Article

Developing a Smart City by Developing Innovation District

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Introduction

Smart Cities are emerging as a subject of discussion within many government and private organizations, as a concept to apply digital technology and information technology to effectively administer a city to ensure good quality of life, safety, and an ever-developing learning society. However, there are many approaches to developing a smart city, each of which presents certain risks and uncertainties. Therefore, it is important that selected smart technologies need to be tested and adapted to the specific context of the city. That is to say, there needs to be a test launch in a pilot area so that the smart city meets or resolves the problems of the area in a concrete and sustainable way. In other words, the investment to develop a smart city does not require all the budgets to be used for smart technology or installation of detection systems and video surveillance cameras at every street corner. Instead, it might start from just a small area in the city as the initial phase.

The concept of developing an innovation district to develop a smart city

One way to turn a typical city into a smart one is to create an *"innovation district"*. The philosophy of this concept is to establish an area for developing innovation or use it at a concentrated level. In the innovation district, innovators will help create innovations that meet the demands of local residents, add value, allocate resources, and promote participation of local people in order to lead to change that benefits residents and the nation. An innovation district could be compared to a special economic zone located within an urban area. Its goal is to promote business, cluster groups and startups with potential in the area in order to develop an innovation ecosystem. To achieve this goal, three types of assets need to be developed, including physical, economic and networking assets (Katz and Wagner, 2014). The innovation district allows the city to test its smart technology in different ways in order to identify the one that suits the context of the city. And once the suitable smart technology is selected, it will be extended in number and area to cover a larger urban area. As of the end of 2016, more than 80 percent of cities worldwide have started developing their own innovation districts (Horn, 2017).

The city of Las Vegas in Nevada, USA, is a good example of a city that has developed an innovation district in order to create a smart city. Apart from its large population of over 600,000 people, Las Vegas attracts millions of tourists each year, creating a major burden in terms of traffic, waste and other forms of pollution. These problems affect quality of life of residents and reduce its attraction as a tourist destination. The city administration is well aware of smart technology as a tool to help identify and manage a range of urban problems, but has limited knowledge when and how to commence using the technology. Local government and the private sector therefore started an innovation district near Las Vegas Strip, a business district and tourism landmark of the city. A system was installed and tested that integrates detection tools. By testing the system and studying the context of the area, the needs and behaviour of business, tourists, and local people, the city administration can now identify the technology needed to make Las Vegas a smart city.

The city of Denver in Colorado, USA, is another example city that develop innovation district to develop a smart city (Figure 1). The local government and Panasonic turned a deserted area in a Denver suburb near Peña Station and Denver International Airport into the *"Next Innovation District"*. The area is considered as a *"living city lab"* to develop the technologies and innovations needed to address current and future problems. The innovation district comprises a network of solar energy, high Wi-Fi coverage, air quality monitoring system, and autonomous vehicles to transport people from the district to the railway station (Chuang, 2016).

Figure 1 The Peña Station Next innovation district in Denver, Colorado, USA
Source: Chuang (2016)

Figure 2 22@ Innovation District in Barcelona, Spain
Source: Eurecat (2006)

Both Las Vegas and Denver opted to develop an innovation district before allocating their full budget allocations to cover their whole city. There are three advantages for developing an innovation district as the initial phase of developing a smart city. First, it enables the administration to become fully familiar with the plan and prepare to take action. Second, the cost for proving the concept is low. Finally, the city grows, as do new ideas.

By testing the technology in an innovation district, the information and details of the technology can be gathered within a short time. For instance, Las Vegas tested its data on waste management in the innovation district to develop Las Vegas Strip. This enabled the city to install a trash monitoring system to ensure that trash boxes are not overloaded, resulting in a clean and attractive city for both locals and visitors. In the meantime, Las Vegas is also developing other systems to support the increasing number and coverage of smart technology into other areas in the city.

Since technologies piloted in the innovation district are real-world tests, it is important to control the quality of the test before introducing new technologies at scale. Successful system development requires that the technology is practical and its coverage sufficient for the target area. Therefore,

testing the technology in a small innovation district simplifies quality control and serves to confirm that such technology works in the real world and delivers the expected results. It could be said that the innovation district gives the administration correct information in verifying the concept of developing a smart city, without spending too much. The findings also agree with the survey conducted by the Center for Digital Government that local governments in the United States spent over USD 50 billion in 2016 to develop information technology systems, and they are likely to spend even more in future (Center for Digital Government, 2016). As such, the development of an innovation district can help change this unnecessary expense.

In addition, an innovation district helps promote businesses and commerce. It makes the city grow and become better known. As a technology lab, an innovation district attracts more investors and innovators, and creates high-skill workers and employment for the locality. An example of remarkably successful innovation district is the 22@ in Barcelona, Spain (Figure 2). Within 10 years after establishing the 22@, the population in the innovation district has increased by 23 percent (Ajuntament de Barcelona, 2010).

Development of an innovation district in Thailand

The development of an innovation district in Thailand was initiated by the National Innovation Agency (Public Organization) in 2015. Yothi was the first district to be developed as an innovation district. Currently, NIA has expanded the concept to 10 other areas in Bangkok and surrounding regions. Higher education institutes are leading this development. The six innovation districts in Bangkok are 1) Yothi Innovation District, 2) Pathumwan Innovation District, 3) Khlong San Innovation District, 4) Rattanakosin Innovation District, 5) Kluai Nam Thai
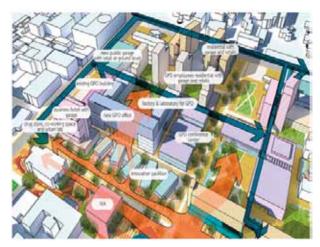
Figure 3 Vision for developing Yothi Innovation District
Source: Chulalongkorn University (2018a)

Figure 4 Vision for developing Yothi Innovation District
Source: Chulalongkorn University (2018a)

Innovation District, and 6) Lat Krabang Innovation District, while four others have been established in the Eastern Region: 1) Bang Saen Innovation District, 2) Si Racha Innovation District, 3) Pattaya Innovation District, and 4) U Taphao – Ban Chang Innovation District. In addition, Punnawithi is an innovation district driven by private sectors as a pilot area for developing innovation districts. In the future, the One Bangkok project situated on Rama IV Road and Wireless Road will be a high-potential project that could also become designated an innovation district.

As for the development of Yothi Innovation District, the vision, concept, and goal for development that leads to the initial development are established (Figure 3 and Figure 4), including:

1) Development of pavement and sky-walk, improved access from Victory Monument BTS Station to Rachawithi Road toward Ramathibodi Hospital via sky-walk, a pavement on Yothi Road from Phayathai Road to Rama VI Road and connecting the traffic network to Ramathibodi Hospital. The development of sky-walk project is a joint project among the relevant agencies within the district, with Phramongkutklao Hospital as the project leader.

2) Development of public areas in government agencies, and medical and educational institutes, development of Yothi Road in front of the Ministry of Science and Technology as an empty space as an activity area for local people, and encouraging innovation knowledge sharing.

3) Development of parking spaces in Yothi Innovation District, common area management by developing a smart parking system with facilitating technology.

Apart from Yothi Innovation District, Pathumwan is another centre of business, transport, and education. Pathumwan Innovation District has the highest potential to develop innovation in Thailand. With high dynamism, the district has seen many changes, both socially and economically. Pathumwan started as a modern trade district in the first generation and became a center for commerce and culture for modern people in the second generation. The district has become a commercial and transportation landmark in the third generation. Pathumwan foresees unprecedented fast-paced change due to globalization and rapid technology advancement. Therefore, the idea to develop Pathumwan as *"Pathumwan Innovation District"* was planned to support potential changes in physical, economic, and social contexts in the future and become the centre that links other innovation districts in Bangkok.

Chulalongkorn University is one of the main organizations that have embraced the innovation district concept to develop a smart city by

developing Siam Innovation District. In this initiative, the university employs five innovation concepts, including 1) lifestyle, 2) sustainable development, 3) inclusive community and smart city, 4) digital economy and robotics, and 5) innovative education (Prachachat Business, 2018). Also, the development of CU Smart City is based on the idea to turn Sam Yan into a model smart city. With this vision to transform such area into an innovation district that creates value for the community and society and enhances quality of life and business, aiming to best benefit sustainable life (Chula Property, Chulalongkorn University, 2018).

Figure 5 Vision for Developing Pathumwan Innovation District
Source: Chulalongkorn University (2018b)

Conclusion

Development of a smart city may not be a mere fashion fad or theoretical discourse. It offers an important means to improve the quality of life for city people sustainably. As seen from cities in the world, including in Thailand, people are trying to collect and analyze data within the city in order to use it to improve the quality of life. Smart city is not too difficult to achieve. It could start from one district at a time.

Acknowledgement

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