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SMART CITY COMPONENTS

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ABSTRACT

In order to make cities more livable in all respects, the interest in the 'smart city' is increasing day by day in policy-making studies and scientific research on the use of digital technologies. The concept of sustainable smart development contains another fundamental issue at this point, but these two concepts are intertwined. This concept seems very attractive in terms of producing pragmatic and applicable solutions for cities. However, at this point, we see that the existing infrastructures of the cities come to the fore. We see that the existing infrastructures in cities that develop economically and socially are generally much more advanced technology and more broadcast. But, the situation is different in developing cities. Infrastructure is one of the most basic arguments for a city plan. In particular, in order to define a smart city, it is based on equipping the existing residential area with advanced information and communication technologies and the effective use of information networks by citizens. According to a common definition, smart cities are the development of sustainable urbanization using information and communication technologies, based on technical systems that can create solutions to the problems of the city. We can consider a smart city as an organic structure that connects multiple subsystems and components. There are some clear criteria for this organic structure. According to these criteria; The six components determined as “smart environment, smart management, smart economy, smart life, smart society and smart transportation” are shown as the basic components that smart cities should have. The data obtained from these six components will only enable us to increase productivity and urban living standards when evaluated from a holistic perspective. In this respect, it is important to reveal what the expressed components contain in terms of understanding the concept of the smart city.

In this study, through a wide literature review and observation; by revealing the basic components that smart cities should have, it was tried to be explained by evaluating the important issues that these components indicate.

Keywords: Smart City, Mobility, Governance.

AKILLI KENT BİLEŞENLERİ

ÖZET

Kentlerin her bakımdan daha yaşanabilir bir hale gelmesi için dijital teknolojilerin kullanımıyla ilgili politika oluşturma çalışmaları ve yapılan bilimsel araştırmalarda 'akıllı şehir’e yönelik ilgi günden güne artmaktadır. Sürdürülebilir akıllı kalkınma konsepti bu noktada diğer temel bir hususu barındırmakla beraber bu iki kavram iç içe geçmiş durumdadır. Kentlere yönelik yararcı ve uygulanabilir çözümler üretilmesi açısından bu konsept oldukça çekici görünmektedir. Fakat bu noktada kentlerin sahip oldukları mevcut altyapıların ön plana çıktığını

görmekteyiz. Ekonomik ve sosyal yönden gelişen kentlerde v ar olan altyapıların genellikle çok daha ileri teknoloji ve daha yayın olduklarını görmekteyiz. Buna karşın gelişmekte olan kentlerde durum daha farklıdır. Bir kent planı açısından en temel argümanların başını altyapı oluşturmaktadır. Özelikle akıllı kent tanımının yapılabilmesi için mevcut yerleşim alanın ileri seviye bilgi iletişim teknolojileriyle donatılması ve bilgi ağlarının yurttaşlar tarafından efektif şekilde kullanılmasına dayanmaktadır. Yaygın bir tanıma göre akıllı kentler, bilgi ve iletişim teknolojileri kullanılarak sürdürülebilir kentleşmenin, şehrin sorunlarına çözüm oluşturabilecek teknik sistemlere dayalı olarak geliştirilmesi şeklindedir. Bir akıllı kenti, birden fazla alt sistemi ve bileşeni birbirine bağlayan organik bir yapı olarak değerlendirebiliriz. Bu organik yapı açısından bazı belirgin unsurlar bulunmaktadır. Bu kriterlere göre; "akıllı çevre, akıllı yönetim, akıllı ekonomi, akıllı yaşam, akıllı toplum ve akıllı ulaşım" olarak belirlenen altı bileşen akıllı kentlerin sahip olması gereken temel bileşenler gösterilmiştir. Söz konusu altı bileşenlerden elde edilen veriler ancak bütüncül bir bakış açısıyla değerlendirildiğinde verimliliği ve kentsel yaşam standartlarını yükseltmemizi sağlayacaktır. Bu bakımdan ifade edilen bileşenlerin ne içerdiğinin ortaya konması akıllı kent kavramını anlamak açısından önem arz etmektedir.

Bu çalışmada geniş bir literatür taraması ve gözlem yoluyla; akıllı kentlerin sahip olması gereken temel bileşenler ortaya konarak, bu bileşenlerin işaret etiği önemli hususlar değerlendirilerek açıklamaya çalışılmıştır.

Anahtar Kelimeler: Akıllı Kent, Mobilite, Yönetişim.

1. INTRODUCTION

The concept of smart city has an appearance that constantly increases its importance in terms of local governments. While the most prominent dynamics of urban life are constantly changing, cities have to keep up with this change. For example, the urban population tends to increase worldwide. Increasing urban population creates new needs and necessities. It is extremely important for a dense population to live in harmony with the environment in a partially narrow area with certain boundaries. Especially considering limited resources; For a sustainable city management, the concept of "smart city" comes to the fore. This concept; It offers a new perspective in terms of society, economy, environment, life, transportation and management, which are the basic dynamics of urban life. This approach addresses the key concepts for healthy growth and sustainable urbanization and addresses the improvements that need to be made.

This article tries to shed light on the subject by considering the components that make up the urban dynamics in question.

2. SMART CITY

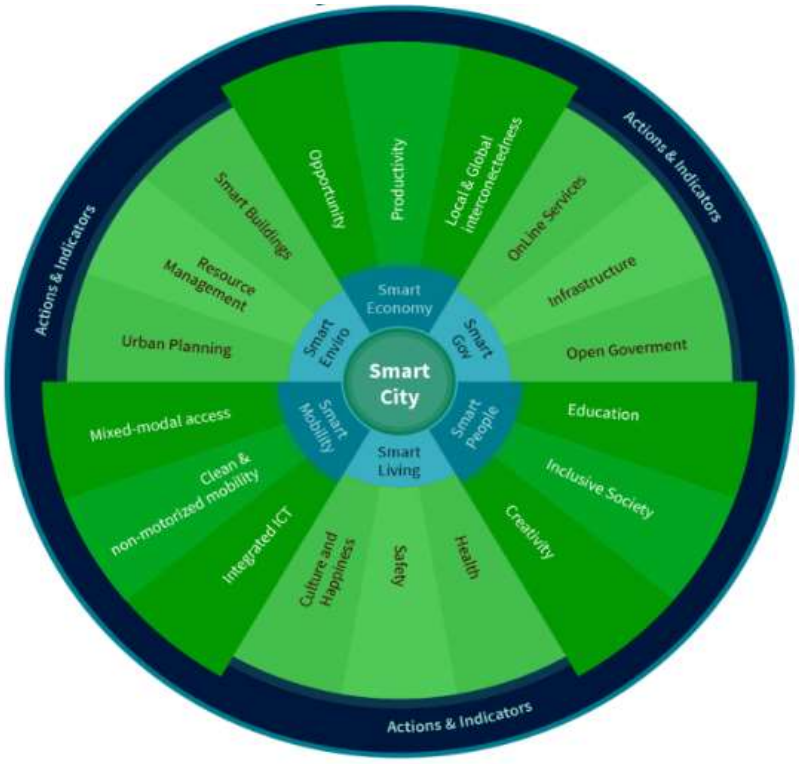
In today's world, urban life is at the center of people's life and place concept in many ways. Cities can change and exhibit differences thanks to their dynamic structures. The social value of urban life is increasing day by day. In line with this increased value, the concept of a smart city also increases its importance. The smart city concept; is generally accepted as the use of new technologies to make existing urban life more comfortable and more livable. The main point where many definitions of the concept of the smart city converge is the urban development vision, which envisages finding solutions to the existing problems of the city with the right infrastructure by using information and communication technologies, sustainable practices that attach importance to nature, solutions that will make social life more comfortable, and is in the

form especially public participation (Abella et al., 2015; Caragliu et al. 2011; Barrionuevo et al. 2012; Hall et al., 2000; Gül and Çobanoğlu, 2017; Lange, 2013; Kutlu, Örselli, & Dinçer, 2018; Singh, 2015; Washburn et al, 2009).

2.1. Smart City Components

To talk about a smart city, we need some components. When we pay attention to the prominent studies on smart city components, the diagrams made by Giffinger and Cohen are the most well-known ones. We can consider a smart city as an organic structure that integrates multiple subsystems and components. For example, Giffinger evaluated smart cities on 6 basic elements. According to this; Smart Life, Smart People, Smart Mobility/Transportation, Smart Environment, Smart Management/Governance and Smart Economy (Giffinger et al., 2015; Chourabi et al., 2012). In the following process, Cohen combined the main components of the smart city determined by Giffinger on a circular wheel and made it more visual. With this model, which Cohen called the Smart City Wheel, 6 main components that make up the smart city and each sub-component associated with these components were divided into groups of 3 and combined into a whole. The sub-components, which were determined as 33 by Giffinger (Giffinger, 2007), were made into three by Cohen and schematized as a sub-gear in the form of 18 sub-components (Cohen, 2012). The point that needs to be emphasized in Cohen's smart cities wheel, which consists of six basic components, is that these components should be evaluated as concepts that complement each other. Because, when the data obtained from these components are evaluated with a holistic point of view, it will be able to increase efficiency and urban living standards while reducing costs. In this context, comprehending what the components mean is important in terms of understanding the smart city.

Figure 1. Cohen's Smart City Wheel



Reference: Cohen, B. (2013); www.researchgate.net/figure/The-Smart-city-wheel-by-Boyd-Cohen.

2.1.1. Intelligent Management/Governance

As in every field, a governance-based model is needed in order for the administration to have a healthy structure in terms of urban as well. Governance is the most promising management element in terms of today's social life, where common minds and common interests come together. Thanks to its democratic and multi-actor structure, the decisions are taken gain a structure that can be accepted more quickly and thus internalized. At the same time, the pluralistic and tolerant structure envisaged by the governance strengthens democratic conventions. As the main actors of governance; government, regional and local governments, citizens, private sector organizations, non-governmental organizations, universities, large international companies and organizations stand out. Today, open and accountable societies, which we often see in socio-economically developed cities, have a much better motivation in terms of creating smart cities. In addition to this, another very important issue is that the citizens contribute to the innovations and initiatives that are planned to be made in line with their own wishes and desires. Participation in the decisions made by the residents of the city creates a civic consciousness and this awareness creates a sense of belonging in people. This strong consciousness and emotion that occurs paves the way for and accelerates urban development (Yılmaz and Telsaç, 2021: 246; Telsaç, 2018:32).

2.1.2. Smart Society

The most basic component of urban life is society. The urban mentality of developed societies is pluralistic and tolerant within a social fabric. Diversity and versatility indicate the wealth of these communities. A democratic structure that respects opposing views and emphasizes ethnic pluralism is seen. At the same time, it is in a developing structure where citizens attach importance to the concepts of continuous learning and lifelong education. Modern urban communities, where learning is continuous in all respects, have sufficient readiness and experience in many subjects. This concept is also a social and human capital approach, and it is also referred to as "smart citizens" or "smart people" in terms of the concept of a smart city. Intelligent person refers to a society composed of people who are tolerance, flexibility, creativity, open-minded and involved in public life in order to reach a sufficient and quality level of human and social capital. A productive and creative society is only possible through continuous education (Belli and Aydin, 2017: 425; Cohen, 2012; Giffinger, 2007: 10-11; Mecek; 2021: 440; Nam and Pardo, 2011:186-187; Uçar et al., 2017; Varol, 2017: 55).

2.1.3. Intelligent Transportation/Mobility

It is possible to say that the first practices of the smart city concept developed on environmental awareness. It would not be wrong to state that the initial foundations of the smart city concept were built on creating a clean environment. Without ignoring the applications that can cause less harm to the environment and include disadvantaged groups, mobility, namely vehicle mobility, by making use of especially the Internet of Things opportunities provided by technology; it is clear that it aims to find solutions to traffic and air pollution problems. Environmentally friendly and solid fuel-free solutions should be focused on, with emphasis on mixed transportation models. Thanks to the necessary sensors and network infrastructure, real-time traffic information is learned by drivers and passengers, providing great convenience and energy savings. According to this; integrated payment systems in public transportation, traffic density measurement, smart intersection, smart stop, smart parking / parking meter systems, smart overpass system, smart barrier-free traffic system, smart barrier systems, traffic guidance systems, smart fleet management system, road sensor, smart bike systems, smart grave information system, smart icing early warning system, wired/wireless networks, smart logistics

services and disabled charging stations should be brought to the fore. At this point, the need for sustainable, innovative and safe transportation systems should be supported by information and communication technologies, and future-oriented steps should be taken (Akdamar, 2017; Chourabi, et al., 2012; Neirotti et al., 2014: 28; Uçar et al., 2017; Varol, 2017: 54).

2.1.4. Smart Economy

Cities are at the center of economic activity. In terms of dynamism, cities constitute the most economical elements of living. The financial opportunities of the city play a leading role in terms of development. From another point of view; in order for urban development to occur, it is very important that the city attracts attention from an economic point of view. Globalizing economic parameters offer development opportunities to cities that can adapt to international markets and be competitive in these platforms. At this point, it is necessary to reveal the spirit of urban innovation and entrepreneurship. Entrepreneurs should be supported and they should be encouraged to take risks. All available means should be mobilized for sustainable urban development that promotes economic growth. In many ways, economic parameters directly affect the capital and infrastructure facilities needed by the city. In a smart city plan, economic values should be acted upon in terms of sustainability, taking into account national and international realities. A grounded city government will transform barriers to productivity and efficiency and provide the environment needed for a flexible labor market. In addition to this, the city's economic image and trademarks should be protected and projects should be created and necessary incentives should be made to move it forward. In order to evaluate opportunities, innovation should be supported continuously and entrepreneurs should be given financial and moral support. Cities that turn into a global common market; should be open to local and global cooperation and coordination (Telsaç and Gözcü, 2021: 170-171).

2.1.5. Smart Environment

When cities are not designed correctly or where planning is done wrong; it harms nature a lot. Living spaces that are not designed correctly or created with insufficient infrastructure harm nature in all respects and reduce the quality of human life. As this cycle is not a single-actor phenomenon, it can lead to irreparable results in possible mistakes. Persistence in the wrong practices, especially, presents a picture that is difficult to return to. While making smart city plans, great attention should be paid to the population that the city has or will have. Today's urban life is an area where people meet their needs both economically and socially, and it is the leading place that needs to be protected in terms of human and nature balance. Cities are also; what citizens need, green areas, parks, excursions, gatherings, socializing, and it's the only place where they can get fresh air. Observing the ecological balance, reducing air pollution, developing renewable energy sources, smart grid and meters, environmentally friendly buildings, smart lighting systems, and smart water systems, clean fuel vehicles, bicycle paths, and basic areas (school, health center, market, park, etc.) must be within walkable distances. Today, large shopping centers and meeting areas outside the city are mostly areas where people use their vehicles for transportation and cause high greenhouse gas emissions. Solid fuel consumption should be minimized and renewable resources should be given importance. In terms of sustainable resource management, it is necessary to design areas that people can reach by walking or cycling as the main argument. For places where this cannot be done, the main purpose should be to direct people to public transport. In terms of public transportation vehicles, it should be treated selectively and rail systems that are more harmful to nature should be used as long as possible (Chourabi et al., 2012; Cohen, 2012; Colldahl et al., 2013: 5; Hall et al., 2000).

2.1.6. Smart Life

Cities are the areas where most of the human population lives. Urban life has a very important place in terms of this large mass. The concept of smart life is based on approaches and practices on how to increase the quality of life of individuals living in the city. At this point, what is tried to be done is to ensure that the residents of the city lead a healthy and comfortable life. Increasing the welfare level of individuals living in the city through information communication and technologies in areas such as education, culture, social life, housing, security, employment and health, increasing their quality of life and developing comfort areas are evaluated within this scope. In order to ensure public safety in terms of urban, disaster and emergency management, fire brigade, health services and the continuity of similar vital city functions; sensors, cameras, voice tracking systems and ICT technologies should be evaluated at an optimal level. Culturally, there should be facilities where citizens of the city can go within walking distance or close to their neighborhood. In addition, education and health opportunities should be accessible in terms of urban mobility. The quality of the houses built should be prioritized in all respects and they should be kept strong and ready for possible disasters. Information technology, sensors and cameras necessary for the safety of the city should be placed in critical places and emergency response teams should be established. In terms of tourism, the image of the city should be taken care of and it should be interesting for others (Cohen, 2012; Giffinger, 2007: 13; Mecek; 2021: 445; Nam and Pardo, 2011: 187; Singh, 2015; Varol, 2017: 55).

CONCLUSION

In our globalizing world, there are very few elements where technological innovations do not create a change in social life. One of the areas where these defeats are felt the most is urban life. In particular, cities that develop socio-economically have already adapted to this change. Cities now offer citizens fast, precise and useful information and applications on many issues, thanks to their advanced information communication networks. However, the picture is slightly different for developing cities. Cities primarily need an action plan that is well thought out and evaluated together with all actors.

In terms of management, as in every other issue, in terms of urban development; in order to realize the smart city idea, it is necessary to ensure more participation of citizens in the administration. When citizens participate in the administration, they develop a sense of ownership towards the decisions taken, and as a natural result of this, they willingly obey and adapt to the rules. Efforts should be made to raise political awareness in order to ensure that citizens adopt the policies implemented in terms of urban development. From a social point of view, the involvement of citizens in the processes of decisions and policies creates an awareness. At this point, the main issue that needs to be emphasized should be the identity of the citizen and the sense of belonging. Because, thanks to this, one of the biggest obstacles to the planned urban development will be removed.

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