resources (electricity, water, gas / heat, space, time ... ) and creating conditions for a comfortable stay in the city, comfortable living and doing business.

The general scheme of such management system is shown in the figure below.

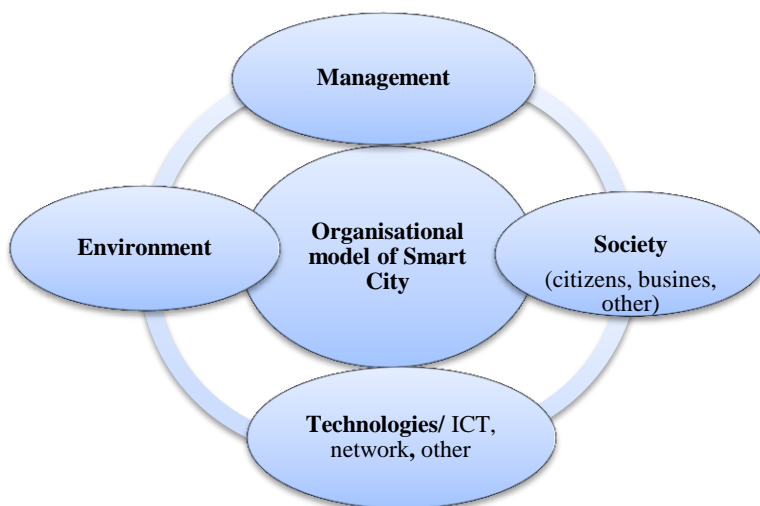


Fig. 5. General scheme of Smart City organizational-structural model  
*Source: Compiled by the authors*

Other definition is presented by (Caragliu et al.,2011): “We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.”

The idea that cities (Albert Meijer, 2013), are the nucleus of economic development is widespread and, for governing the city, this means that city administrators should not aim to solve all problems in the city but rather that they strengthen the capacity of urban systems to tackle a wide variety of problems and produce a wide range of public values.

However, cities are becoming smart not only in terms of the way we can automate routine functions in the sphere different city systems but in ways that enable us to monitor, understand, analyse and plan the city development to improve the quality of life for its citizens in real time (Batty et al., 2012).

One of the main perspectives on which the smart concept has been built is the smart city management and government policy. Government policies have a critical role to play in fostering the smart cities (Yigitcanlar et al., 2008). This is not merely a question of developing good policies but much more a managerial question of organizing strong collaborations between government and other stakeholders (Albert Meijer, 2013).

### 3. SHORT OVERVIEW OF APPROACHES IN SMART CITY MODEL DEVELOPMENT

Our analysis of various approaches to the definition of the concept of a smart city indicates that, although not all definitions emphasize management, organizational models of urban management. But is obvious that the success of the implementation of smart city projects depends on authorities, city management. This conclusion is confirmed by the attention paid by the authorities of one of the most successful smart city - the city of Vienna at the management, the interaction of the authorities with all interested parties. Moreover, in its understanding of smart city, city authorities mark two components of smart project management of smart city - internal and external.

“The smart city approach has two primary levels of implementation: on the one hand, it concerns the political level and hence the privilege of setting political priorities and defining policies in view of increasing complexity coupled with tight resources. On the other hand, the smart city concept poses challenges for the operative level, also because many tasks can only be handled by cutting across individual organizational units. For the staff members and organizational units of the City of Vienna, this calls for even tighter co-operation within and outside the municipal administration” (Smart City Wien, 2014).

As we see, the main trait of Smart City Wien consist in the approach based on co-ordination of politics and administration as well as a wider leeway of action assigned to citizens.

At Overview of the Smart Cities Maturity Model (JSC) adopt a ‘system-of systems’ approach to service delivery and develop collaborative service models to focus on shared outcomes across organisational boundaries. Successful Smart Cities adapt traditional organisational models of delivery to realise the opportunities of data and digital technologies. They invest in system-wide partnership models focused on shared outcomes (Table 4.)

Table 4.  
Adopt a ‘System of Systems’ Approach in the Smart City Maturity Model

Level	City Management Status	Smart City Status	Effect on Outcomes
1.Ad-Hoc	Siloed	Operation focused digital and data driven service improvement.	Capturing evidence and building business case.
2.Oppportunistic	System Collaboration	Holistic system thinking and emergent sharing of data.	Cross boundary partnerships emerging to focus on shared outcomes.
3.Purposeful & Repeatable	System Integration	Strategy led and outcome driven. Enabled by system-wide technology investment.	Shared accountability for outcomes and joint system-wide Investment programme.
4.Operationalised	Managed System	Technology and data enabled dynamic sense and response systems.	Improved prediction, prevention and realtime response delivers improved outcomes.
5.Optimised	Sustainable and Open ‘System of Systems’	Continuously adaptive city-wide ‘smart’ deployment.	City-wide open ‘system of systems’ approach drives innovation that enhances city competitiveness.

Source: JRC

This approach clearly shows the stages of change in emphasis of City Management Status from 'Siloed' to 'System of Systems' and of Smart City Status from 'Digital and Data Driven Service' to 'Continuously Adaptive City-Wide 'smart' Deployment'.

What can be the organizational model of city management in this case? Summarizing the above, we can draw an intermediate conclusion:

In most studies, the smart city model is considered as a component of various kinds of technical and technological solutions. And this is understandable, since the most part of the solutions for creating a smart city is offered by the ICT and communication sphere, i.e. concerns the technical and technological component of city management system. The human - organizational and managerial - factor in such models is not reflected enough. These models, for example, do not answer "how does the organizational structure of municipalities change in the conditions of functioning of a smart city?", "What management functions remain behind the divisions of the municipality, how will they interact with each other and with society" (citizens, business, etc.).

### 3.1. WHAT DECISIONS WE HAVE IN THIS SPHERE?

Structures for city governments (Organizational Structure, 2004 ) generally fall into three main categories: the mayor-council form (Fig.6a), the council-manager form (Fig. 6b), and the commission form. Exist two typical features of the "mayor-council" model: it's "strong mayor-council" and "weak mayor-council". In the first case, the mayor and the council are elected by all citizens and mayor has the right of a suspensive veto for decisions of the council; independently forms the administration, appoints and dismisses officials of the administration; individually manages the activities of the administration; organizes the work of the council, presides at its meetings, signs the acts adopted by the council. In this model use a balance of rights between mayor and council. Early termination of the mayor's powers is carried out on local referendum.

In the second case, the mayor is elected from among the deputies of the council. In this case mayor is in the full dependence on and accountability to the council: the mayor, for example, has not the right of veto; formation of the administration, appointment and dismissal of officials of the administration, etc. Early termination of the mayor's powers is carried out by the council on its own initiative or initiative of citizens.

In the "council-manager" model, the mayor's post is not provided (Fig. 6b). Organization of the council's activities is carried out by the chairman elected from among the deputies of the council, which does not have powers to manage the local administration. The Model City Charter has endorsed the council-manager form of government since its first edition in 1915 (National Civic League, 2003). The most recent edition of the Model City Charter suggests that the position of Manager (Chief Administrative Officer, CAO) be created for the community that chooses a mayoral form of government. All administrative functions belong to the manager appointed on a contractual basis, which independently forms the administration, manages its activities,

appoints and dismisses officials of the administration. Relations between the manager and the council are determined by the terms of the contract.

Similar to an appointed council Chairman, a Chief Administrative Officer (CAO) serves as a professionally-trained staff person to oversee daily operations. The CAO's position typically serves at the pleasure of the council.

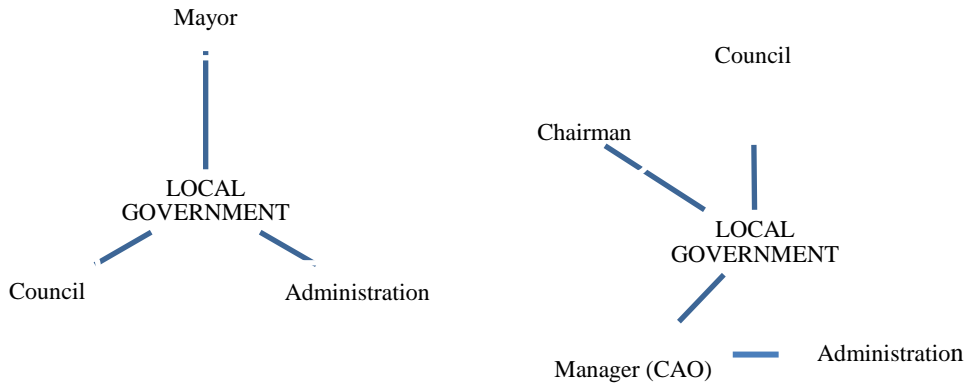


Fig. 6. (a). Model “Mayor-Council”;

(b) Model “Council-Manager”.

A “city commission” model is based on the election of a number of local government officials and a combination of representative and executive functions. At the same time, not deputies of a representative body, but heads of bodies and structural subdivisions of the local administration are elected. Powers of the representative body are exercised by the commission, which includes all elected officials.

These models do not exhaust all the variety of organizational structures of municipal administration, but on their basis various modifications and “hybrid” models (combining certain features of basic ones) can be create.

It is important that the basic models of organizational structures of local government allow, by choosing from a small number of options that have practically proved their right to exist, to adopt one of them as a basis and as applied to specific conditions develop it to the full structure of the management bodies of the municipal economy.

Choosing one of the models of local government organization is only the first step in formation of organizational structure of the local government. The next step should be a determination of the procedures for the formation of each body included in the general system. For different local government bodies, the procedures will differ, which is due to the different nature of the bodies, distribution of the functions performed between them and other important circumstances. There will be different procedures for the formation of bodies depending on the chosen organizational model.

In practical activities, it is very important to solve the problem of building the structure of local government bodies on the basis of applying various classifications. The algorithm for solving this problem will be as follows. The characteristics of the object of management (municipal economy) shall be established; in relation to the object as a whole and to its components, a list of management functions shall be established; it shall be determined how each function is most effectively performed and what characteristics in accordance with the classifications the bodies performing this function should have; by means of integration and aggregation of functions, the bodies that build the structure shall be defined; relations and interconnections of these bodies shall be established; the system of local government bodies shall be finally formed. Surely, the implementation of this algorithm is much more complicated than its description, and there is a need to illustrate the application of the algorithm, at least in a private and simplified example.

Use of the main definitions the term ‘Smart City’ and description the main components of smart infrastructure in the Report (Smart cities and infrastructure, 2016) elaborates on the one of the five main challenges encountered in the implementation of smart city infrastructure, - lack of application of a suitable governance model. Underlines also the key role of science, technology and innovation, society in addressing these challenges.

Based on the extensive experience of creating smart cities (Hafedh Chourabi, et.al., 2012), eight factors have been identified that form the content of initiatives to their create: Governance; Technology; Organisation; Policy decisions; People & communication; Economy; Built infrastructure; Natural environment.

These factors formation the basis of an integrative model of a smart city (see Fig.7), which can be used by the city authorities to develop and make decisions. This general model can be used as a basis for creating an organizational model of city management.

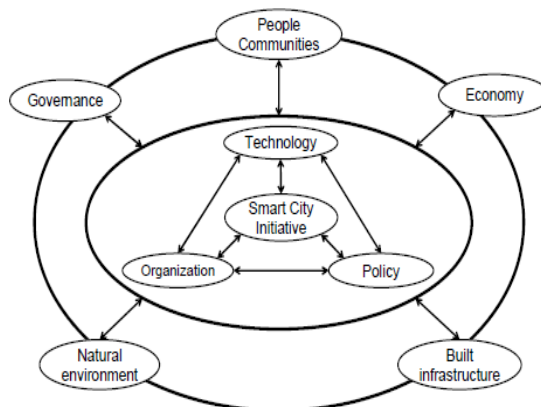


Fig. 7. Smart city initiatives framework  
 Source: Hafedh Chourabi, et.al.,2012

The proposed model clearly reveals external and internal factors, which are represented by two different levels of influence. External factors on the periphery of the model (leadership, people and communities, economics, infrastructure and the environment). They to some extent depend on the internal factors of the model (management and organization, ICT technologies, policy decisions) and through them (directly or indirectly) influence the success of initiatives taken on the basis of agreed decisions of all stakeholders in the creation of a smart city.

Studying the experience of many cities in the world, a number of researchers are looking for the ways to create a hybrid model that would take advantages of these two, yet dominant, models (Frederickson, H. G., Johnson, G., & Wood, C.,2002; 2004a; 2004b). It should be noted that these proposals at that time did not take into account the impact that ICT began to have on the formation of city management systems and their organizational structures (). In search of a hybrid model in the work (Jered B. Carr, Shanthi Karuppusamy ,2009), an attempt was made to adapt these two models. At the same time, the authors of the work suggested four directions for future research that may substantially improve understanding of this topic. They invite others to build on and refine their approach to coding municipal governments as adapted cities.

At the same time, we understand that the construction of the smart city is inextricably connected with the spatial planning of the city (Garvin A., 2013; Townsend A.,2013; Urban Street Design Guide, 2013; Meinhold B., 2013; Treb Allen, 2015; Smart Cities, 2013), which forms its basis and determines many decisions in the management of city systems that ensure the livelihoods of its citizens (transport, health, education, environment, human resources, services).

Highly appreciating the potential of technologies in the transformation of city planning, Townsend takes an unbiased look at the current elites, too technocratic and not so rational. Townsend tries to comprehend the ethical and economic consequences of the “digital inequality” and expresses an anxiety that the ubiquity of technologies and mobile autonomy will lead to the emergence of governments abandoning their commitments - at the expense of “excluded” segments of the people.

The author sees the cities as “social search engines” that help like-minded people find each other and join forces. From his point of view, it makes sense to ask the question “will there be new social movements as activists, artists and designers will get more and more tools suitable for building the smart city, the idea of which will differ from those that the technology industry now spoon-feeds to us”.

Interesting is the set of common multidimensional components underlying the concept of an intelligent city and the main factors for successful initiatives of the intelligent city, proposed by a group of researchers ( Taewoo Nam & Theresa A. Pardo, 2011).



A set of the common multidimensional components underlying the smart city concept and the core factors for a successful smart city initiative is identified by exploring current working definitions of smart city and a diversity of various conceptual relatives similar to smart city.

The paper offers strategic principles aligning to the three main dimensions (technology, people, and institutions) of smart city: integration of infrastructures and technology-mediated services, social learning for strengthening human infrastructure, and governance for institutional improvement and citizen engagement.

So, for example, “smart” can be the cities that are built as “smart” cities or cities that are oriented toward specific goals (for example, cities-industrial parks, cities-scientific centres), or, more often, ordinary cities that step by step become “smart”. In the ordinary city, ICT-based services cannot react to changes in economic, cultural and social conditions so flexibly as services in the “smart” city. Thus, the “smart” city is primarily people-oriented, based on the ICT infrastructure and continuous city development with constant consideration of the requirements of environmental and economic sustainability. Many of the world’s largest cities launched projects to create the “smart” city, including Seoul, New York, Tokyo, Shanghai, Singapore, Amsterdam, Cairo, using the latter approach - becoming “smart” step by step. A number of researchers, referring to the current pace of innovations, suggest that in the next decade models of the “smart” cities will become widespread real and popular city development strategies.

In our opinion, the main difference between the “smart” city model and the traditional city model is in the nature of the relationships between the authorities and the society and in the constructed city management system, which also includes the organizational structure of the city authorities.

Looking examples (Urban Planning Strategy, 2015) of Smart City implementation in global cities, it is observed that a strong government with a strategic blueprint that guides Smart City planning is fundamental to the successful achievement of Smart City visions. Also, cross-sector collaboration between the public, private, and academia; and the cultivation of an innovative environment are also important elements for the development of a Smart City.

As notes Enid Slack (2004), the local governments not only do they have to ensure access to skilled labour and transportation and communications infrastructure but they also have to provide those services that attract and retain highly trained human capital. The appropriate local government structure will help them to do this.

And, He said, the type of government structure for cities will have an effect on the efficiency with which services are provided and on the ability to share the costs throughout the entire region in a fair and efficient way.

### 3.2. THE NEED FOR AN INTEGRATED APPROACH

Smart cities on the next development stage need an integrated solutions in order to harness all potential of smart technologies. At this case integrated approach are effective tools for capturing the relations between people, policies, habitat and technologies.

One possible approach (Smart cities and infrastructure, 2016) can be an creating municipal management centres to aggregate the different city data streams that help break down administrative silos. This centres must be integrated in organisational structure of municipal management as a special part of city government.

Therefore smart cities call for new governance models. Effective smart city management needs to balance both top-down and bottom-up governance approaches. On the one hand, collating the information generated by smart sensors deployed in different smart infrastructures and taking policy actions, especially during emergencies, may require strong top-level leadership and top-down execution processes. On the other hand, bottom-up governance approaches, including citizen-driven innovations and co-creation, have been the defining characteristic of much of smart city infrastructure.

We propose (Fig. 8) suggests a general scheme for constructing such a model on the basis of an integrated approach.

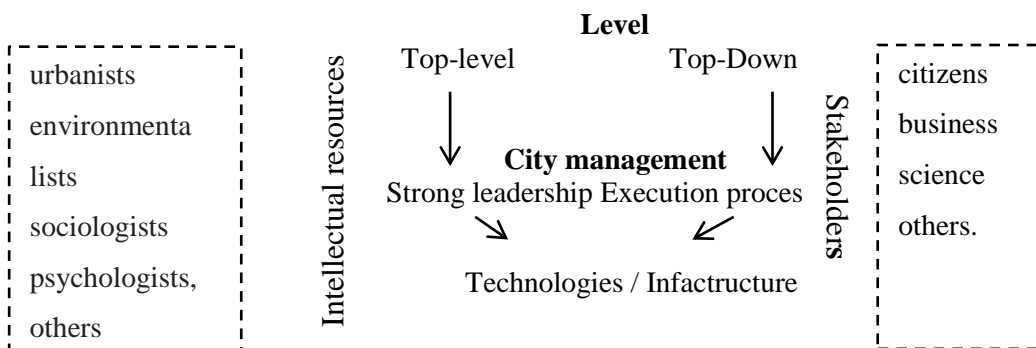


Fig. 8. General scheme of smart city management model based on integrated approach

The proposed integrated approach (Smart cities and infrastructure, 2016) provides an opportunity to formulate the following key principles of creation an organizational model of smart city management.

(a) Smart city model should rely on a people-centric approach that responds to the sustainable development needs of people, and avoid a technology-centric approach.

(b) Smart city model should be chosen and designed with a deep understanding of people's lifestyles, cultures, behaviours and needs.

(c) Smart city model should be resilient to external shocks and ensure sustainability.

- (d) Smart city model should be designed in order to be flexible with regard to future modifications and enhancements.
- (e) Smart city development should be accompanied by appropriate risk management.

### 3.3. TYPES OF CONCEPTUALIZATION OF A SMART GOVERNANCE

Identified four types of conceptualization (Albert Meijer, Manuel Pedro Rodríguez Bolívar, 2013) about the need for transformation of government to make cities smarter.

The first type of conceptualization of smart governance exclude transformation of city structures and processes. In this context, smart governance is the governance of a smart city, consist in making the good policy solutions and effective realizing these in the existing organizational structures (Alkandari et al., 2012; Batty et al., 2012; Nam, T. (2012); Winters, J. V., 2008).

The second type of conceptualization of smart governance emphasizes the need to innovate decision-making processes and the implementation of these decisions. (Schuurman et al., 2012; UNESCAP, 2007; Walravens, 2012).

The third level of conceptualization is that smart governance is about creating a smart administration (Caragliu and Del Bo, 2012). In this context (Batty et al., 2012) highlight that ‘smart governance is a structure that brings together traditional functions of government and business’.

The fourth and most transformative level of conceptualization stresses that smart governance is about rearranging the position of government within the urban system. This type of conceptualization is at the highest level of transformation since it is not only about the transformation of the internal organization but also of the external organization of city management (Smart City Wien, 2014). Bătăgan (2011) argues that ‘...smart governance is the pro-active and open-minded governance structures, with all actors involved, in order to maximize the socio-economic and ecological performance of cities, and to cope with negative externalities and historically grown path dependencies’.

We can only assume, what a smart city on the fourth level of conceptualization is most effective and most legitimate, but this can be under certain conditions and in a certain context. On this question can be answered only through additional empirical research.

## 3. CONCLUSIONS

So, we can see that question: is a smart city as III type city model in the sense of the new model of the organisational structure the governance of smart cities have a base to discussion since because exist different vision on smart cities, smart sustainable cities and smart governance are presented.

The literature review shows that many publications have a technico-technological focus. Others combine these perspectives as a socio-economical results of a smart cities.

Summarizing, we can answer on the main paper question based that many of the approach to smart city structure and organizational model of the city management can't being reproduced in the new, developing conception of smart cities III type studies because exist:

- A forming of smart city approaches as technical or technological solutions and a strong emphasis on technologies or communication, a limited attention to the internal and external municipal collaboration as a main of the city management principle;
- Insufficient emphasis on transformation of governance and exploring organizational forms of smart city government at the case using ICT;
- A lack the smart city management standards for different type of cities (new cities, reconstructed cities, etc; megalopolises, small or middle cities);
- Organizational structures of many cities that are considered "smart" can't be a hybrid type III model based on the two main models of the city management system. Since in most cases they don't contain reengineering of the management processes and organizational management structure change in the conditions of transfer of many functions of a city management to the technical systems.

We think, that this problems can be solved on the basis of the principles of integrated approach with the participation of different specialists in the sphere of the management science, urban planning, organisational design, created new conception of a city management and forming new model of the structure city government.

## REFERENCES

1. Albert Meijer, Manuel Pedro Rodríguez Bolívar (2013). *Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy*. [https://www.scss.tcd.ie/disciplines/information\\_systems/egpa/docs/2013/BolivarMeijer.pdf](https://www.scss.tcd.ie/disciplines/information_systems/egpa/docs/2013/BolivarMeijer.pdf), date: 20.10.2017.
2. Alkandari, A.; Alnasheet, M. and Alshekhy, I. F. T. (2012). *Smart Cities: Survey*. Journal of Advanced Computer Science and Technology Research Vol.2 No.2, 79-90.
3. Bătăgan, L. (2011). *Smart Cities and Sustainability Models*. Informatica Economică, 15 (3), 80-87. <http://revistaie.ase.ro/content/59/07%20-%20Batagan.pdf>, date: 20.10.2017.
4. Batty, M., Axhausen, K.W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G. and Portugali, Y. (2012). *Smart Cities of the Future*. European Physical Journal 214, 481-518. <https://link.springer.com/content/pdf/10.1140%2Fepjst%2Fe2012-01703-3.pdf>, date: 20.10.2017.
5. Caragliu, A., Del Bo, C. and Nijkamp, P. (2009). *Smart Cities in Europe*. [https://intaivn.org/images/cc/Urbanism/background%20documents/01\\_03\\_Nijkamp.pdf](https://intaivn.org/images/cc/Urbanism/background%20documents/01_03_Nijkamp.pdf), date: 20.10.2017.
6. Chernyshev V. (2013). *Infrastructure of "smart city" - the best solutions*. CNews Conferences (rus). [http://www.cnews.ru/reviews/ppt/2013\\_06\\_13/10.pdf](http://www.cnews.ru/reviews/ppt/2013_06_13/10.pdf), date: 20.10.2017.
7. Cohen, Boyd. (2011) "*The Top 10 Smart Cities On The Planet*." Fast Company, 11 Jan. 2011. Web. Last accessed 12 Feb. 2014. <http://www.fastcoexist.com/1679127/the-top-10-smart-cities-on-the-planet>, date: 20.10.2017.
8. Cohen, B (2012). "*What Exactly is a Smart City?*" Fast Company Co.Exist. September 19, 2012. <http://www.fastcoexist.com/1680538/what-exactly-is-a-smart-city>, date: 20.10.2017.
9. Cohen, B. (2015). *The Three Generations of Smart City*. <https://www.fastcompany.com/3047795/the-3-generations-of-smart-cities>, date: 20.10.2017.

10. Dameri, R.P. & Rosenthal-Sabroux, C. (2014). *Smart City. How to Create Public and Economic Value with High Technology in Urban Space*. Switzerland, Springer International Publishing. [https://books.google.com.ua/books?id=9PIpBAAAQBAJ&printsec=frontcover&hl=ru&source=gbs\\_ViewAPI&redir\\_esc=y#v=onepage&q&f=false](https://books.google.com.ua/books?id=9PIpBAAAQBAJ&printsec=frontcover&hl=ru&source=gbs_ViewAPI&redir_esc=y#v=onepage&q&f=false), date: 20.10.2017.
11. Department for Business Innovation & Skills. (BIS,2013). *Smart Cities: Background Paper*. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/246019/bis-13-1209-smart-cities-background-paper-digital.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246019/bis-13-1209-smart-cities-background-paper-digital.pdf), date: 20.10.2017.
12. Enid Slack (2004), *Models of Government Structure at the Local Level*.
13. <http://www.queensu.ca/iigr/sites/webpublish.queensu.ca.iigrwww/files/files/WorkingPapers/Archive/2004/2004-4Slack2004.pdf>, date: 20.10.2017.
14. Forms of Municipal Government (2017). <http://www.nlc.org/forms-of-municipal-government>, date: 20.10.2017.
15. Frederickson, H. G., Johnson, G., & Wood, C. (2002). *Type III cities*. In H. G.;
16. Frederickson, H. G., Johnson, G., & Wood, C. (2004a). *The adapted city: Institutional dynamics and structural change*. Armonk, NY: ME Sharpe;
17. Frederickson, H. G., Johnson, G., & Wood, C. (2004b). *The changing structure of American cities: A study of the diffusion of innovation*. *Public Administration Review*, 64(3), 320-330.
18. Garvin A. (2013). *The Planning Game: Lessons from Great Cities*. W. W. Norton & Company, 224 p.;
19. Giffinger, R., (2007), Fertner, C, Kramar, H., Kalasek, R., Pichler-Milanovic, N, & Meijers, E. (2007). *Smart Cities: Ranking of European Medium-Sized Cities*. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology. [http://www.smart-cities.eu/download/smart\\_cities\\_final\\_report.pdf](http://www.smart-cities.eu/download/smart_cities_final_report.pdf), date: 20.10.2017.
20. Gridaptive Technologies (2012). *“Smart Cities: Intelligent Transportation and Smart Grid Standards for Electrical and Lighting Management Systems.”* White Paper, 2012. [http://www.gridaptive.com/whitepapers/Smart\\_Cities\\_Intelligent\\_Transportation\\_and\\_Smart\\_Grid\\_Standards\\_for\\_Electrical\\_and\\_Lighting\\_Management\\_Systems\\_.pdf](http://www.gridaptive.com/whitepapers/Smart_Cities_Intelligent_Transportation_and_Smart_Grid_Standards_for_Electrical_and_Lighting_Management_Systems_.pdf), date: 20.10.2017.
21. Greener Cities Partnership (2017). <https://unhabitat.org/tag/greener-cities-partnership>, date: 20.10.2017.
22. Hall, R. E. (2000). *The vision of a smart city*. In Proceedings of the 2nd International Life Extension Technology Workshop <http://www.osti.gov/bridge/servlets/purl/773961-oyxp82/webviewable/773961.pdf>, date: 20.10.2017.
23. Harrison, C, Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). *Foundations for Smarter Cities*. *IBM Journal of Research and Development*, 54(4). DOI: 10.1147/JRD.2010.2048257.
24. Harrison C, Donnelly I. (2011) *A Theory of Smart Cities*. Proceedings of the 55th Annual Meeting of the ISSS. Hull: International Society for the Systems Sciences.
25. Hafedh Chourabi, et.al.(2012). *Understanding Smart Cities: An Integrative Framework*. – In: 2012 45th Hawaii International Conference on System Sciences, p.p.2290-2297, [https://www.ctg.albany.edu/publications/journals/hicss\\_2012\\_smartcities/hicss\\_2012\\_smartcities.pdf](https://www.ctg.albany.edu/publications/journals/hicss_2012_smartcities/hicss_2012_smartcities.pdf), date: 20.10.2017.
26. Harrison, C. & Abbott Donnelly, I. (2011) *“A Theory of Smart Cities.”* White Paper, 2011.
27. Hitachi (2012). *“Smart Sustainable City Overview.”* Smart Cities: Hitachi. Hitachi, Web.. <http://www.hitachi.com/products/smartcity/vision/concept/overview.html>, date: 20.10.2017.
28. Humphries, C.(2013) *“The too-smart city: We’re already building the metropolis of the future - green, wired, even helpful.* Now critics are starting to ask whether we’ll really want to live there.” *The Boston Globe*, May 19, 2013.
29. IBM. *“India Needs Sustainable Cities.”* (2014) IBM SMARTER PLANET, [http://www.ibm.com/smarterplanet/in/en/sustainable\\_cities/ideas](http://www.ibm.com/smarterplanet/in/en/sustainable_cities/ideas), date: 20.10.2017.
30. International Business Machines Corporation. (IBM,2008). *Analyzing the future of cities*. [http://www.ibm.com/smarterplanet/us/en/smarter\\_cities/overview](http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview), date: 20.10.2017.
31. Jered B. Carr, Shanthi Karuppusamy (2009). *Beyond Ideal Types of Municipal Structure Adapted Cities in Michigan*. *The American Review of Public Administration* 2009 Volume 39 Number 304-321 <http://arp.sagepub.com/content/39/3/304>, date: 20.10.2017.
32. Joining the dots of Smart Cities (JSC). Overview of the Smart Cities Maturity Model. [https://static1.squarespace.com/static/5527ba84e4b09a3d0e89e14d/t/589898a303596ed56644c548/1486395647793/UT\\_SmartCitiesMaturity\\_Summary.pdf](https://static1.squarespace.com/static/5527ba84e4b09a3d0e89e14d/t/589898a303596ed56644c548/1486395647793/UT_SmartCitiesMaturity_Summary.pdf), date: 20.10.2017.
33. Legal Definitions & Legal Terms Defined. <https://definitions.uslegal.com>, date: 20.10.2017.
34. Meinhold B. (2013). *Urgent Architecture:40 Sustainable Housing Solutions for a Changing World*. W. W. Norton & Company, 256 p.;

35. Meijer, Albert (2013), and Manuel Pedro Rodríguez Bolívar. "Governing the Smart Sustainable City: Scaling-Up the Search for Socio-Techno Synergy." TEGPA 2013 (Edinburgh, September) Permanent Study Group on E-Government, 2013, [https://www.scss.tcd.ie/disciplines/information\\_systems/egpa/docs/2013/Bolivar\\_Meijer.pdf](https://www.scss.tcd.ie/disciplines/information_systems/egpa/docs/2013/Bolivar_Meijer.pdf), date: 20.10.2017.
36. Nam, T. (2012). *Modelling municipal service integration: a comparative case study of New York and Philadelphia 311 systems*. Dissertation. University at Albany, State University of New York. <https://pqdtopen.proquest.com/doc/1038380201.html?FMT=AI>, date: 20.10.2017.
37. National Civic League. (2003). *Model City Charter: Defining Good Government in a New Millennium* (8th Ed.). Denver, Colorado, USA: National Civic League Press.
38. Organizational Structure of Subnational and Local Government (2004). <http://www1.worldbank.org/publicsector/civilservice/june2004seminar/adb.pdf>, date: 20.10.2017.
39. Partridge, H. (2004). *Developing a human perspective to the digital divide in the smart city*. In Proceedings of the Biennial Conference of Australian Library and information Association (Queensland, Australia, Sep 21-24). <http://eprints.qut.edu.au/1299/1/partridge.h.2.paper.pdf>, date: 20.10.2017.
40. Radovan Novotný (2014), Radek Kuchta and Jaroslav Kadlec. *Smart City Concept, Applications and Services* Telecommun Syst Manage 2014, 3:2 <http://dx.doi.org/10.4172/2167-0919.1000117>, date: 20.10.2017.
41. Schuurman, D. ; Baccarne, B.; De Marez, L. and Mechant, P. (2012). *Smart Ideas for Smart Cities: Investigating Crowdsourcing for Generating and Selecting Ideas for ICT Innovation in a City Context*. Journal of Theoretical and Applied Electronic Commerce Research, 7 (3), 49-62. <http://www.scielo.cl/pdf/jtaer/v7n3/art06.pdf>, date: 20.10.2017.
42. Smart cities and infrastructure (2016). Report of the Secretary-General. Commission on Science and Technology for Development, United Nations. [http://unctad.org/meetings/en/SessionalDocuments/ecn162016d2\\_en.pdf](http://unctad.org/meetings/en/SessionalDocuments/ecn162016d2_en.pdf), date: 20.10.2017.
43. Smart Cities: Big Data, Civic Hackers and the Quest for a New Utopia. (2013). W.W. Norton & Co. 400 p.). [https://ssir.org/articles/entry/smart\\_cities\\_big\\_data\\_civic\\_hackers\\_and\\_the\\_quest\\_for\\_a\\_new\\_utopia](https://ssir.org/articles/entry/smart_cities_big_data_civic_hackers_and_the_quest_for_a_new_utopia), date: 20.10.2017.
44. Smart sustainable cities (2014): *An analysis of definitions*. Focus Group Technical Report. ITU p.71 [http://www.itu.int/net/itu\\_search/index.aspx?cx=001276825495132238663%3Anqzm45z846q&cof=FORID%3A9&ie=UTF-8&q=Smart+sustainable+cities%3A+An+analysis+of+definitions](http://www.itu.int/net/itu_search/index.aspx?cx=001276825495132238663%3Anqzm45z846q&cof=FORID%3A9&ie=UTF-8&q=Smart+sustainable+cities%3A+An+analysis+of+definitions), date: 20.10.2017.
45. Smart City Wien. (2014). Framework Strategy. City of Vienna. p.56 [https://smartcity.wien.gv.at/site/files/2014/09/SmartCityWien\\_FrameworkStrategy\\_english\\_doublepage.pdf](https://smartcity.wien.gv.at/site/files/2014/09/SmartCityWien_FrameworkStrategy_english_doublepage.pdf), date: 20.10.2017.
46. Taewoo Nam & Theresa A. Pardo(2011). *Conceptualizing Smart City with Dimensions of Technology, People, and Institutions/* The Proceedings of the 12th Annual International Conference on Digital Government Research- pp.282-291 <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.432.5479&rep=rep1&type=pdf>, date: 20.10.2017.
47. The Smart/Connected City (2014 ) and Its Implications for Connected Transportation. White Paper — October 14, 2014. [https://www.its.dot.gov/itspac/Dec2014/Smart\\_Connected\\_City\\_FINAL\\_111314.pdf](https://www.its.dot.gov/itspac/Dec2014/Smart_Connected_City_FINAL_111314.pdf), date: 20.10.2017.
48. The Connected City (Connected City, 2016) THE U-BLOX TECHNOLOGY MAGAZINE, NO. 2 – NOVEMBER 2016. [https://www.u-blox.com/en/system/files/u-blox\\_Magazine2\\_Inhalt\\_LOW.pdf?hash=22nwLWWBVq0Gf42yi58RL3fvZMfQkjEoyTXMdozdndE](https://www.u-blox.com/en/system/files/u-blox_Magazine2_Inhalt_LOW.pdf?hash=22nwLWWBVq0Gf42yi58RL3fvZMfQkjEoyTXMdozdndE), date: 20.10.2017.
49. The Smart City Wheel (SCW,2013) BOYD COHEN BLOG: <http://www.smart-circle.org/smartcity/blog/boyd-cohen-the-smart-city-wheel>, date: 20.10.2017.
50. Townsend A. (2013). *Smart Cities: Big Data, Civic Hackers and the Quest for a New Utopia*. W.W. Norton & Co. 400 p.;
51. The Ubiquitous City – Songdo (U-City, 2014). <https://www.mcgill.ca/channels/channels/news/ubiquitous-city-songdo-songdo-236653>, date: 20.10.2017.
52. Treb Allen (2015) *Optimal City Structure /* Treb Allen, Costas Arkolakis, Xiangliang Li. <http://www.econ.yale.edu/~ka265/research/OptimalCity/AAL%20-%20City%20Structure.pdf>, date: 20.10.2017.
53. UN–Habitat. (2015). The Habitat III Issue Papers. 21 – Smart Cities.
54. UNESCAP. (2007, January) Good Governance. UNESCAP. <http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp>, date: 20.10.2017.
55. Urban Planning Strategy (2015) for Developing Hong Kong as a “Smart City” - Final Report. The University of Hong Kong. 2015. p.182. [http://www.arch.hku.hk/media/upload/LUMOS\\_Final\\_Report\\_Revised.pdf](http://www.arch.hku.hk/media/upload/LUMOS_Final_Report_Revised.pdf), date: 20.10.2017.
56. Urban and Regional Innovation Research Unit. (URENIO, 2015). The 3 Generations of Smart Cities. <http://www.urenio.org/2015/08/25/the-3-generations-of-smart-cities>, date: 20.10.2017.



57. Urban Street Design Guide (2013). National Association of City Transportation Officials (NACTO). Island Press. 192 p.;
58. Walravens, N. (2012). *Mobile Business and the Smart City: Developing a Business Model Framework to Include Public Design Parameters for Mobile City Services*. Journal of Theoretical and Applied Electronic Commerce Research, 7 (3), 121-135. [http://www.scielo.cl/scielo.php?script=sci\\_arttext&pid=S0718-18762012000300011](http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-18762012000300011), date: 20.10.2017.
59. Washburn, D.(2010), Sindhu, U., Balaouras, S., Dines, R. A., Hayes, N. M., & Nelson, L. E. (2010). *Helping CIOs Understand "Smart City" Initiatives: Defining the Smart City, Its Drivers, and the Role of the CIO*. [http://public.dhe.ibm.com/partnerworld/pub/smb/smarterplanet/forr\\_help\\_cios\\_und\\_smart\\_city\\_initiatives.pdf](http://public.dhe.ibm.com/partnerworld/pub/smb/smarterplanet/forr_help_cios_und_smart_city_initiatives.pdf),date: 20.10.2017.
60. Winters, J. V. (2008). *Why are smart cities growing? Who moves and who stays*. W.J. Usery Workplace Research Group Paper Series. <https://pdfs.semanticscholar.org/c82b/d5e6cb0e5b1c1842ae86575fc9dfe41e4478.pdf>, date: 20.10.2017.
61. What is the difference between the mayor-council, commissioner, and manager forms of city government? (2015). [http://www.klc.org/news/470/What\\_is\\_the\\_difference\\_between\\_the\\_mayor-council,\\_commissioner,\\_and\\_manager\\_forms\\_of\\_city\\_government](http://www.klc.org/news/470/What_is_the_difference_between_the_mayor-council,_commissioner,_and_manager_forms_of_city_government), date: 20.10.2017.
62. Yigitcanlar, T.; Velibeyoglu, K. and Martinez-Fernandez, C. (2008). *Rising knowledge cities: the role of urban knowledge precincts*.[https://www.academia.edu/6773768/Rising\\_knowledge\\_cities\\_the\\_role\\_of\\_urban\\_knowledge\\_precincts?auto=download](https://www.academia.edu/6773768/Rising_knowledge_cities_the_role_of_urban_knowledge_precincts?auto=download), date: 20.10.2017.