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The Concept of Smart City in the Theory and Practice of Urban Development Management

Pramote Unjitsakul [1], Suphattra Yodsurang [2], Vorasit Chareonput [3], Chaowarit Chaowsangrat [4]

[1] *Doctor of Management of the Doctor of Management, College of Innovation Management, Rajamangala University of Technology Rattanakosin.*
[2,3] *Lecturer of the Doctor of Management, College of Innovation Management, Rajamangala University of Technology Rattanakosin.*
[4] *College of Innovation Management, Rajamangala University of Technology Rattanakosin.*
Email: bluessky28@gmail.com

Abstract

When discussing the issue of development of urban areas, it is not uncommon to highlight a new stage of urbanization – stage of smart city creation. Increasingly more cities are nowadays labelled as "intelligent" or "smart", even though there is no clear-cut definition which would specify the criteria that cities ought to meet to be considered as such. The existing sets of criteria are relatively ambiguous, they have different priorities depending on the region etc. It is thus extremely important and useful to determine whether or not cities may be considered as smart cities, to what degree and on what grounds. The article's objectives are: firstly, to identify the degree to which the smart city

Keywords : Smart City, ICT, Local Management, Technology, Intelligent City

I. INTRODUCTION

Concept of urbanization

Urbanization is the most important social process of human beings in any part of the world based on the characteristics of each age group. Urbanity is generally defined as the process of collecting populations at a particular point in a geographical area. It can be said that urbanization refers to the growth of the urban population that encompasses the area and the development of urbanization along with the transformation of urban lifestyles for rural people.

Population densities are proliferating and the patterns of activity are making life more complex, such as organizations, enterprises, institutions, and virtual organizations under various goals and needs. The current concept defines urbanization in a broader and more diverse range of economic, social, and cultural processes that influence growth. Urbanization, urban population, and population density spread everywhere, along with the distribution of enterprises and governance. In addition, there has been a change in the development of anthropology and support of urban lifestyle almost everywhere in the world. Globalization has a wide range of indicators, but one important aspect is the rapid exchange of information between developed and developing cities. Today, each country has a different geographical approach. Countries with higher economic costs have better ways of improving their quality of life, and that is why underdeveloped countries cannot develop into urbanization as intended.

Research has shown that the major factor is the urbanization process resulting from globalization combined with technological advancement. While population growth reflects business and social needs, we change such needs according to social consciousness under the quality of life. Likewise, the economy, culture, and environment change according to people's lifestyle conditions. Technological advances and innovations impact opportunities to meet the needs of urban populations, quality of life, and equity in urban development. We may consider this a process of positive change in terms of both the quantity and quality that occur and meet community needs. Globalization as a key indicator is the exchange of global information by bringing information from developed cities to developing cities. Various models of urban development at both national and continental levels consider by raising the standard of living, but such methods are costly. A city or country with a low level of economic development cannot be leveled on the same level as a city of a developed country.

Over the past 40 years, researchers have found that some factors and processes contribute to the development of urbanization, along with the problems and obstacles that affect urban development. Discovering the concepts and tools used to drive and control the work of executives. At this stage, the period of urbanization can divide into four phases: urbanization passes from quasi-urbanism, the collapse of urbanization and its re-urbanization, which are related to the development of the area and the change of the local population, economic theories underlying the consideration of elements such as local market output, and disseminating and receiving extensive information to serve the public both in the local and non-urban areas.

The promotion of industry not only reflects the process of urbanization but also has a significant effect on fragmentation and infrastructure (Mierzejewska, 2008). The external effect theory describes the creation and driving of urbanization processes and their objectives regarding dimensions, scope, and direction corresponding to the level of economic and social development. Differences in spatial development result in deviations in external effects, while activities focus on confined areas. For example, external factors can influence urban areas. In recent years, urbanization has often focused on the context of the city's competitiveness, such as creating attractive situations to facilitate new investors.

The concept of sustainable development (most relevant to environmental activities) recognizes the need to maintain the natural environment as in perfect condition as possible. We may consider this development or a combination of areas such as environmental, social, economic, and spatial characteristics. This is to stop the neglectful behavior but focus on prevention to mitigate the impact to preventive action that not only solves the problem but also at a higher level of urban development. We should also note zoning, which is viewed in terms of activity intensity. There is a network connection between departments and organizations with a high level of human and social resources (Nowakowska, 2011). We also claim that the metropolitan process differs significantly from the one that took place in the previous urban area and manifests a new way by zoning, funding, knowledge, and power of the metropolitan process. We achieve this through the crystallization of a new spatial structure that has a competitive advantage over other areas internationally. It established different relationships between the central city and the surrounding regions, leading to the formation of large cities and hugely complex settlement systems with various internal and external connections. It refers to the development of urban areas and then leads to the expansion of exports and the generation of model behaviors transferred to other areas using comparative processes. Creativity is a factor in regional development (and a factor in urban development). According to Gunnar Törnqvist, a Swedish city

planner and geographer in the 1980s, in terms of the relationship between the creative environment and territorial development, he focused on four key development factors: resources, large-scale information, and data transfer opportunities within the knowledge area, the acquisition, and accumulation of knowledge over time by organizations and institutions and the ability and type of activity (Stryjakiewicz, Stachowiak, 2010).

The combination of these elements forms a powerful space. The main reason is creativity, which is the ability to create new materials, forms, and values. With the development of the city through the cultural and scientific sectors, as well as a creative capital and economic potential, we can call this city a "creative city". Indications of the development process include:

1. It reflected creative capital by creative professionals in social capital and the effectiveness of management.
2. There are special materials and technological infrastructure and non-material information.
3. Properly developed urban areas can attract people and institutional environments for creative activities (such as technology parks, cultural and entertainment districts, renovated post-industrial facilities used for cultural, scientific, sports, and exhibition purposes)
4. Creative industries serve as the basis of the economy, an important part of the city's economic activities. Richard Florida, who coined the term "creative class," proves that cities with the most creative and dynamic staff contribute to dynamic development. To maintain high development dynamics, such a city must include a high standard of living, attractive entertainment, and freedom of expression for its residents (Florida, 2010). The density of people, production capital, and consumption within cities also relate to economic reasons. Density determines effectiveness because of the benefits of agglomeration. Large cities experience many social conflicts, one of the most probable reasons is the diverse levels of wealth of urban communities.

The development history of every city includes periods of prosperity, stagnation, and decline. Several factors influence the development of cities in different stages, such as the stabilization of the country's political and economic stability, national development policies, globalization, the global economic crisis, the choice of investor location, the personal decision of the residents, activities of local governments, entrepreneurship, and the wealth of residents. Regardless of the demographics of the country and the continent, but focusing on the cities, it found that over the years cultural reformation has affected economic power. In addition, influence, innovative offerings, and recent developments affect the public space and the rules of coexistence in many aspects. They undoubtedly understood that in the future these areas will eventually become cities. Therefore, it is of paramount importance that the city management process (city structure) considers the needs and expectations of the urban community. Agility, entrepreneurship, creativity, and standard of living are of paramount importance for anyone. More important is the focus on the time spent commuting home to work and access to the service sector.

More research is being done on changes in the spatial and economic structure of cities and found additional factors in urban development, such as advanced technologies that save time and energy, as well as human capital. Modern urban society means not only the physical structure but also the network of cyber-connections to optimize resource utilization and processes to prevent negative external effects resulting from sustainable urbanization. Ultimately, this concept focuses on saving resources through creative development.

Over the past decade, there has been an interesting idea: smart growth using spatial

planning methods and transport network planning, which aims to avoid increased costs due to increased urbanization. Technologically advanced cities are trying to find every way to save all resources (including finances), time, or energy. A city called the foundation of civilization not only emphasizes the creation of human works because of cooperation between people but also a place for them to do activities using their ideas and a source of new ideas (SzymaNska, 2007).

In the reason of economic growth, the process of urbanization represents the peculiarities of modern civilization, its curriculum, and nature-related to globalization. For decades, scientists and policymakers have focused on questions related to the origins of urbanization and the level of quality of the system of procurement of goods and services also affects their quality of life (Caragliu, Del Bo, Nijkamp, 2011). The most important factors of urban development are social capital, knowledge, and advanced technologies that contribute to saving time and energy. Academics in many fields have analyzed the context of urban development in various aspects. For example, economists discuss long-term city operating costs by the two entities (public service charges), as well as costs for residents and other users. We can calculate costs in such areas as municipal transportation, public lighting, waste management, public facility maintenance, or public safety insurance. From an economic point of view, the relationship between cost and impact is significant.

Smart City Development Concept

The concept of "smart city" urban development base on considering the best quality of life and satisfaction of long-term cost savings while considering a systematic approach to corresponding solutions. Smart City is a new concept that focuses on managing cities (urban areas) in a modern way by using advanced technologies (including IT systems) that are environmentally friendly. It maintains a resource-saving approach and achieving innovative technological development results. In particular, computer and communication technologies used in human activities significantly improve the functioning of contemporary cities. Smart refers to the ability to solve problems, recognize relationships, learn and adapt to external situations, seize opportunities, prevent threats, act on purpose, think and deal with problems effectively, process information, take action, and think about the consequences. If we consider the concept of "smart city", we found that city management should have the above characteristics. Innovation and technology promote "smart" management in both public and urban organizations, although people (organizations, society, users, policymakers) are the ones who follow the rules of the idea. Originally, the information technology-based smart city model could use in urban planning, as shown in the first published book by Ishida and Isbister (Ishida and Isbister, 2000). In this book, we apply the essence of the information society to create virtual spaces of cities (Komninos, 2015) using the Internet and IT infrastructure. Subsequent papers are the development of urban management methods (Van der Meer and Van Winden, 2003), the ability to attract specialists (Murray, Minevich, Abdoullaev, 2011), or the ability to develop and absorb innovation (Florida, Florida). 2005) As explained above, the current definition of a smart city emphasizes the functions of a city in various aspects and pays special attention to the role of transport and telecommunication infrastructure, ICT, digital media, creative industries, and cultural initiatives. To improve economic, social, and political efficiency (Hollands, 2008) and educated society by using new channels of communication with public administration (Lombardi, Giordano, Farouh, Wael, 2012). Komninos (2002) offers a broad definition that characterizes smart cities as a place of learning, innovation, creativity, university-based research and development institutions, digital

infrastructure, ICT, and high efficiency. Literature discussion of the concept of smart cities reveals that advanced technology plays an important role. This concept has several approaches to urban development based on competitiveness, sustainable development, and smart solutions. Over the past two decades, computer systems have been used to their fullest potential. National and local politicians in various regions of the world are trying to plan rules to promote the use of ICT to stimulate the development of urban areas. However, they do not yet have a criterion for distinguishing intelligence between knowledge-limited and cognitive-rich cities (Tranos, Gertner, 2012). The availability and quality of new technologies are therefore not the only indicators of "intelligence and knowledge". Some researchers have incorporated the relationship between the infrastructure of ICT systems and their economic effectiveness (Roller, Waverman, 2001). Other researchers point out that we can solve the problem of excessive inclusion through a method of collaborating between people interested in human capital and creativity, known as an "intelligent society." Therefore, smart cities should focus on new solutions that enable the development of modern cities through both qualitative and quantitative improvements in efficiency (Caragliu, Del Bo, Nijcamp, 2011).

The concept of smart cities combines the concept of urban development. The European country's approach to smart cities is based on actions to reduce carbon emissions and to use energy efficiency in all areas while improving the quality of life of residents. According to the European vision, smart cities are based on partnerships created to catalyze advances in production and energy consumption, as well as transport mobility and highly connected advanced technologies and deliver a better quality of service while reducing energy and resource consumption and reducing greenhouse gas emissions as much as possible. We can assume that modern smart city technology has played an important role in the sustainable development of European cities. European cities are the starting point for a shift in low-emissions use. Over the past three decades, the United States developed its concepts related to the use of innovation and advanced technology in various areas of the city. The concept of knowledge-based cities will focus on education, intellectual capital development, lifelong learning, creativity, and maintaining a high level of innovation. The existing ICT system in the city is a key factor in digital city development. Renewable energy sources and a focus on environmental protection activities are the driving forces supporting the development of eco-city (Stawasz, Sikora-Fernandez, Turała, 2012). It reflected problems in defining the components of a smart city in the challenge of finding terminology. Although there is no consensus on the definition of a smart city, scientists agree on the coverage of the idea.

Generally, the components of a smart city are:

1. Smart Economy - Cities should be highly productive by combining knowledge-based manufacturing methods within an innovative climate and flexible labor market. An economy should characterize by taking advantage of innovative solutions and flexible adaptation to changing circumstances. In this sense, it also related the term to the "based-knowledge" ICT industry, as well as to the establishment of business and technology fields.
2. Smart Transportation - As the ICT sector turns cities into a network of massive connections between all resources in terms of traditional transport and digital communications, advanced technology should take advantage of existing infrastructure.
3. Smart environment - Smart cities improve the efficiency of energy use from renewable energy sources and other

methods by striving to minimize emissions and establishing waste management policies based on sustainable development principles. Environmental activities also require a high level of environmental education.

4. Smart Citizen - To create a learning-based society, all transformations in cities should begin with residents. Once they have the technical support, they can prevent excessive energy consumption and emissions and increase trying to improve their quality of life.
5. Smart Living - Having a friendly environment should be consistent with access to public services, technical and social infrastructure, a high level of safety, cultural and entertainment offerings, as well as environmental stewardship and greenery in the area.
6. Smart supervision - This development required the creation of an appropriate governance system, the development of procedures requiring the cooperation of local authorities and other users, and the use of new technologies in city administration. It also includes intelligent public administration, which can create knowledge and apply it in practice.

Figure 1: *Factors affecting the creation of a smart city*

The five components of a smart city have different metrics, but we consider them essential components of a smart city. Understanding the direction of smart cities around the world is just as important as the government's driving smart city development. At present, we can see that many countries around the world have recognized the importance of smart city development and continuous development. However, governance or requirements are also important. Governance or regulation should not hinder the development of smart cities, but it should be consistent with government policy-based smart city pushing efforts. Smart cities can make possible through solidarity (The World Economic Forum 2017). In considering the "smart city" indicators, we can list the relevant departments besides economic, environmental, quality of life, governance, people mobility. The factors that correlate with urban development are:

Building, municipal performance, facility, public service principles, landscape/ecology, waste management, water management, energy management, ICT system management, and agile communication management. In an actual situation, we can observe the results between these factors. The relationship represents the interplay between the city system, the "smart city" concept, and the approach of public activity management. Public management stems from the well-known and commonly used organizational and management theories, but it differs significantly from the management between private and public companies. Most of the differences are because of these two sectors. The first and most important difference is that government organizations are organizations that serve the people (Markowski, 1999). They have various responsibilities, such as providing public goods and services. There are other interesting differences, such as the size of the activities, the number of employees, or the close relationship with the political system, which often influences

the goals, nature, and methods of an organization. The basis of public management stems from criticism of Max Webber's ideal form of bureaucracy. Although this emphasizes in the literature review, later forms of public administration still had to maintain certain rules (Hausner, 2008). We base the concept of New Public Management on implementing professional management in the public sector through standards and regulations, control of outcomes, financial discipline, resource savings, and competitiveness. Secondly, participatory management is the participation of all stakeholders in governance processes, transparency of procedures and decisions, as well as accountability and commitment to sustainable development (Hausner, 2008). We can interpret public sector management in two ways: as the management of public affairs and as management in the public sector. There are differences only in management approaches (subjective of managing public affairs and objectives of management in the public sector). In both cases, management is carried out by a national or territorial public authority (local government) which performs the administrative tasks assigned.

Government statutes and municipal ordinances or district administrative requirements govern the state and function of the city. This is the setting of goals and rules of civil servants under the local administrative organization that leads to the projects in public action. Urban management is an area of public management that influences many people so that they perform specific tasks and use municipal resources to achieve specific goals (Markowski, 1999).

If we assume that public management is a search for potential organizations for working on public projects, we could conclude that smart city-based management is a requirement for government agencies where decisions about the direction of urban development and the rules to be followed in the decision-making process involving the selection of tools to achieve the goals. This means that we must develop a set of rules to define how to control and operate the city development and bring it into the relationship with all stakeholders. Finally, methods and scope for using local government resources to improve the quality of life are also important. We should consider that effective urban management considers all aspects of development, so the strategic management documents used as tools for the decision-making process of local governments must be consistent. When we decide about cities, local officials must consider possible segmentation for all areas - social, economic, spatial, and environmental. We deem such behavior consistent with the Sustainable Development Law, which affects environmental, economic, social, and spatial standards for everyone in the city and future generations. Therefore, this concept assumes the needs of the current generation and responds to them without compromising the opportunities of the next generation, meaning resource-saving decisions and the reduction of unnecessary material and material costs. In recent years we have witnessed a contextual shift in public administration, mainly on the production and service processes, as well as the search for creativity and innovation in public sourcing. In addition, the development of information society, knowledge economy, and digital technology is forcing governments to change the way they provide services and smart solutions. In public service, we have discussed it among researchers and politicians since the 1990s on digitization in public administration (Anttiroiko, Valkama, Bailey, 2014). The concept of smart communities was first placed, followed by smart cities and knowledge (Komninos, 2002). Changing the way government services require coding and formalization using advanced technology, while digitization reduces the cost of the process. There are also more local services around the world. If we think that introducing new advanced technologies in urban management and city affairs aims to improve the living conditions of residents and reduce the overall cost of the city, government officials may

face challenges in choosing specific technologies. This can create problems because they lack technical skills and may affect their management and their clients. In addition, some solutions did not work as expected.

Smart city management is not traditional management, but we must consider the policy direction of the municipality. Although city authorities use the idea to create policies in various sectors, we should not forget that the marketing slogan "Operation must be practical".

Thailand has set the policy of developing smart cities as a national agenda. The Government expects that this policy will be an important mechanism to reduce inequality and distribute civilization equitably in all regions of the country as stipulated in the 20-Year National Strategic Plan, the 12th National Economic and Social Development Plan, the Economic Development Model "Thailand4.0" and the Digital Development Plan for the Economy and Society.

In the past, Thailand still has inequality in urban development. In the dimension of smart city development, we should have the policy to encourage cities to focus on developing their cities into smart cities. Smart cities can better meet and reach people's needs. Governments should have measures to promote and support smart cities through policy-making mechanisms and pilot plans including creating an ecosystem for the development of digital infrastructure and the application of smart cities in both old and new areas such as tax incentives from the BOI and testing new software in a limited area and without affecting system functionality, budget or capital. Smart cities promoted by the Board of Investment (BOI) include 1. Development of smart city systems, 2. Development of smart city areas, and 3. Development of smart industrial estates or zones. The expected benefits are 1. 8-year tax exemption (with a limited amount) when all 7 areas of service are provided. 2. 5-year tax exemption when fewer services are available 3. 3. Adding a 5-year deduction (50% tax deduction) if the business is in the Eastern Economic Corridor Development Plan.

For the development of smart cities in Thailand, there are pilot projects for implementation in prototype areas such as areas in Phuket, Chiang Mai, Khon Kaen, and areas related to rail transport, energy, and the environment, as well as special economic zones. For Khon Kaen Province, it is a model area where the local private sector has gathered together with Khon Kaen City Development Company Limited. They started the development of privately funded smart cities in 2013 intending to become a Smart Mobility City, which focuses on the development of public transport infrastructure. There is already a project that provides services to the public, namely Khon Kaen City Bus, which connects the system with an application on a mobile phone (Smartphone) so that users can check the car's location. There are also many projects under development, such as Smart Parking and large projects like Light Rail Transport. The government sector under the Digital Economy Promotion Agency has laid out the next guidelines for developing Khon Kaen's smart living as Smart Health Care & Medical Hub, such as the use of wristbands connected to the Internet to track information on patients or the elderly. With the cooperation between the public and private sectors, we can see the development of Khon Kaen. The major development goal is Khon Kaen City Area or Khon Kaen Municipality (Pakwan Maison, 2017; Waratchanan Phetchrongrong, 2018)

II. CONCLUSION

The development of advanced technology using computer systems allows us to achieve unlimited fast data transfer, database availability, efficient infrastructure, and easy programming. The expected benefit is that it affects residents in terms of increased quality of services while improving the economy in terms of financial resources and time and energy in managing the city. However, regarding cities in Thailand, technological backwardness remains a major

obstacle to decision-making and rational use of resources and ITC services that suit the needs of the people. Businesses need to improve both the efficiency and effectiveness of public administration through the use of modern ITC technologies. Local authorities need to find solutions to enable them to use state-of-the-art technologies in urban management processes, especially in energy, transportation, housing, public safety, and electronic administration. As for the advice and development of ICT-based services, local and regional authorities seem to be aware of the fact that ICT technologies are increasingly being used in the daily routine of urban development.

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