

# Research on the Dilemma and Countermeasures of Digital Empowerment for Emergency Management in Super Large Cities

-- A Case Study of Shenzhen

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**Abstract:** This paper gives a detailed introduction to the current difficulties faced by digital empowerment for emergency management in super-large cities from three aspects: difficulty in data sharing and integration, high application threshold of digital empowerment technology for emergency management, and inability of emergency response speed to meet actual needs. According to the three aspects of strengthening the sharing and integration of data, actively introducing new technologies and improving the application ability of technologies, and optimizing the specific process of emergency response, the corresponding analysis of the countermeasures of digital empowerment in emergency management of super large cities is made, and the importance of solving the dilemma of digital empowerment in emergency management of super large cities is explained.

**Keywords:** Mega City; Digital Empowerment for Emergency Management; Dilemma and Countermeasure.

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## 1. Introduction

With the continuous development of The Times, the progress of urbanization is also gradually accelerating. The emergency management of super large cities in the new era has met great opportunities and challenges. The emergence of digital enabling technology has provided a new solution direction for emergency management in super-large cities, ensuring the efficiency and quality of emergency management in super-large cities. However, according to the analysis of super large cities that have applied digital empowerment technology in China, it is found that there are still some difficulties in the application process of digital empowerment technology, which needs to be integrated by relevant departments and technical personnel to ensure the scientific, stable and comprehensive application of digital empowerment technology.

## 2. First, the Dilemma of Digital Empowerment for Emergency Management in Super-Large Cities

(1) It is difficult to share and integrate data

In the application of emergency management digital enabling technology in Shenzhen, there is a problem of greater difficulty in data sharing and integration. The main reasons can be analyzed from the following aspects. First, the data sources are relatively wide. Because the data sources involved in Shenzhen emergency management include but are not limited to government departments, enterprises, and social organizations. Because the data sources are different, different fields have their own normative systems when sorting out data information, and there are corresponding gaps in the format and standards of data transmission. When digital enabling technology is used to share and integrate existing data, the workload will rise sharply.

Second, data quality cannot be guaranteed. Because the emergency management data in Shenzhen comes from a wide

range of sources, some data may be lost or deviated from the actual data during transmission. When digital enabling technology is integrated, the accuracy and integrity of data cannot be accurately judged, and it is very easy to fail to provide objective results after data sharing and integration [1]. Third, data security needs to be addressed. Shenzhen's emergency management involves personnel information, equipment information and other data are very important, but when digital empowerment is integrated, it is easy to be used by criminals to steal data through network vulnerabilities. Fourth, the technical difficulty is greater. In the process of digital enabling technology application, it is necessary to involve big data technology, cloud computing technology, etc. At the same time, the application of technology requires a very high level of professional technicians to provide later maintenance and support, otherwise it is very easy to have a system breakdown.

(2) The technology application threshold is high

The technical application threshold of digital empowerment for emergency management in Shenzhen is relatively high, mainly due to the following reasons: First, the range of technologies is extensive and complex. Shenzhen's emergency management digital enabling technology involves big data technology, artificial intelligence technology, Internet of Things technology and other types. In the application of these technologies, it is necessary to ensure that technical personnel and talented tasks have professional technical level and theoretical knowledge. In the case of relatively high technical threshold, there is a shortage of talents [2]. Then there is the urgent need to ensure data privacy and security. Emergency management digital enabling technology needs to process a large amount of data, including a lot of information that needs to be encrypted, such as personal identity information, public data, etc. In order to avoid important information leakage, technical encryption should be carried out on the existing basis, but this operation will also add difficulty to the application of digital enabling technology. Finally, from the practical application demand

analysis, the application of emergency management digital enabling technology in Shenzhen, to ensure the initiative and availability of technology, in the application should be combined with the actual needs to analyze. In the process of research and analysis, it is necessary to conduct field investigation and adjust the application scheme of the technology, and set a high threshold for the application of digital enabling technology.

(3) The speed of emergency response needs to be improved

The technical emergency response speed of digital enabling for emergency management in Shenzhen needs to be improved, which should be discussed from the following aspects: First, the development of digital enabling technology for emergency management needs to be improved. At present, the technical development of digital empowerment for emergency management is still in the initial stage, and technical optimization needs to be completed in some links. For example, the technical application of big data analysis and processing cannot ensure the need for real-time emergency response. Second, from the perspective of data quality problems, the application of emergency management digital empowerment technology in Shenzhen should ensure the analysis and processing of massive data, and after the processing, it is necessary to ensure the quality and accuracy of data. If there is poor data quality, data missing, processing and analysis efficiency is not high, the work efficiency and accuracy of digital enabling technology will be affected, so that emergency management will lose its original meaning. Thirdly, from the perspective of system design and process problems, the design and process of digital enabling system for emergency management will also slow down the speed of emergency response. Designers did not take into account the science and rationality of the system, resulting in an increase in the processes involved in the operation of the system, which will greatly reduce the emergency response speed.

### **3. Analysis of Countermeasures of Digital Empowerment for Emergency Management in Super-Large Cities**

#### **1. Strengthening data sharing and integration**

Take Shenzhen as an example, how to strengthen data sharing and integration work, first, to establish a unified data sharing platform, through a unified and centralized data sharing platform to Shenzhen emergency management related to various departments and enterprises unified summary of emergency management data. The platform will screen and centrally manage duplicate information to ensure the quality and utilization of data and scientifically improve work efficiency. Second, we need to set strict standards for data sharing. When sharing data, it must be carried out in accordance with the prescribed format standards to ensure the same format of data from different sources, laying a good foundation for the integration and management of massive data [3]. Third, strengthen data integration and cleaning. After the integration and cleaning of data from different sources, the repetitive, missing and wrong data can be removed to improve the availability and accuracy of data.

Fourth, we need to strengthen the communication and coordination among various departments. The cooperation between the emergency management department and relevant departments should ensure the sharing of data and information, avoid the waste of time and energy in the

communication between employees of different departments, and ensure the tacit understanding and effectiveness of departmental cooperation. For example, the establishment of cooperation with public security, fire, medical and other departments to achieve data sharing, to ensure that emergency management information can be consulted in the first time, to ensure the efficiency of emergency management work. Fifth, improve data security protection. Introduce high-quality and high-quality professionals to actively apply encryption technology, access control, data desensitization and other technologies such as sensitive data information in emergency management to ensure data security and stability.

#### **2. Improving technology application capabilities**

Emergency management digital empowerment to enhance the ability to apply technology, first of all, to strengthen technical training. From the perspective of ensuring that the professional level of emergency management personnel and their understanding and application ability of digital enabling technology are effectively improved, professional technical training and expert lectures are organized by relevant departments to exercise the mastery and application of digital enabling technology for emergency management personnel. Then, the local government and relevant departments increased investment in capital construction and actively introduced advanced technologies. Such as artificial intelligence technology, big data analysis technology, etc., to ensure that the technical level of Shenzhen emergency management can be significantly improved. At the same time, cooperate with major scientific research institutions and universities to bring together outstanding talents to optimize and upgrade digital empowerment technology. When formulating the application standard of digital enabling technology for emergency management in Shenzhen, it is important to pay attention to ensuring the unity of technology application processes and methods, so that different departments can get effective help when they need technical support and cooperation with other departments, and indirectly promote the optimization of technology. For example, Shenzhen Nanshan District Emergency Management Bureau held the high-tech fair in Shenzhen International Convention and Exhibition Center Hall 4. The fire fighting robot brought by Shenzhen Betel Robot Co., Ltd. adopts explosion-proof design, which can not only be remotely controlled, but also cleverly equipped with a large flow of fire water cannon and 360 degree explosion-proof PTZ camera to achieve efficient rescue. Compared with traditional fire fighting robots, it is more automated and intelligent, which can make fire fighting robots come in handy in more complex scenes.

Finally, the improvement of the application ability of digital enabling technology for emergency management in Shenzhen should also be carried out from the aspects of technological innovation and scientific evaluation. Technological innovation is carried out from the establishment of special funds and the provision of policy support to ensure that Shenzhen emergency management is always in continuous progress. Establishing a scientific and technological evaluation and feedback mechanism that fits the actual situation can ensure that relevant departments can timely understand the shortcomings in the application process of digital empowerment technology and make corresponding improvements.

#### **3. Optimize the specific process of emergency response**

The specific process of optimizing emergency response

includes the following aspects: First, the establishment of a comprehensive monitoring network. From meteorology, hydrology, environment, public health, social security and other aspects, to ensure that emergency events can be assessed. After monitoring the emergency event, it is necessary to ensure that the emergency response mechanism is activated in real time, and the corresponding emergency plan is formulated according to the classification of the emergency degree of the emergency event. Second, collect and report relevant information to ensure timely allocation of resources, scientific planning of human, material and financial resources, and improve the efficiency of emergency response work. In the on-site disposal, it is necessary to strictly abide by the planning of the emergency plan, formulate the best strategy for rescue, medical treatment, personnel evacuation, traffic control, material support, etc., and assess the loss. Third, when dealing with the post-rescue work after the rescue, it is necessary to arrange relevant staff to analyze and record the cause of the emergency incident, the rescue process, and the loss generated, so as to ensure that the emergency plan can be effectively recorded. At the same time, it is also necessary to pursue the responsible units and responsible persons after the occurrence of emergency incidents. In order to ensure that the relative process of emergency response can be optimized and improved, but also from the emergency management scientific and technological innovation analysis, in recent years, Shenzhen Nanshan District Emergency Management Bureau has strongly established a strong science and technology safety "Nanshan model". For example, by accelerating the establishment of the "1+8+N" emergency management monitoring and early warning command system, combined with the construction of "digital city", the district government, housing and other departments to promote the in-depth application of BIM/CIM technology in the field of safety emergency, and innovate the digital governance of urban security. In addition, the construction of urban lifeline monitoring and early warning platform, exploration and modeling of gas pipelines, oil pipelines, etc., more than 2,500

kilometers; The use of technologies such as IoT perception has solved regulatory problems such as electrical fires and household charging of electric bicycles, and has also strengthened safety management issues. The forest fire monitoring system of "visible light + infrared thermal imaging detector" has been built at the distribution points of Daishan and Tanglang Mountain in Shenzhen, which is also an important embodiment of improving the level of disaster prevention and control technology.

## 4. Conclusion

In short, the application of digital empowerment technology in the emergency management of super-large cities is an important development direction of urban emergency management in the future for a long time. However, so far, during the application of digital empowerment technology in super-large cities, the difficulty factor of data sharing and integration is large, the technical application ability cannot meet the needs of urban emergency management, and the emergency response speed is slow. In order to ensure the initiative of digital enabling technology, it is necessary to strengthen data sharing and integration, ensure that the technology is upgraded, can be stably applied, and improve and optimize the processes involved in emergency response.

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