

# Development Tendency of Smart Sanitation

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## Abstract

**Since the reform and opening-up for more than 30 years, great achievements have been made in the field of social economy. However, the environmental problems have not been solved well. Sanitation work is an important part of urbanization construction and plays an important role in maintaining the overall environmental sanitation of the city. As social development drives the progress of science and technology, the construction of smart sanitation provides a solution to solve urban environmental problems. It is particularly significant to analyze the development trend of smart sanitation.**

## Keywords

**Smart sanitation, development status, development trend.**

## 1. Introduction

With the continuous development of information technology, the application level of urban informatization has been continuously improved and the construction of smart cities has developed rapidly. The construction of smart sanitation is an important part of smart cities, which are based on mobile Internet technology, Internet of Things, cloud computing, big data, artificial intelligence and other technologies, establishing a network information system covering the scope of sanitation operations, providing services for sanitation operation management, information monitoring and comprehensive evaluation through the established sanitation operation management information platform, and advanced information technology utilization. The real-time monitoring and recording of sanitation operation transfer and garbage disposal will finally realize the smart management of the whole sanitation operation process including garbage classification and recovery, production and transportation, data disclosure, production control and product utilization. The construction of smart sanitation will greatly enhance urban development, improve people's living environment level, realize the refined, visual and smart development of urban sanitation management. Moreover, it will reduce resource waste and urban environmental pollution, finally realize urban sustainable development and build a green city.

## 2. Characteristics of Smart Sanitation

### 2.1. Monitoring Integration

Establish an omni-directional and spatial three-dimensional monitoring network, and comprehensively monitor the classified collection, transportation management, transfer and transportation, factory recovery and treatment of garbage by monitoring equipment and various sensors, collect data and control the sanitation operation status in real time, so as to achieve smart supervision with integrated monitoring and ensure the implementation of sanitation operations orderly.

## 2.2. Smart Decision Making

Smart sanitation can not only monitor the whole sanitation operation process, but also analyze and process the data obtained by testing equipment by using big data and cloud computing artificial intelligence algorithm, establish a decision-making early warning model, forecast the quality or unexpected situation in the sanitation operation process, and analyze and deal with the unexpected situation in the sanitation operation.

## 2.3. Information Transparency

Through the government's extranet websites, online service halls and smart environmental protection software, citizens can see the situation of urban sanitation work in time through mobile networks. Communication platform among government, sanitation enterprises and urban residents can provide information on the work of sanitation enterprises, the intensity of government supervision and whether citizens are satisfied with the quality of sanitation operations and government supervision, which can put forward opinions and suggestions on the existing problems, promote the development of sanitation enterprises and improve people's satisfaction with the government.

## 3. The Importance of Smart Sanitation

### 3.1. The Needs of Smart City Construction

Smart sanitation is an important part of a smart city. With the help of the development achievements of smart cities, smart sanitation can match the construction of smart cities and make the construction of smart cities more complete. In the process of building smart cities, the government makes a great difference, and some of them will be controlled by the government as well. The ultimate goal of smart city construction and development is to achieve economic benefits, social benefits and environmental protection. In the process of using Internet technology to build a data platform, smart sanitation has gradually upgraded the Internet of Things, and supervised the whole process of garbage collection, production treatment and product recovery, realizing smart management of sanitation operations, greatly helping to reduce urban pollution and waste of resources, and improving social and economic benefits, thus accelerating the construction of smart cities.

### 3.2. Protect the Urban Environment and Improve the Quality of Life of Residents

In recent years, China's urbanization construction has been accelerating with a large number of migrant workers flooding into cities every year. The waste generated by urban construction has increased sharply, showing the trend of garbage siege, resulting in outstanding urban environmental problems. The traditional sanitation operation mode can't meet the needs of urban construction and development because there are low efficiency and waste of resources. With the continuous development of China's social economy and the continuous improvement of people's material life, people's requirements for a better living environment are getting higher and higher, and the cleaning and beautification of urban environment is directly related to it, so it is imperative to build smart sanitation.

## 4. Analysis of the Development Status of Smart Sanitation

### 4.1. Low Degree of Informatization

Smart sanitation relies on the construction of smart city and it is established on the basis of big data information platform. However, the level of information utilization of sanitation enterprises is low now. Specifically, there are the following aspects: First, it is the era of big data, the construction of smart city is accelerating, so the development of smart sanitation should

adapt to the construction of smart city to ensure the overall coordinated development of the city; second, there is no information sharing platform among various sanitation enterprises, which leads to the slow progress of smart sanitation development. Smart sanitation is a process of clear division of labor, cooperation and continuous improvement, not every sanitation enterprise establishes its own smart sanitation system. Without the data support provided by other enterprises, it is easy for the whole enterprise to face losses or even go bankrupt. Although each sanitation enterprise is competitive, it should not be an obstacle to their cooperation. If the government solves this problem or through a third-party platform, so that all enterprises can reach a consensus and establish cooperation. The whole sanitation industry will make a big step forward.

#### **4.2. Management of the Whole Process of Sanitation Operation**

With the implementation of urban garbage classification, the mode of sanitation operation should be adjusted. Traditional smart sanitation operation does not take into account the problems of garbage classification collection, transportation and treatment. Therefore, smart sanitation should be further developed to adapt to social development, improve resource recycling and achieve the goal of protecting the environment. In addition, the traditional smart sanitation mostly stays in the information collection and monitoring, and it is very mature in the positioning of personnel and vehicles and garbage collection and transportation, while it is not good enough in transshipment, handling, emergency response, resource recovery and decision-making assistance, and some of them are not mature. This is based on the fact that many sanitation enterprises do not have a correct and comprehensive understanding of smart sanitation, and lack a systematic understanding of the development of smart sanitation, which leads to the fact that traditional smart sanitation cannot effectively supervise the whole sanitation operation process. Moreover, it lead to low utilization rate of sanitation resources and waste of sanitation resources as well.

#### **4.3. Recycling**

With the call of energy conservation and environmental protection, the development of smart industry is gradually exploring the direction of resource recycling. In traditional sanitation work, garbage is simply treated as waste products and the treatment method is recycled as waste products as well. In order to realize the recycling of resources, smart sanitation should treat garbage as a resource and fully explore its utilization value. Recycling can also extend the sanitation industry chain, create new economic growth points for sanitation enterprises, and realize the unification of economic and social benefits of sanitation enterprises.

The process of sanitation or intelligence in foreign countries is the whole process of public participation led by enterprises and government. Through systematic search and investigation of the status quo of foreign smart sanitation, it can be summarized as "five transformations": socialization, informationization, intelligence, platformization and ecologicalization. Representatives from different countries can be seen at each stage. China is in the stage of informationization and intelligence, while developed countries have gone to the process of ecologicalization in stages, and their front-end (source), mechanism (guarantee), back-end emission and operation, and technology and equipment are maturing.

### **5. Analysis of the Development Trend of Smart Sanitation**

#### **5.1. Smart Sanitation Self-Help Decision-making**

At present, with the development of social economy, information society and the progress of science and technology, most sanitation enterprises in the market have realized visualization, data and intelligence, which is a real-time monitoring and positioning to staff and vehicles, the status of containers and the operation status in the process of sanitation operation. On this basis,

the monitoring equipment or sensors installed on the sanitation operation equipment are collected, classified, processed and stored, and some data can be counted and compared, so as to improve the operation efficiency. Through the combination of big data analysis and cloud computing, the database can be processed and smartly analyzed, which can realize smart decision-making in some operation processes, such as smart route selection and smart scheduling of personnel. Most of the processes in sanitation operations require to manual decision-making, that is to say, the current smart sanitation construction has not truly realized. In the future, the development direction of smart sanitation should be devoted to systematic self-help decision-making and artificial supervision. On the basis of the above-mentioned three modernizations, through a large amount of data collected by hardware systems, big data analysis and artificial intelligence, are used to make decisions on the analysis results, and software is used to send the decision results to every staff member. The data processing results will be publicize to the public, collecting suggestions and improving the system.

### 5.2. Data Confirmation and Data Sharing

Data confirmation is the key to data sharing. Only data ownership and responsibility are clear can it be carried out under the legal framework and play the role of its data assets. Data confirmation is the key to ensure data ownership. In recent years, our country has begun to attach importance to the protection of intellectual property rights, but the relevant laws have not been made to protect data ownership yet.

Not only the data sharing is the sharing among sanitation enterprises, but the building of smart sanitation should be a data network between the government and sanitation enterprises, and other industries and sanitation enterprises, which can realize the link of data resources by third-party platform.

### 5.3. Resource Recovery and Reuse

With the national advocacy of waste sorting and recycling, all large, medium and small cities have put it on the agenda and actively promoted its implementation. The purpose is to improve the recycling of resources, reduce the waste of resources and realize the recycling of some wastes in recent years. The construction of smart sanitation should also conform to the social development, taking resource recovery and recycling as its target and direction. Further more ,it will make a contribution to the urban economic construction and the green, healthy and sustainable development of our society.

## 6. Conclusion

In the long run, smart sanitation has great development potential, which is supported by national policies, such as the rapid development of urbanization, sustainable development strategy, and internet plus. On the other hand, the development of information society provides conditions for it, such as big data, artificial intelligence and the development of 5G technology. I believe that a true smart sanitation will be built and the sanitation industry will be flourishing in the near future.

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