

Urban Model Of City Planning Smart Cities

Ghaith Ibrahim Abdel Latif Alshwaheen

Architecture engineer, Mu'ath Bin Jabal Municipality, Ministry of Local Administration, Irbid, Jordan.

DOI: 10.29322/IJSRP.12.09.2022.p12947
<http://dx.doi.org/10.29322/IJSRP.12.09.2022.p12947>

Paper Received Date: 15th August 2022
Paper Acceptance Date: 15th September 2022
Paper Publication Date: 26th September 2022

Abstract- Smart urban technologies have started to become the foundation of new and substantial "intelligent" infrastructures over the past two decades, especially in the affluent regions of the developed world, such as Madrid, New York, Paris, San Francisco, and Singapore. The spread of the smart city idea has also significantly impacted how cities and their surrounding regions are planned and developed. Due to the growing interest in the subject, this special issue focuses on two closely related ideas: smart cities and innovative urban technologies. It also includes scholarly writings that offer some priceless insights into how our cities and societies produce knowledge and the spatial effects of information and communication technologies (ICTs).

Index Terms- Smart; City Planning; Big Data.

I. INTRODUCTION

7 billion people live on the world, and of those, 1.2 billion use personal computers. By the middle of 2013, there were 1.5 billion smartphones in use, with a 30% annual growth rate. These devices create a staggering amount of data. In reality, sensor technology has advanced to the point that it is practically plug-and-play, making it possible for anyone to watch and gather data from moving things. For instance, quick automated travel data now tracks demand and supply, device performance, pricing, fuel and energy usage, and other factors in our realm of the city. The information we have for London's public transportation, where 8 million trips are made daily on buses, heavy train, and tubes, comes from the smart card that 85% of all users use. This results in roughly 45 million trips every week, 180 million per month, around a billion every six months, and so on. The data set will never stop unless technology changes, and even then, a continual stream of data will theoretically continue to be produced.

By 2050, six out of ten people will live in cities, as the global urban population is projected to double (Koutra, Becue, & Ioakimidis, 2018). Smart solutions are needed to address the complexity of urban life when dealing with the issue of future "mega-cities" as complex eco-systems and prolonged urbanization (Eremia, Toma, & Sanduleac, 2017). The phrase "smart city" has received a lot of attention recently from decision-makers, industry executives, and the general public. A smart city is a city that uses information and communication technologies to improve the quality of life of its residents while promoting sustainable

development, yet there is no single definition for what a smart city is (Capdevila & Zarlenga, 2015).

Information and communication technology has become a tool for monitoring and controlling the services, traffic, infrastructure and environment sectors. Recently, trends appeared in parallel talking about sustainability and the related ideas for cities that express the principles of sustainability and images and models to achieve them, such as eco city and sustainable city. Thus, information and communication technology and its applications contribute to bringing about some fundamental changes to the elements and variables of urbanization, including changing functional relationships and spatial requirements for many activities as a result of changing the nature of performance of activities and the possibility of not going to the site of the activity to perform it or not having to deal directly with individuals to perform activities that needed to be done as before. Therefore, it is possible to reduce the area of many land uses that have changed the nature of the performance of their activities.

II. EXPLORATION OF SMART CITIES

The concept of smart cities is still largely being researched. The two ideas that make up the term are smart cities. The term "smart" and its connection to "city" are topics of extensive literary reviews. A city is a living, breathing, autonomous system that interacts with the natural and constructed environments. No one can envision a livable, sustainable, or even smart city in the future. A city is a living, breathing, autonomous system that interacts with the natural and constructed environments. No one can conceive a future city that is livable, sustainable, and even smart without making investments in human and social capital, and no one can dismiss the importance of ICT or the necessity for judicious resource management. The term "smart city" refers to a number of concepts, including "intelligent city" (Komninos, 2011), "digital city" (Jucevičius, Patašienė, & Patašius, 2014), etc. that have commonalities and concentrate on the specific application of technologies to urban settings.

Despite this, the conversation about "smart cities" is mostly focused on ICT issues while gradually taking into account the concepts of "technology," "people," and "institutions" (Nam & Pardo, 2011). In order to increase the competitiveness of future cities, the "smart city" is typically taken into account in the ICT sector's "business" field (Batty, 2013). Reduced energy use,

environmental effect, and carbon footprint, as well as ensuring that sectors are competitive for growth and jobs, are the primary challenges.

III. HISTORICAL BACKGROUND

Hippodamus is credited with creating formal city planning, which led to the creation of Miletus, circa 450 BC. Hippodamus is also credited with organizing Miletus' structures and streets. The Greeks credited the formal designs of orthogonal urban planning (Koutra et al., 2018). The first cohesive concepts about the future of society, economy, and urban settlements began to emerge in the 1850s as city planning developed throughout the following centuries, with E. Howard's vision of the "Garden City" becoming the most well-known to this day (Lahanas). Howard advocates the idealistic concept of the 'garden city' to divide the city into numerous wards as a combination of city and countryside surrounded by greenbelts placed around large cities with a social dimension (Sharifi, 2016).

A turning point in the history of architecture and urban planning in the 20th century, exhibiting G. Fourier's ideas in opposition to the idea of zoning, which divided the city into four basic functions: labor, housing, health, and leisure (Koutra et al., 2018). The term "eco-city" was first coined by the Urban Ecology Group in the middle of the 1970s to emphasize ecological preservation while emphasizing beautiful green surrounds (De Jong, Joss, Schraven, Zhan, & Weijnen, 2015) made up of a synthesis of complex subsystems (Tsolakis & Anthopoulos, 2015). Recent years have seen ideas for the development of "eco-cities" with a clear environmental focus. The term "cyber cities," "digital cities," or "virtual cities" became popular in the 1980s as a result of the idea of instrumenting the city (Angelidou, 2014). Urbanization and information and communication technologies are two key new phenomena that have just emerged (Cocchia, 2014). Virtual city representation, e-government services, and other concepts serve as examples (Suzuki & Finkelstein, 2013). Today, academics debate the efficacy of "smart" city planning as a solution to all urban problems.

IV. SMART CITY PLANNING AND THE DISTRICTS

A city's "smart" planning is a difficult process with competing interests. The issue is twofold: (1) The notion of "smart" is still being explored and developed using a multidisciplinary approach, and (2) Modern cities have been built

with a variety of urban features. Any smart city project's planning process is based on a plan created by the districts. Undoubtedly, there are many diverse, often conflicting proposals for the development of "smart" solutions in urban agglomerations, each with a different focus on a different area of expertise.

The "district" level does indeed seem intriguing in an operational and multi-thematic framework for modeling and exemplifying the realization of a "smart city" within the introduction and application of contemporary technology techniques and practices. The "district," which is part of the city's constructive design (Pérez & Rey, 2013), analyzes patterns of energy use and offers practical "planning" solutions for "sustainable" and strategic urban development.

Without a question, cities are complex systems. The "smart" challenge offers the city system a fresh perspective on how to solve specific challenges with practical solutions. In fact, using "smart rules" in city planning calls for creative planning techniques (Greco & Cresta, 2015). The cornerstone to "smart" city planning is integrating strategic goals and teamwork among the essential components that contrast the issues (Chowdhury et al., 2011). The authors' concept of "smart planning" a district entails "smart planning" in a "optimal" and sustainable planning that respects human capital and invests in the quality of life of its users while also taking into account the effective management of resources, the use of technologies, and sustainability objectives. Recently, (Koutra et al., 2018) classify the wide range of the 'smart planning' of a district into five pillars as shown in figure 1 below which are:

1. Smart location: A district's physical limits and linkages to its surroundings (the city center, neighboring districts, etc.) are important considerations for locating it "intelligently."
2. Smart buildings: architectural patterns, including the use of environmentally friendly materials.
3. Smart energy management: The integration of energy design into spatial planning and urban planning is necessary for energy planning to produce "smart" urban solutions.
4. Smart mobility: Reducing pollution is the "bet" of the "smart district" and, by extension, the "smart city."
5. Smart people: An agglomeration's "smartness" cannot be guaranteed by the incorporation of "smart techniques and systems" on buildings or even by "smart" energy management.

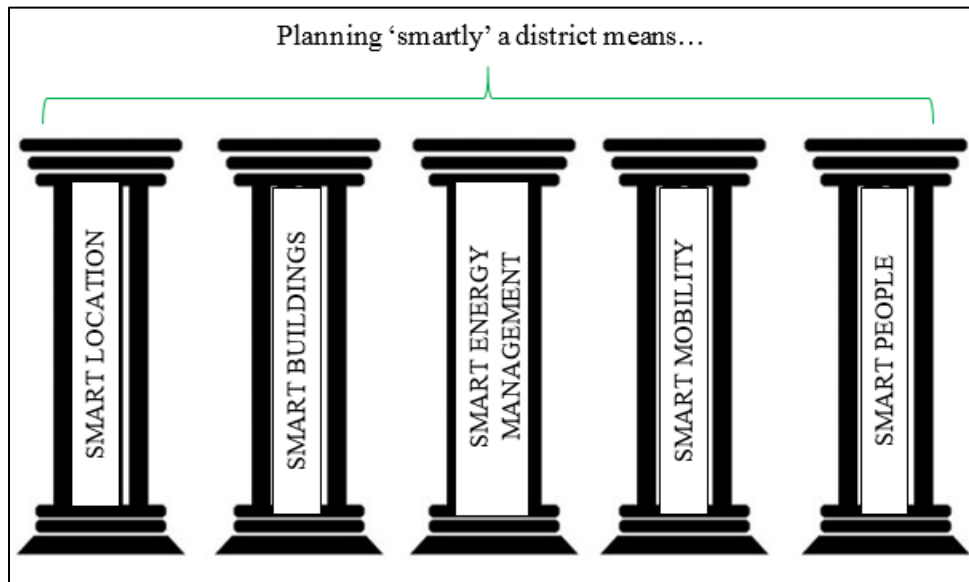


Figure 1: Smart pillars towards a smart district planning

V. DISCUSSION

To illustrate our main question - that is - What are the most predominant challenges and aspirations in a smart city from the municipal decision maker's perspective? We contend that the challenges around collaboration - or the lack thereof - are the most crucial discovery. According to the findings, there is limited trust and understanding for collaborative endeavors, demonstrating poor ties between internal and external stakeholders. That is, cooperation not only among municipal agencies, but also between vendors and municipalities, is essential and appears to be the biggest problem (Pierce & Andersson, 2017). The Jordanian Smart Cities Association launched an initiative to establish three sustainable cities in the north, center and south of the Kingdom. This came during workshops aimed at promoting the establishment of smart cities in the Arab countries and energy storage. The President of the Association, Dr. Muhammad Al-Taani, stressed the need for a practical transition to the use of technology in smart cities that depend on social cohesion, artificial intelligence, electric cars, self-sufficiency, and limiting attacks on agricultural lands and random construction (Agency, 2022b).

Dr. Muhammad Al-Taani said during the Second International Forum for Renewable Energy and Artificial Intelligence that our goal during 2030 is to achieve 30% in energy efficiency, and the same in renewable energy, smart grid and smart measurement. He explained that the Arab Committee for Renewable Energy last year determined the future of the energy map that depends on the smart grid, smart cities, smart energy and smart cars for the year 2030 (Agency, 2022a).

He added that the forum also aims to open sections for innovation, modernization and smart grids in electricity companies in the Arab world. He urged all Arab utilities to establish new departments for innovation and intelligence based on the huge process in these technologies. The forum, which was held in cooperation between the Arab Renewable Energy Authority (AREIC), the Jordan Renewable Energy Association (JREA) and the Jordan Chamber of Commerce (JCC), with the

participation of experts from 11 Arab countries and concludes its work kindly, discussed topics related to smart networks smart cities, smart cars, green energy, energy storage and electrical interconnection for renewable energy, in addition to the role of renewable energy in sustainable development, the future of energy transfer, and the issue of energy management and rationalization of consumption as a major step in conjunction with renewable energy (Agency, 2022a, 2022b).

VI. CONCLUSION

This study illustrates smart city planning and implementation that involve a wide range of factors and players, including local administration, planners, and potential residents. To improve the criteria for sustainable development in cities and create a broad framework for city planners and its stakeholders toward effective methods with regard to specific objectives, urban planning is an intriguing vehicle.

Planning a city in the twenty-first century necessitates comprehensive strategies and attempts by fusing several viewpoints, such as: the energy consumption of buildings, the maximization of its renewable resources, the architectural patterns and design to minimize its needs, etc. To this end, therefore, it will also be important for future studies to explore the ethical concerns of rapid urbanization and it will be with great advantages for Mua'th Bin Jabal Municipality to start put the principles and rules for smart cities. In fact, the municipality can start with implementing renewable energy sources since it is the lowest point in the world and has a very hot climate in summer which starts early in our city.

Five pillars are proposed at the procedure. Possibly, the Jordanian Ministry of Local Administration can adopt the most interesting parameter at this approach which is the role of people/users and their adaptation to 'smart' solutions to deal with cities' problems. This can be performed in several ways such as holding workshops for the employees to inform them of these important items mentioned in this paper (i.e., smart cities).

REFERENCES

1. Agency, J. N. (2022a). إطلاق جمعية المدن الذكية الأردنية. *إطلاق جمعية المدن الذكية الأردنية*.
2. Agency, J. N. (2022b). إطلاق مبادرة لإنشاء مدن مستدامة بوسط المملكة وشمالها وجنوبها. Jordan News Agency.
3. Angelidou, M. (2014). Smart city policies: A spatial approach. *Cities*, 41, S3-S11.
4. Batty, M. (2013). *The new science of cities*: MIT press.
5. Capdevila, I., & Zarlenga, M. I. (2015). Smart city or smart citizens? The Barcelona case. *Journal of Strategy and Management*.
6. Chowdhury, R. R., Larson, K., Grove, M., Polsky, C., Cook, E., Onsted, J., & Ogden, L. (2011). A multi-scalar approach to theorizing socio-ecological dynamics of urban residential landscapes. *Cities & the Environment*, 4 (1): Article 6. 19 p., 4(1), 1-19.
7. Cocchia, A. (2014). Smart and digital city: A systematic literature review. *Smart city*, 13-43.
8. De Jong, M., Joss, S., Schraven, D., Zhan, C., & Weijnen, M. (2015). Sustainable-smart-resilient-low carbon-eco-knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner production*, 109, 25-38.
9. Eremia, M., Toma, L., & Sanduleac, M. (2017). The smart city concept in the 21st century. *Procedia Engineering*, 181, 12-19.
10. Greco, I., & Cresta, A. (2015). A smart planning for smart city: the concept of smart city as an opportunity to re-think the planning models of the contemporary city. Paper presented at the International Conference on Computational Science and Its Applications.
11. Jucevičius, R., Patašienė, I., & Patašius, M. (2014). Digital dimension of smart city: critical analysis. *Procedia-Social and Behavioral Sciences*, 156, 146-150.
12. Komninos, N. (2011). Intelligent cities: Variable geometries of spatial intelligence. *Intelligent Buildings International*, 3(3), 172-188.
13. Koutra, S., Becue, V., & Ioakimidis, C. S. (2018). A multiscale approach for 'smart city' planning. Paper presented at the 2018 IEEE International Smart Cities Conference (ISC2).
14. Lahanas, M. *Town (or Urban) Planning in Ancient Greece*.
15. Nam, T., & Pardo, T. A. (2011). Conceptualizing smart city with dimensions of technology, people, and institutions. Paper presented at the Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times.
16. Pérez, M. G. R., & Rey, E. (2013). A multi-criteria approach to compare urban renewal scenarios for an existing neighborhood. Case study in Lausanne (Switzerland). *Building and Environment*, 65, 58-70.
17. Pierce, P., & Andersson, B. (2017). Challenges with smart cities initiatives—A municipal decision makers' perspective.
18. Sharifi, A. (2016). From Garden City to Eco-urbanism: The quest for sustainable neighborhood development. *Sustainable Cities and Society*, 20, 1-16.
19. Suzuki, L., & Finkelstein, A. (2013). *An introduction to digital cities: Working Paper 01*. University College London, London.
20. Tsolakis, N., & Anthopoulos, L. (2015). Eco-cities: An integrated system dynamics framework and a concise research taxonomy. *Sustainable Cities and Society*, 17, 1-14.

AUTHORS

First Author – Ghaith Ibrahim Abdel Latif Alshwaheen
Architecture engineer, Mu'ath Bin Jabal Municipality, Ministry of Local Administration, Irbid, Jordan., Corresponding Author:
Gaith Ibrahim Abdel Latif Alshwaheen
Email: gaithshawaheen@yahoo.com