CP110 Research Paper

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People's Smart City in the Bay Area:

I. BRIEF BACKGOUND OF SMART CITY

The Smart City is a global urban development trend that uses information communication technology (ICT) to help solve the increasingly complex and serious urban development issues, enhances the efficiency of the use of limited resources, and uses different areas of specific practices to achieve economic development[1].

A. What is Smart City?

During the first industrial revolution of the 18th century and the second industrial revolution of the 20th century, the collective machinery production replaced individualized handmade production, productivity promotion led to mass consumption, and people who grasped more resources (including human, land, mine and capital) had great competitive advantages. People thus chose their living areas based on resources, and thus agricultural cities, mining cities or industrial cities were developed.

But after years of the rapid growth of global populations and urbanization, the living conditions of residents in urban areas deteriorated drastically. The reduction of resource consumption and improvement of resource use efficiency became a focus of industrial development in recent years.

Within the evolution of digital technology in the third industrial revolution of the 21st century, new technologies were successfully utilized to achieve "low consumption" and "high efficiency" of resources. As a result, residents were able to stay outside the city to have access to some urban functions or services, the barriers of traditional cities were broken, and the "smart city" concept was formed.

B. Smart City Cluster in the Bay Area

The Silicon Valley is a high-tech industrial cluster corridor formed by a 25-mile-long valley in the Bay Area. It was the telegraph and radio industry development center in the late 18th century. The city of San Jose had one of the earliest radio stations in the United States. By 1933, the US Navy had established a dock at Moffett Field as a distribution center for the early aviation industry. During World War II, the US Navy built and maintained warships in San Francisco, which became a supply center and a Navy dock. During the same period (1939), the Ames Research Center was established in this area, and many scientists and researchers came to find work there.

In the 1940s and 1960s, many research centers were established, including Hewlett-Packard (1939), Shockley Semiconductor Labs(1956), Intel, AMD, Nvidia, Xerox, and other well -known technology companies. In 1970, a reporter used the term "Silicon Valley" to

[1] Hafedh Chourabi et al., "Understanding Smart Cities: An Integrative Framework" (IEEE, 2012), 2289–97.

describe the transistor manufacturing cluster phenomenon; since then the Silicon Valley has become the alias of the region.

In the 2000s, due to Silicon Valley's unique historical background, international talents and skilled immigrants rushed into the region and created new startups. Based on academic support from top universities such as Stanford and UC Berkeley, infrastructure and policy support from the government, technology support from leading IT firms, the Silicon Valley is regarded as the most important development cluster of "smart city."

C. Phases of Smart City

1. Development Mechanism

The U.S. government has a high degree of decentralization governance. The federal government does not intervene deeply to the administration of local governments. In developing smart cities, the federal government provides policy direction and part of the budget to support the local government, and the local government makes the decision whether to seek budget subsidies. Instead of investing a large amount of the budget on purchasing hardware and software equipment, the local government encourages private enterprises to seek cooperation with the local government on relevant Smart City applications such as police safety, transportation, energy efficiency, health care, and education.[2]

2. Applications

The applications of smart cities mainly consist of utilizing technologies such as cloud storage and computing, Internet of Things (IoT) and Big-Data analysis, or the creation of new business models such as sharing economy. Here are some examples:

- **Smart Transportation**: Including traffic management systems, electric vehicle charging infrastructure, electronic detection and congestion charging systems, integrated mobile management, electronic wall and asset tracking, parking management and payment systems.
- **Smart Education,** also known as e-learning, includes teaching materials, digital audio and video content, teaching materials, online distribution, online discussion and other auxiliary tools. Emerging cloud computing, Internet of things, big-data and other technologies to help the sharing of educational content, interaction and learning management tools.
- **Smart Building**: The main purpose of the smart building is to use the Internet of Things technology and data analysis to enhance the operational efficiency of buildings, thereby reducing energy consumption, reduce operating costs and provide a better user experience.

II. E-GOVERNMENT POLICY

[2] Amy Glasmeier and Susan Christopherson, "Thinking about Smart Cities," *Cambridge Journal of Regions, Economy and Society* 8, no. 1 (March 2015): 3–12.

During the development of smart cities, when the concept is escalated to a larger scale, technologies can also help the public sector learn how to revitalize business processes, improve decision-making, and gain a competitive advantage. It is known as the development of e-government[3].

A. Government-Owned Cloud Platform

With the accumulated administration data from governments at all levels, it is crucial for the public sector to utilize cloud-concept technology to build up an integrated government-owned cloud platform and create open-data platforms; not only for the government to improve integrated public services and assist policy decisions, but also to benefit people and stimulate innovation.

Through an integrated service data platform, it will be possible for citizens and businesses to complete a transaction with government agencies without having to visit several separate ministries/departments in separate physical locations.

The adoption of e-government requires a compatible IT infrastructure and integrated information systems. To develop integrated services, the data between governments at all levels and other different agencies should establish a unified standard for data exchange, utilizing relevant geographic information database for data preservation and visualize display.

B. People's Participation

Transparency in governmental governance and people's participation in public policy created an important trend in the development of e-government.

1. Benefits of Open-Data

The opening of the data (Open data) is a mechanism that reveals government-owned data to citizens and enterprises, through utilizing technological innovation to solve problems in cities and improve citizens' quality of life.

One of the successes of open-data analysis and application is the urban model, such as UrbanSim, a Cloud Platform developed by UC Berkeley that leverages state-of-the-art urban simulation and 3D visualization. It also shared open data to empower users to explore, gain insights into, develop, and evaluate alternative plans to improve their communities. The simulation platform is for supporting planning and analysis of urban development, incorporating the interactions between land use, transportation, the economy, and the environment.

With the knowledge (data) spread to people across cities, the people not only become smart, but also create a community of smart people, and therefore form the whole Smart City.

2. Confrontation to Status-Quo

Innovation could cause conflict to the status-quo.

- **Uneven Development**

[3] Zakareya Ebrahim and Zahir Irani, "E-government Adoption: Architecture and Barriers," *Business Process Management Journal* 11, no. 5 (October 1, 2005).

California, especially the Bay Area, with world-class high-tech industries, the average high knowledge level, and strong innovation potential, was considered the leading smart city development compared with other states.

However, when the development was led by market-driven and profit-making promotion in economic and industrial development under the trend of neo-liberalism[4], it led to uneven development amongst areas. Many states in the U.S. focused on agriculture, textile, transportation and other traditional industries with low density of high-tech or knowledge-intensive industries. It caused the development of Smart City concentrated in certain major metropolises on the west coast and the east coast. The developments in the rest areas were still extremely slow.

- **Confidentiality of Data**

The open sharing of information should be built under protection of personal privacy and web security. Many agreed that computer security, privacy and confidentiality of personal data were barriers on implementing e-government[5]. Additionally, some people were against open data, because they considered data reveal could cause harm to their vested interest.

- **Relocation of Labor Market**

During the Smart City development, technologies were used to achieve low-consumption of resources, and human resource was also included. According to estimation by Frey, about 47 percent of total U.S. employment is at risk[6], jobs to expect could be automated relatively soon, perhaps over the next decade or two. It would cause relocation of labor market, and also a potential threat to lower class households.

III. BETTER WELL-BEING TO HUMAN-BEING FROM TECHNOLOGY

No matter how almighty the information technology can apply, without sufficient people's participation, the Smart City will be difficult to run smoothly, and may ultimately confront resistance.

A. Public-Private-People-Partnership

Building a Smart City requires technology supports from the private sector. In the traditional (Public-private-People-Partnership (PPP)), a partnership that the government provides the "City" field, and the private sector builds "Smart" technology applications, it is lack of civil dialogue to create a win-win situation between the government and the people.

The "Bottom-up" 4P (Public-Private-People-Partnership) cooperation model is a new trend in the development of Smart City[7]. Here is an example. In the City of Chattanooga[8], when the

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[4] David Harvey, "Neo-Liberalism as Creative Destruction," *Geografiska Annaler: Series B, Human Geography* 88, no. 2 (2006).

[5] Zakareya Ebrahim, and Zahir Irani. "E-government Adoption: *Architecture and Barriers." Business Process Management Journal 11*, no. 5 (October 1, 2005).

[6] Carl Benedikt Frey and Michael A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?," *Technological Forecasting and Social Change* 114 (2017): 254–280.

[7] Junqi Zhang and Mohan M. Kumaraswamy, "Public-Private-People Partnerships (4P) for Disaster Preparedness, Mitigation and Post-Disaster Reconstruction," in *Annual Conference of the International Institute for Infrastructure, Renewal and Reconstruction* (The International Institute for Infrastructure, Renewal and Reconstruction (IIIRR)., 2012).

city encountered serious industrial pollution, the residents initiated public meetings with various stakeholders to reach municipal construction goals. With government resources support and private fundraising, the city of Chattanooga was transformed into a modern environmental friendly Smart City.

Compared with the traditional "top-down" Smart City planning and construction, which is suitable for the development of new cities, "Bottom-up" 4P cooperation model is applicable to the transformation and upgrading of old cities. The challenge of the 4P model is how to encourage people to participate and reach public consensus. The citizens dream of the future of the city with various imaginations. The government encourages and supports civil innovation. The enterprises seek feasibility and turn the imaginations into realities.

B. Open-Government Development

Because the development of e-government requires grassroots' engagement from the communities, which is a comprehensive understanding of the complexities and interconnections among social and technical factors of services and physical environments in a city[9], it requires transparent governance for people to participate. This is the open-government development.

Even if tens of thousands of people express their views on public issues on the internet every day, the traditional government still carries out them very slowly due to confinement of its' bureaucratic institutions. Also, due to its' gap to the people, it is hard for people capable of solving public problems to find the right door. Open-government encourages citizen participation and makes the traditional government keep up with the rapid pace of modern society. If real innovation of this society is expected, then everyone must be involved to promote the opening of government agencies.

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[8] Project for Public Spaces, "The Chattanooga Riverpark: Transforming a City and Its Economy," *Project for Public Spaces*, accessed June 20, 2017.

[9] Taewoo Nam and Theresa A. Pardo, "Conceptualizing Smart City with Dimensions of Technology, People, and Institutions," in *Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times* (ACM, 2011), 282–291.

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