



# Smart City Governance Model: International Experience & Recommendations for Ho Chi Minh City

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## Abstract

Ho Chi Minh City is a leading large-scale socio-economic center. In addition to economic, cultural and scientific achievements, the city is also a densely populated city facing many problems: environmental pollution, traffic, infrastructure overload, healthcare, education,...In order to solve these problems, to be able to develop sustainably, to continue playing the leading role of the whole country, the City needs to have a strategy to develop into a creative city, Using information technology to follow the model of a smart city. This article aims to summarize the world's views on smart city, smart city governance, from there, discussing and recommending development models for Ho Chi Minh City.

**Keywords:** Smart City, Smart Technology, Smart People, Smart Collaboration, Smart City Governance, Smart Governance.

## 1. Introduction

Ho Chi Minh City (HCMC) is a trade-service centre, an economic locomotive of the country, a bridge for international integration, attracting foreign investment, promoting markets development: commodity market, labor market, science - technology market, financial market. Although HCM has gained economic, social, scientific, and educational achievements, this populated urban has been facing many issues: pollution, traffic congestion, overloaded infrastructures, healthcare, education. To solve those issues and meanwhile be able to develop sustainably, maintain the leading role of the country, HCMC needs to have a development strategy to become smart city applying information & communication technology innovations (ICT) and other mechanisms to enhance life quality, improve operational efficiency and services, ensure the demands of economic, society and environment of current and future generations are met. In other words, it is a must to build HCMC to become Smart City. On 23/11/2017, the People's Committee of Ho Chi Minh City issued Decision No. 6179 / QD-UBND approving the Project "Building Ho Chi Minh City to become a Smart City in the period of 2017 - 2020, with a vision. to 2025".

Smart city is the concept that has appeared less than 2 decades recently in the world, until now, there are still many controversies and no consensus. Arising from the unique reality of each country, many published studies of researchers gave out different point of views related to Smart City. This journal aims to summarize those views about Smart City, Smart City governance, from there,

discussing about developing Smart City models of Ho Chi Minh City.

## 2. Literature review

### 2.1. Smart City

According to the research analysing the definitions of Smart Cities, Albert & Manuel (2016) has come out with three typical definitions: Smart City is the city using Smart Technologies – Technology orientation, Smart city is the city having Smart People – Manpower orientation and Smart City is the city having Smart Collaboration – Governance orientation. Besides, there is the definition of Smart City appeared in the speech in which was included two, three or more orientation as mentioned above.

#### 2.1.1. Technology Orientation

Regarding Technology Orientation, authors in the world emphasized the possibility that new technology will will strengthen urban system of the smart city (Walravens, 2012). Washburn (2010) defined a smart city is "using smart computing technology enables critical city infrastructure components and services (including city governance, education, health care, public security, real estate, traffics and utilities) to be smarter, more connections and effectives". Aurigi (2005) argued that although there are many different point of views about smart city, the concept about Information Technology which is the operational centre of the future city is the core

#### 2.1.2. Manpower orientation

This orientation assumes that Human capital and/or human resources are the main feature of a smart city. Smart cities have been considered as urban area with high rate of population having Undergraduated degree (Shapiro, 2006). These smart cities are normally small urban area and having national leading universities (Winters, 2011). Smart city concept in this chain is mainly built on the characteristics of Smart citizens, their educational level (smart people) and this education level is considered as the main momentum of urban growth (Lombardi, 2012; Shapiro, 2006). Regarding high educational population level, while Shapiro (2006) pointed out population which has high level of education will move to cities having high life quality to live, Winter (2011) argued that students in leading universities will stay in the cities after graduated. Although emphasizing the concentrate on manpower, which means smart people are the core of smart city's operation, but those who planned this orientation have never ignored technology.

### 2.1.3. Governance orientation

This orientation taking focus on governance to highlight the interaction among different parties in city and that is the key to identify a smart city. Smart cities will be viewed from users' perspective, concentrated more on the connections between citizens and other relevant parties (Calderoni, 2012). This point of view emphasized the vital of connecting knowledge centre and behaviours of other stakeholders in the city to create the "hub" of renovation (Kourtit, 2012). The collaborative idea focuses more on developing integrated network producing other components of the urban (Kourtit, 2012; Yigitcanlar, 2008).

### 2.1.4. Combination

Some scholars have given statements about smart cities based on a combination of all three factors: Smart Technologies, Smart People and Smart Collaboration. Hollands (2008) emphasized that not only do smart cities require high information technology also human factors. Giffinger (2007) presented the comprehensive discussion about factors of smart city (smart citizens, smart governance) and orientation (smart economy, smart mobilization, smart environment, and smart living). A noticed definition developed by Caragliu (2011) is "we believe a city will become smart when investing in human – society and traditional infrastructure (traffic) and modern in infrastructure (communication – information technology) in order to boost sustainable economic development and high quality of life, along with controlling natural resources through governance having citizens' involvement.

## 2.2. Smart City Governance

### 2.2.1. Point of view 1: Governance of a smart city

According to this point of view, smart city government is simply the governance of a city: it means making the right policy choices and doing these effectively. Batty (2012) emphasized that smart governance is just an attribute related to the government management of a city. Alkandari (2012) pointed out that the government has to approve the development of smart cities and it may prioritize some projects or regions. Winters (2011) argued that urban government only has to promote higher education institutions to develop smart city. Finally, Nam (2012) emphasized that smart governance is the promotion of smart city initiatives. With this definition, there is no need to transform the structure or processes of the government.

### 2.2.2. Point of view 2: Smart decision-making

This concept emphasizes the need for intelligent decision-making and implementing these decisions. This does not have to restructure the organization of the local government but emphasize on the need to restructure decision-making. Walravens (2012) also pointed out making decisions would become smart by using network technologies. Schuurman (2012) defined smart governance is the process of collecting data and information related to management by sensor or sensor networks. New technologies are used to reinforce government legitimacy by using available, more complete, and accessible information for these governance decision-making processes and implement these decisions.

### 2.2.3. Point of view 3: Smart governance

Gil-Garcia (2012) thought that smart governance is a new form of electronic governance using sophisticated information technologies to connect and integrate information, processes, institutions, and physical infrastructure to serve residents and communities better. This type of smart governance is at a higher level of transformation because it requires internal restructuring of the government's organization. Batty (2012) stressed that "smart governance is a much more powerful intelligent function that coordinates the various components of smart cities. This is a structure combining the traditional functions of government and business". According to this content, smart governance means creating a smart government.

### 2.2.4. Point of view 4: Smart city collaboration

Batagan (2011) pointed out that smart governance means cooperation between departments and communities, helping to boost the economic growth and at the top important level that drives activities and services towards the center which is the citizen. Similarly, Tapscott và Agnew (1999) emphasized smart governance is widely applying governance model based on community rather than better connectivity facilitated by new technologies. Kourtit (2012) argued 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". With this intelligent governance concept, to achieve the requirement of a smart city, it is necessary to transform the internal components of the government but also of the external organizations.

## 3. Research's results and discussion

### 3.1. Ho Chi Minh City and building smart city scheme

#### 3.1.1. Overview of Ho Chi Minh city

Ho Chi Minh City (HCMC) is a trade-service centre, an economic locomotive of the country. Ho Chi Minh is also a bridge for international integration, attracting foreign investment, promoting markets development: commodity market, labor market, science - technology market, financial market. In 2018, the economy of Ho Chi Minh continued to growth well, maintain the leading economic locomotive of the country: Gross Regional Domestic Product of the city (GRDP) achieved more than 1,33 quadrillion compared to the whole country economy scale (5.51 quadrillion), which accounted for 24.16%. Total social investment in 2018 reached 465.900 billion which is accounted for 35% GRDP (in 2017 was 34.5%, exceeding the average target of the year 2016-2020 which was 30% GRDP). Foreign investment reached 7.39 billion USD (highest in the country, 6.6 billion USD in 2017, 3.78 billion USD in 2016), which accounted for 22% of total foreign investment in

the country in 2018. Ho Chi Minh City is the largest budget collector in the country, estimated at 378.543 billion VND (in 2019). While the labours in the city just accounts for about 8.3% of the country's labor force, city budget revenues accounted for more than 28% of the total national budget revenue (average of the period 2008 - 2017 was 27.8%).

**Table 1 - HCMC Social and educational situation, 2017**

| Indicator  | Vietnam    | HCMC      |        |
|--|------------|-----------|--------|
|  |            | Number    | %      |
| Population (people)  | 93.682.400 | 8.640.000 | 9,22%  |
| Labour from the age of 15 (Thousand people)                      | 53.703.400 | 4.415.000 | 8,22%  |
| Number of kindergarten pupils 2017-2018 (people)                 | 4.599.841  | 329.065   | 7,15%  |
| Number of high school pupils 2017-2018 (people)                  | 15.882.000 | 1.225.040 | 7,71%  |
| Number of University Students (people)                           | 1.695.922  | 462.552   | 27,26% |
| Number of vocational, intermediate and college students (people) | 2.204.400  | 503.846   | 22,82% |

Source: General Statistics Office

Ho Chi Minh City is a training and science - technology center conducting technology transforming, carrying out training activities, contributing to the supply of high skilled resources for the Southern region and the country. In the city, there are 54 universities, 52 colleges, 64 intermediate colleges, 82 vocational education centers and 346 vocational education institutions. In addition, the city's education system also has 2,283 kindergartens, primary schools, secondary schools, education centers with 2 million pupils, students, over 100 thousand teachers, lecturers, experts, leading scientists in the field of education - training.

### 3.1.2. Building Ho Chi Minh to become smart city scheme

On November 26, 2017, the People's Committee of Ho Chi Minh City announced the project "Building Ho Chi Minh City into a smart city in the 2017-2020 period, with a vision to 2025". Project outlined a vision of building a smart city, in 2025 "HCMC will develop a relatively high and sustainable economy, on the basis of best exploitation of resources, and the citizen is the center of the city". The overall goals of building smart city in the period of 2017-2020 are: Ensuring economic growth, moving towards knowledge economy, digital economy; effective city governance on the basis of forecasting; improving the quality of living and working environment; involving people's participation in management.

The scheme proposed implementation solutions including: Building a shared data center and developing an opened data ecosystem of the City; Building a Research Center to simulate forecasting and building socio-economic development strategy of the City; Building smart city controlling center; Establishing City Information Security Center; The Information and Communication Technology (ICT) for smart city. Scheme implementation schedule:

- Phase 1 (2017-2020) deploy to build a technology platform for smart cities, focusing on cloud infrastructure, backup data center, opened data platform, big data analysis platform, shared database, smart controlling center (IOC) with citizenship service platforms and information security monitoring center (SOC - can be integrated into the IOC); implement some smart solutions to meet urgent needs of the City under breakthrough programs to bring practical benefits to the people soon, including: digital government, traffic, and school, flood prevention, security, health care and people's health,...
- Phase 2 (2021- 2025) focusing on synchronously implementing smart solutions in specialized fields,

Ho Chi Minh City is a high populated city with both permanent and temporary workers (2017: 8,640,000 people, more than 4 million workers from the aged 15. Besides, with average monthly income per person is twice as much as the national average.

helping to solve critical problems of the city in many fields; Specialized smart solutions that have started in phase 1 need to continue to be extended along with updating data, ...

- Phase 3 (after 2025) continuing to set targets and tasks for the period after 2025 to warding a longer-term vision; Technology platform will continue to be strengthened to improve processing capacity, storage, safety and security; Smart solutions are upgraded smarter and extended to other areas of life.

### 3.1.3. Implement scheme result in the period of 2017-2019

After 18 months of implementing the project, the city has determined to focus on building 4 centers that are considered as vital including shared database and developing an opened data ecosystem; Smart city controlling center; Center for socio-economic simulation and forecasting; Information Security Center.

- Shared database center has been operated in Quang Trung Software Park on the basis of integrating existing data of departments and branches. Some important databases have been integrated into the shared database center such as electronic one-stop databases; complaints; hotline; business registration; Foreign investment; taxpayers; foreign workers; land database... Data has been applied to serve the administration tasks, initially extracting and exploiting the shared database center serving the city administration. Besides, the city has piloted the Open Data Portal at <https://data.hochiminhcity.gov.vn/>, in the short term, trial to provide information about medical treatment agencies and medical practice certificates. Recently, the city has also deployed a shared digital map service (called Gis service) to provide shared digital map services to promote the application of Gis to management software's, create attribute data with Gis map connection. Providing consistent geocode service as a basis for standardizing geographic information fields for city database layers; This is a reference of an important spatial property to integrate and overlay data layers when integrating into shared database center; creating an environment for sharing data layers on a consistent background.
- Regarding the Smart City Controlling Center, in phase 1, the city has piloted connection and data integration of surveillance camera systems of the Department of Transportation and the People's Committees of districts:

District 1, District 12, Phu Nhuan District, Go Vap District. The total number of cameras integrated into the controlling center is more than 1,000, in which 50 cameras at the same time are able to do advanced data analysis, including facial recognition, vehicle type recognition, crowd detection, traffic incidents, public security... Traffic monitoring and controlling center has been built and located at the Saigon River Tunnel Management Center. This is considered as the first phase of the roadmap to develop the Smart City Traffic Control Center, increase the application of information technology to solve traffic congestion and traffic accidents in the central area. The center has four main functions: traffic monitoring, traffic light controlling, providing traffic information, and assisting in handling traffic safety violations. To be more specific, The traffic monitoring function has met the requirements for managing and centralizing recordings of all cameras installed by the Department of Transportation. Flexible controlling and monitoring on screens support high-efficiency traffic camera operation, which is convenient in monitoring traffic incidents. Supporting to share traffic surveillance camera images to coordinated units such as: the Department of Transportation and its affiliated units (Traffic Management Areas), District Management Centers, City People's Committees, City Police department ... Supporting to retrieve traffic accident data for investigation.

- Center for socio-economic simulation and forecasting has completed a set of documents consolidating the methodology, thereby building a scientific and experimental basis for research and advisory activities on economic - society forecasting; build an initial database from data published by domestic authorities and data from a number of international organizations, accordingly designing a trial version of the data processor and model of some key socio-economic indicators.
- Meanwhile, the Ho Chi Minh People's Committee has approved the project to establish a City Information Security Center Jsc. On this basis, the City will organize the establishment of companies with the State's capital contribution accounting for 51% or more of its charter capital, with the participation of enterprises experienced in the field of information security.

### 3.2. Discussing about the model of building and developing Smart City of Ho Chi Minh City

#### 3.2.1. Objectives:

Based on the content of implementing 3 phases, it can be judged that the project to build Smart Cities of HCM City focuses on technology orientation as Aurigi (2005) pointed out, in which concentrates on "the use of smart computing technology helps the key city infrastructure components and services (including city governance, education, health care, public security, real estate, transportation and utilities) become smarter, more connected, and more efficient. This is very clear in the implementation contents in phase 1 (2017-2020) such as: Building a shared database and developing the City's opened data eco-system; The Information and Communication Technology (ICT) Framework for the smart city.

#### 3.2.2. Governance

Ho Chi Minh City seems to be in between point of view 1 and 2 when choosing a smart city governance model:

- Alkandari (2012) pointed out that the government must approve the development of smart cities and it may prioritize some projects or regions. This is clear when the People's Committee of Ho Chi Minh City is the one who approved the Project, identifies priority projects (4 projects) and some priority areas for implementation (District 1), at the same time, facilitating and motivating promote smart city initiatives like Nam (2012) has emphasized. However, with this point of view, the project should have a solution to promote universities to consider it as a priority and key target for the formation of smart city (Winters (2011).
- With the projects of Building the forecasting simulation research center, building the socio-economic development strategy of the city, building the smart city controlling center, establishing the City Information Security Center, it seems that HCMC is working on creating a foundation for the city government to make "Smart Decision" in its city management function. Obviously, the city government is gradually setting up a "Process of data and information gathering related to public management by sensors or sensor networks. New technologies are used to reinforce rationality by using readily available, complete and accessible information for these decision-making and and implement these governance decision" (Schuurman, 2012 )

At conferences and seminars to implement the project, city leaders mentioned the development of e-government with the center is the citizen (point 3), however, the content of implementing Project and actual implementation showed that the use of sophisticated information technologies to connect and integrate information is to serve the implementation of the administration function of the government, it is unclear how the processes, changes in terms of organization and infrastructure to serve residents and communities better.

## 4. Conclusions and recommendations

### 4.1. The city needs to clearly identify a smart city development model

We believe that in order to achieve the overall goal of the Project, the content of building smart city for Ho Chi Minh City must apply the orientations combining all three factors: Technology, People and Governance, towards the implementation of the management model "Smart Urban Collaboration". In other words, building a smart city with those goals is not limited to focus on developing sophisticated information technology that is central to the governance of the city government, but also create an "open and proactive governance structure, with all stakeholders involved, to maximize the socio-economic and ecological efficiency of cities" (Kourtit, 2012). This shows that we have to move towards to a Sharing Economy (instead of just knowledge economy) and form a culture of participation (not just a participation mechanism) of the community.

Specifically, in the association model, the contents to target are:

- Technological factors: Form intelligent data source, controlling system, interface; Establishing system

availability and accessibility; Equipped with intelligent computing technology, network connection; Real-time alarms and advanced data analysis.

- Human factor: It is necessary to have specific solutions to form a smart community with digital knowledge and skills, can easily access and use the utilities of the system; Reinforce the trust on the system and community trust on the reliability of shared service; On the basis of establishing digital mechanisms and solutions for sharing access to ownership (assets, other resources) in order to increase efficiency in using social resources.
- Governance factor: Building a smart government with sophisticated information technology tools (e-

Government) coordinates many different components of a smart city in a transparent, connected manner. and flexible cooperation; Building a legal framework and surveillance solutions to ensure information security and privacy for individuals and organizations in society; Establish protection system to against fraud, liability and poor service provision.

In fact, HCMC has been well focusing on technology issues, thus, to implement the combined model, in the next stage, the city needs to identify and implement projects focusing on issues of human and governance factors.

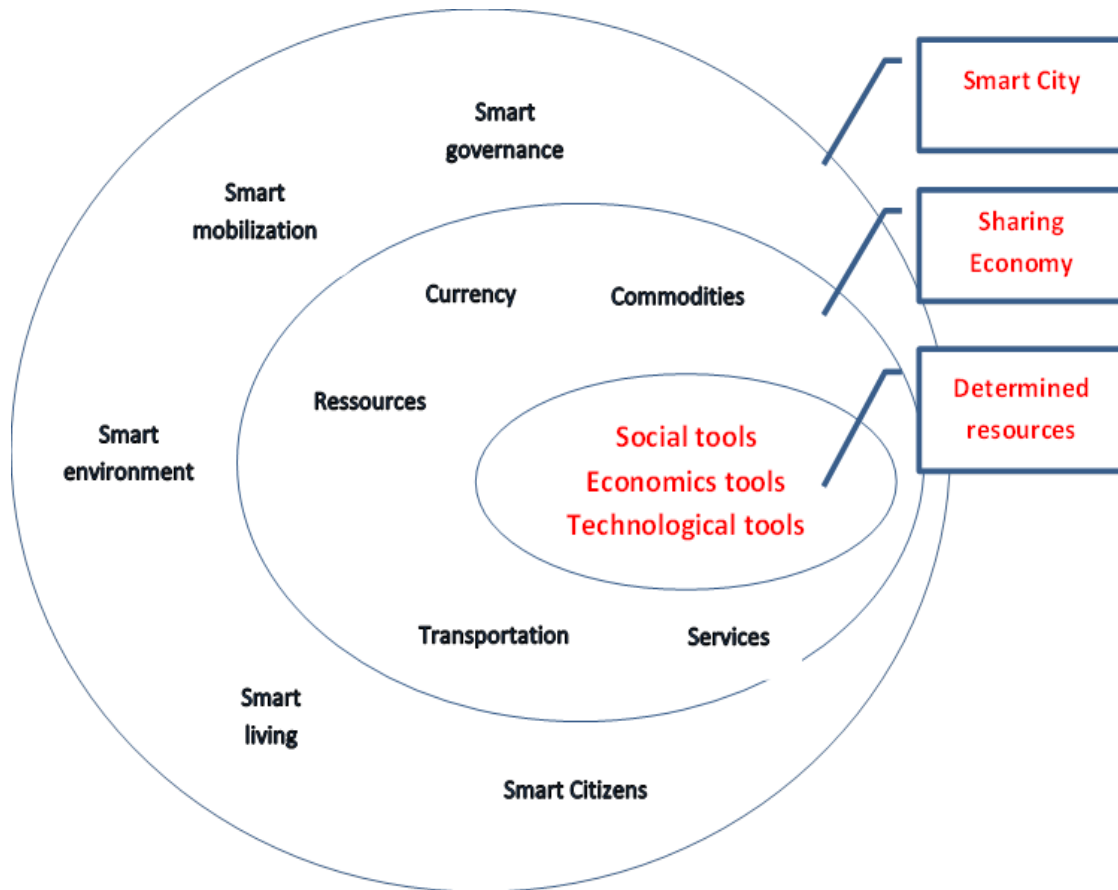


Figure 1 – Smart city and sharing economy

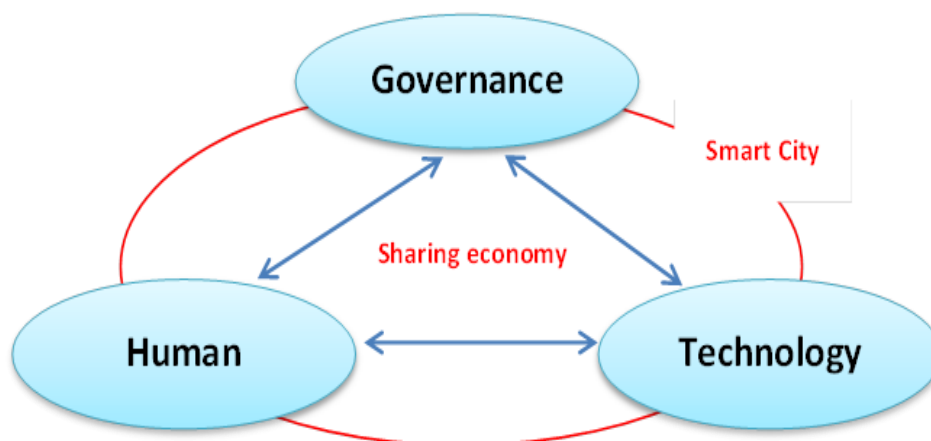


Figure 2: Combined model to build smart city

#### 4.2. Continuing the leading role of the country

Currently, the GRDP of Ho Chi Minh accounts for 24.16% of the country's economic size. Building smart city towards to a sharing economy will form a flexible cooperation model to mobilize completely and effectively resources of the society, certainly, the city will not only continue to have the largest economic scale in country but also the locomotive towing the surrounding areas and the whole country. On the other hand, as a science-technology center with many leading universities training more than 27% of the students of the country, if there is the right solution, this will be a smart resident generation in the future not only for Ho Chi Minh City but also for the development of other smart cities in the country.

#### 5. Data Availability

All data generated and analyzed are available in this paper.

#### 6. Conflicts of Interest

The author declare that there is no conflict of interest regarding the publication of this paper.

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