Smart Governance in Shanghai in the Context of Public Health Emergencies

Chunyan Ren[1,a,*]

[1]*Architecture and Urban Planning, Shandong Jianzhu University, Shandong, Jinan, 250100, China*
a. 202105102010@stu.sdjzu.edu.cn
*corresponding author

Abstract: Under the background of public health emergencies, how to conduct intelligent governance in Shanghai has become a focus issue. On this basis, by reviewing and analyzing literature and other research methods, this paper research the development status of Shanghai's smart city and makes plans for the development direction and development strategy of Shanghai's smart governance in the future. Post-COVID-19 pandemic, the prevailing smart governance in Shanghai reveals deficiencies in public health emergency warning systems and response mechanisms, inadequacies in the management of public health security information, an excessively prolonged longitudinal chain in public health emergency management, a need for enhancement in the intelligent governance of urban communities, and an urban transportation system ill-equipped to handle public emergencies. In order to deal with these problems and improve the smart governance system of Shanghai. Proposing ways to transform smart city governance under public health emergencies, correctly using big data, strengthening the analysis and integration of big data, optimizing the cross-part collaborative governance mechanism, building a smart health management platform, strengthening public participation, and enhancing information transparency. So as to improve Shanghai's ability to cope with public health emergencies.

Keywords: Public health emergencies, Smart city, Urban governance, Shanghai, Intelligent.

1. Introduction

With the rapid development of modern information technology, the construction of smart cities has become an important trend of global development. Smart city integrates various date resources through modern information technology to provide data support for urban governance and services, then to achieve efficient, intelligent and sustainable development of the city. Shanghai, one of the first pilot cities in China to build new smart cities, aggressively encourages the development of smart cities and achieves some success in raising urban competitiveness and raising residents' quality of life.

In addition to technological innovation, the creation of smart cities involves a shift in urban government models and concepts. It strengthens the interaction and cooperation among various subjects such as government, enterprises, social organizations and citizens. Intelligent governance makes urban planning, construction, operation and management more scientific, refined and intelligent. For instance, real-time monitoring and administration of urban infrastructure and increased resource utilization efficiency are made possible by Internet of Things technology. Big data

analysis can furnish precise data support for urban decision-making and enhance the scientific rigor of the decision-making process.

However, when it faces the public health emergencies, smart governance faces great challenges. Public health emergencies are defined by their high level of danger, complexity and suddenness, which put forward severe tests to urban emergency management, public health security and community governance. For example, during the COVID-19 epidemic, the public health emergency response system in cities has exposed many problems, including lagging information transmission, difficulties in coordination between different departments, and pressure on community prevention and control. As a city with dense population and large mobility, Shanghai has higher requirements for the construction of smart cities in the face of public health emergencies. An in-depth study of the governance of Shanghai's smart city construction under public health emergencies is of great significance for improving the urban emergency management system, ensuring urban public health safety and promoting the development of smart cities to a higher level.

The goal of this study is to deeply examine the smart governance of Shanghai under public health emergencies, and to explore how Shanghai should realize the transformation of smart city governance under the epidemic condition through literature analysis. Firstly, the paper analyzes the status quo of Shanghai smart city construction. Secondly, the existing problems in the construction of Shanghai smart city are discussed. Finally, based on the research results from various aspects, it is concluded that the governance of smart cities should provide perfect and solid technical support in the face of public health emergencies.

2. Status Quo of Smart City Construction in Shanghai

2.1. The Connotation and Influence of Smart City Governance

With the rapid development of information technology, the construction of "smart cities" should also continue to follow up. Smart city governance is a progressive governance paradigm that thoroughly incorporates contemporary information technology, including the Internet of Things, big data, cloud computing, and artificial intelligence, into the urban governance system. Smart city governance is part of the institutional infrastructure. It has to do with open governance, public and social services, political tactics and viewpoints, and decision-making participation [1]. Chiariottit posits that the development of smart cities can enhance urban administration and increase the efficacy of urban administrative services [2]. Xu Qingrui et al. pointed out that smart city is a complex integrating various urban functions, aiming to achieve sustainable development of economic and social environment [3].Smart city governance emphasizes the collaborative participation of multiple subjects. The government is no longer a single governing body, and enterprises, social organizations and citizens are also actively participating in urban governance. The connotation of smart city governance is to realize the wisdom of the region as a whole, pay attention to the interconnection of population, economy, technology and other factors among cities in the region, break the isolation of geographical space through the development of smart and information technology, so as to create sustainable development urban agglomerations with innovation and competitiveness, and promote regional coordinated development [4]. Smart urban agglomeration governance has a great impact on the development of cities. Smart urban agglomeration governance is based on modern information technology to promote regional coordinated development, which is an advanced stage of modern smart city construction. The construction of smart city clusters not only speeds up the more macro and systematic development of smart cities, but also provides broad development space and innovation space for regional smart development, and greatly reduces the difficulty of managing public health emergencies.

2.2. The Current State of Shanghai's Smart City Development

Shanghai, as one of the first megacities in China to explore digital governance, uses cloud computing, big data and other technical means to focus on promoting government services "one-network management", urban operation "one-network management" and community management "community cloud", referred to as "two networks and one cloud". The purpose of construction is to make urban governance more scientific, refined and intelligent [5]. In order to explore the innovation of urban social governance mechanism and improve the efficiency of government services. However, it is still necessary to further explore the integrated development of smart city construction and social governance in order to achieve the continuous improvement of the modernization level of social governance from the perspective of smart city.

In terms of infrastructure, Shanghai has invested a lot of resources to build 5G base stations, and has achieved full 5G coverage in major areas of the city, and the development of this smart city provides stable and rapid network support. In public health emergencies, it has played a role in data collection, real-time epidemic monitoring, and decision-making assistance, which has improved the speed of epidemic discovery, statistics, and handling.

At the same time, Shanghai is still trying to establish intelligent application scenarios, simulate the development direction in advance, and facilitate advance treatment and prevention. In terms of smart medical care, Shanghai has established digital medical care mainly to serve the health of the people. Under the epidemic situation, advanced intelligent management methods have been applied, precise positioning has been adopted, and decisive actions have been taken to narrow the target scope and quietly block the spread of the epidemic [6]. Medical information sharing among different medical institutions, including patients' medical records, inspection reports, improves the accuracy of medical diagnosis and the utilization efficiency of medical resources.

3. Issues with Shanghai's Smart City Building

3.1. Ineffective Emergency Response and Early Warning Systems for Public Health Crises

Shanghai's smart city development has shown the shortcomings of emergency response and early warning systems in the face of public health crises. Lack of awareness in the early stages of the pandemic caused the early warning system to fail and society to react slowly, which led to the massive spread. Lack of effective integration and analysis mechanism, accurate and timely early warning of the possible dangers of public health emergencies is challenging. For example, in the early stage of the epidemic, there were abnormal signals such as an increase in the number of fever in major hospitals in Shanghai, but they did not carry out timely integrated processing to issue early warning information.

The emergency response mechanism lacks flexibility and synergy. In the event of a public health emergency, the existing emergency mechanism is not activated quickly enough, and the ability of coordination between various departments needs to be improved. For example, during the COVID-19 pandemic, poor communication and lack of effective coordination mechanisms in resource allocation and personnel management have led to uneven distribution of materials and even shortages in remote areas.

3.2. Deficiencies in the Management of Public Health Safety Emergency Information

In the case of public health emergencies, Shanghai uses the Internet to collect and process various information, but there are some omissions in the management of public health security emergency information. Information collection is incomplete, and communities are scattered and the construction of smart cities has not been fully realized. As a result, the timeliness and accuracy errors of

information are too large. As a result, the health code (the proof of whether the code is infected with the new coronavirus) cannot accurately reflect the physical condition of the code holder, resulting in the continuous spread of the virus.

Due to the consideration of data format and data security among various departments, the information sharing degree is low and there are obstacles to information sharing. For example, it is difficult for the medical department to quickly and accurately transfer the clinical information of patients to the disease control department for epidemic analysis, which affects the speed of response to public health events and the scientific nature of decision-making to a certain extent.

3.3. Excessively Lengthy Vertical Chain of Public Health Emergency Management

Shanghai's emergency management issues are reflected in public health emergencies. The vertical chain of emergency management is too long, which affects the efficiency of emergency management to a certain extent. From the decision-making level to the grass-roots executive level, the four-level management chain of "city - district - street - community" has been experienced, which is prone to delay and distortion in the process of information transmission and decision execution. Under normal circumstances, the defects of this system are not obvious. However, once the state of emergency management is entered, emergencies often develop rapidly. At this time, if the layers of reporting, request, balance, coordination, and decision-making of different departments of the multi-level government coexist, it is difficult to achieve timely information release. In this Internet era, the Internet has become the main way for citizens to understand the dynamics of the epidemic, so the dissemination of information should be high-speed and convenient. Government agencies and enterprises and institutions can also use the Internet to grasp the physical conditions of the public or employees, and relevant departments can also formulate epidemic prevention and control plans based on the real-time feedback of big data information.

While the outbreak is being prevented and controlled, the state media exposed the problem of imperfect construction through the Internet and lacked a strong response mechanism in terms of public opinion guidance. In the face of false information, some people lack rational thinking and judgment ability, and casually follow and forward posts, which makes rumors easier to breed and spread.

3.4. The Intellectual Governance Level of Urban Communities

The role of intelligent community facilities in emergency response in Shanghai is not enough. For example, although the intelligent access control system in some communities can achieve personnel access management, the role of diagnosing abnormal conditions like fever is inadequate during the epidemic prevention and control period, and it cannot effectively be integrated with the requirements of public health prevention and control.

Secondly, the integration ability of community information service platform in emergency management is weak. There are multiple information systems in the community, such as community service system, property management system, but in the event of public health emergencies, these systems cannot be effectively integrated to form a unified emergency management platform. For instance, the efficiency of the community's efforts to prevent and control epidemics is impacted by the ineffective integration of volunteer information in the community service system and owner information in the property management system.

3.5. Insufficient Capacity of Urban Transportation System to Cope with Public Emergencies

Establishing a modern industrial system, paying attention to the real economy, actively developing a new kind of industrialization, and accelerating the development of a manufacturing power,

transportation power, space power, quality power, network power, and digital China were all suggested in the report of the Party's 20th National Congress. However, Shanghai, as China's economic and financial center, has complicated personnel, a large number of motor vehicles and complicated traffic conditions. During public health emergencies, medical supplies and medical personnel need to be transported quickly and efficiently, but the existing transportation system has shortcomings in the organization and scheduling of emergency transportation. For example, in the early days of the outbreak, the delivery of medical supplies in some areas was delayed by traffic control and transportation coordination problems.

The prevention and control measures of public transportation are not intelligent. Although public transport has taken some prevention and control measures, such as disinfection, wearing masks, the application of smart technology for control and prevention still has a lot of space for development. For example, the lack of effective intelligent detection equipment to quickly detect abnormal conditions such as whether a passenger has a fever increases the risk of disease spread by public transport.

4. Big Data Application in Public Health Crises

4.1. Using Big Data in Medical Emergencies

In the event of a public health emergency, the integration and analysis of big data is crucial to the transformation of smart city government. To make it easier to create a single big data platform, Shanghai should gather, combine, and categorize data from a variety of domains, including the transportation, medical, and community service systems. Through the in-depth analysis of a large number of data, the potential risk of public health emergencies can be found in time. For example, it integrates data from medical system visits, drug sales data from pharmacies, and resident health data from communities to analyze disease prevalence trends and potential high prevalence areas. Combined with the results of big data analysis, precise prevention and control of different regions and different populations are carried out. The movement of people in high-risk areas should be monitored in a focused manner, and precise health warnings and protection guidance should be provided for vulnerable groups. At the same time, big data can be utilized to evaluate the effectiveness of preventative and control measures and quickly adjust strategies in response to data feedback. All things considered, when models and algorithms are created to predict new outbreaks, artificial intelligence (AI) will be a powerful new weapon in the fight against infectious illnesses. Monitoring the spread of disease has already shown encouraging results thanks to recent advancements in machine and deep learning, and the COVID-19 pandemic has provided valuable data for neural network testing and training [7].

4.2. Optimization of Cross-departmental Collaborative Governance Mechanism

Optimizing the inter-departmental collaborative governance mechanism is the key to responding to public health emergencies. As a comprehensive high-tech project, Smart city construction requires multi-sectoral and interdisciplinary participation and support. At the same time, due to the highly systematic, complex and linked characteristics of smart cities, their social governance is also inseparable from the participation of multiple subjects [8]. Shanghai should establish an inter-departmental emergency coordination body to clarify the responsibilities and authority of various departments in emergency management, improve the efficiency of decision-making and command capabilities, and be able to quickly coordinate the actions of various departments when public health emergencies occur. For example, in terms of material allocation, the agency will command production, procurement, transportation and distribution in a unified manner to avoid communication confusion among various departments.

The establishment of inter-departmental information sharing platform should break the data barriers between departments and realize real-time information sharing. For example, the medical department can share the diagnostic information of patients with the transportation department in time, so that the transportation department can control the flow of relevant personnel and prevent the further spread of the virus in a timely manner. The transportation department can also share information about the movement of people with the community, so that the community can carry out precise prevention and control.

4.3. Construction of Smart Health Management Platform

The smart health management platform should have the following functions: First, the health information collection function can comprehensively grasp the public's health information, including basic health status, vaccination status, and disease history. The second is the health risk assessment function, based on the collected health information, using artificial intelligence algorithms and large data research to evaluate residents' health risks and quickly identify possible issues. The third is the function of health service provision, such as online medical consultation, appointment registration, health knowledge push.

Therefore, the establishment of this platform plays a crucial role in improving Shanghai's ability of intelligent governance under public health emergencies. If the situation of each citizen is classified, it can accurately track the whereabouts of everyone and be able to locate every population that goes out, so that the movement of people can be managed in a more orderly way [9]. During the epidemic, the platform can be used to quickly locate suspected patients, provide telemedicine guidance to patients, and conduct health monitoring and reminding of contacts to improve the response efficiency of public health incidents.

4.4. Increase Public Participation and Information Transparency

This information must be gathered from both the citizen and the sensor. As end users and active participants in smart city services, citizens are crucial to addressing issues and enhancing urban ecosystems [10].

In order to improve information transparency, the government should timely and accurately release relevant information about public health emergencies to the public, including the epidemic situation, prevention and control measures, and supplies. Information is released through official websites, social media and other channels to let the public know the true situation of the incident and enhance public trust and cooperation.

5. Conclusion

In the context of public health emergencies, the smart governance of Shanghai is faced with huge opportunities and challenges. The traditional governance model can no longer cope with public health emergencies, while the smart city, as a more intelligent, convenient and rapid comprehensive technological means, has obvious advantages in facing public health emergencies. Therefore, Shanghai's sole option for development is to speed up the building of smart cities.

Using technologies like cloud computing, big data, artificial intelligence, and the Internet of Things, a smart governance platform has been established and applied to public life and public emergencies. In the construction of Shanghai smart city, attention should be paid to establishing and improving the early warning and emergency mechanism for public health emergencies, strengthening the monitoring and early warning of public health risks, and improving the speed and effect of emergency response. Various departments should strengthen coordination and cooperation, and personnel should be dispatched through the smart city construction platform to jointly respond to

public health emergencies. Shanghai should strengthen the management of public health and safety emergency information, realize the timely and accurate transmission of information through the integrated smart city system, collect information at the same time, and strengthen information analysis through big data applications. After a public health emergency, public life should be restored, and transportation, medical security, and community management should also rely on the intelligent governance platform to restore to before the public health emergency, so that urban governance and people's life can return to normal.

References

[1] Silva, B.N., Khan, M., Han, K. (2018) Towards Sustainable Smart Cities: A Review of Trends, Architectures, Components, and Open Challenges in Smart Cities. Sustainable Cities and Society, 38, 697-713.

[2] Chiariotti, F., Condoluci, M., Mahmoodi, T. et al. (2018) Symbio City: Smart Cities for Smarter Networks. Transactions on Emerging Telecommunications Technologies, 29(1), e3206.

[3] Xu, Q.R., Wu, Z.Y., Chen, L.T. (2012) Vision and Architecture of Smart City. Journal of Management Engineering, 26 (4), 1-7.

[4] Ma, Q.L., Zhang, L., Wang, X.Y. (2024) Intelligent Governance of Chengdu-Chongqing Urban Agglomeration under Public Health Emergencies. Journal of Chongqing Jiaotong University (Social Sciences Edition), 24(04), 54-62.

[5] Ji, H.L., Liu, Y.X. (2022) Research on Fine-oriented Smart City Construction -- A Case Study of Shanghai. Journal of Software Guide, 21(09), 241-246.

[6] Song, X., Hao, D.D., Yan, L.P. (2022) Research and Exploration of New Smart City Construction in Shanghai. Economic Research Guide, (09), 61-121.

[7] Costa, D.G., Peixoto, J.P.J. (2020) COVID-19 Pandemic: A Review of Smart Cities Initiatives to Face New Outbreaks. IET Smart Cities, 2(2), 64-73.

[8] Chen Y. (2024) Research on Challenges and Countermeasures of Social Governance from the Perspective of Smart City: A Case Study of Shanghai Urban Social governance. Shanghai Real Estate, (8), 52-54.

[9] Xu, C., Luo, X., Yu, C. et al. (2020) The 2019-nCoV Epidemic Control Strategies and Future Challenges of Building Healthy Smart Cities. Indoor and Built Environment, 29(5), 639-644.

[10] Tešić, D., Blagojević, D., Lukić, A. (2020) Bringing 'Smart' into Cities to Fight Pandemics: With the Reference to the COVID-19. Zbornik Radova Departmana Za Geografiju, Turizam i Hotelijerstvo, (49), 99-112.