

# *Research on the innovation strategy of Chinese public toilet business model based on the concept of green energy conservation and the thought of deep flow operation*

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**Abstract**—The public toilet is an important symbol to measure a country's civilization. Improving the condition of the public toilet is directly related to people's health and environment. This paper analyzes the current operation mode of public toilets in China. The background of the current reform of public toilets in China is analyzed through logical analysis, functional analysis and other research methods. We summarize the inadequacy of the current hardware equipment, management system, operation mode and other aspects of public toilets, and put forward a new concept of "netred intelligent environmental protection public toilets" based on the deep flow operation thinking. It aims to provide a new business model of "keeping toilets by toilets" for the reform and operation of public toilets in China and a theoretical basis for the improvement of public toilets.

**Keywords**- reform of public toilets, deep flow operation, energy saving and environmental protection, business model

## I. INTRODUCTION

Toilet problem is not only related to the improvement of people's working and living environment, but also related to the improvement of national quality and the progress of social civilization. Since the 18th National Congress of the Communist Party of China, general secretary Xi Jinping has attached great importance to the basic livelihood work of the "toilet revolution". However, problems such as poor environment, single function, high cost and low market demand of public toilets still need to be solved.

### A. Environmental analysis of public toilets

According to a 2016-2017 tourism competitiveness report released by the world economic forum in April, among the 136 countries participating in the ranking, China ranks 15th in the world in terms of tourism competitiveness. But in terms of specific measures, such as tourism infrastructure, China is in the 92nd place, and China's health conditions are in the 67th place. The image of "dirty, disorderly and poor" will inevitably lead to a certain resistance psychology after forming the inertial thinking among the masses, which is not conducive to the popularization and development of public toilets in China.

### B. Functional analysis of public toilets

Most of the current public toilets are to solve the physiological needs of users. However, with the economic development, people's spiritual needs are growing. If the function of public toilets only stays in the function of solving the basic needs, the lack of a complete humanized service system and spiritual enjoyment supply will inevitably be eliminated by the times. And the smart public toilets that pay attention to "enjoyment experience" can be more easily stand out in the market competition.

### C. Cost analysis of public toilets

Most of the current public toilets are provided free of charge to the public, and they have no economic income. They are operated by the government's investment in social infrastructure. And because of using more traditional equipment and lack of reasonable management mode, the operation cost of public

toilets is higher, which is one of the reasons for the serious environmental problems of public toilets. While introducing new technology to save water and electricity, smart public toilets also conduct in-depth operation of flow, develop advertising value, realize "keeping toilets by toilets", and greatly reduce the basic cost of public toilets operation.

#### D. Analysis of social needs

The current public toilets in China are of low grade, single function and poor environment, which all lead the masses to form a kind of resistance psychology to public toilets. Compared with the public toilets with poor sanitary conditions, the masses are more willing to meet their physiological needs in stores or at home.

## II. LITERATURE REVIEW

Ma Zhentao (2020) mentioned that the original intention of the toilet revolution is to solve livelihood problems in a down-to-earth manner meaning achieve sustainable operation, so as to minimize the cost.<sup>[1]</sup> Chen Xiangqian and Yu Chiming (2019) believed that public toilets are important carriers of humanization, not only because of the diversity of the groups, but also because of the rationality of their functional divisions, that is, the convenience, comfort, safety and privacy protection of the use of facilities and equipment.<sup>[2]</sup> Jin Qian (2018) believes that public toilets are an essential part of urban infrastructure, which not only meet people's basic living needs, but also have cultural connotation and civilization attributes.<sup>[3]</sup>

Chen Xiangqian and Yu Chiming (2019) believe that toilets have large flow of people and hence their commercial value is very obvious. However, if the environment of the toilet is very poor, people avoid it and lose its value. By combining their business model with the operation of public toilets, sustainable operation model can be achieved. Furthermore, the marketization of the operation of public toilets can not only make up for the lack of government funds, accelerate the speed of urban construction, but also promote the continuous innovation of public toilets in energy saving, water saving, environmental protection and other technologies to achieve win-win results.<sup>[2]</sup> Moreover, there is an excellent example of the public toilets in the Han Ling village in Dongxian Lake, using the "Internet +" control system to collect real-time monitoring information, which not only provides intuitive guidance for the public, but also realizes precise placement of advertisements through big data analysis.<sup>[4]</sup>

## III. BUSINESS MODEL INTRODUCTION

### A. Innovation

This business model puts forward the concept of "netred intelligent environmental protection public toilets", aiming to achieve the purpose of water and electricity saving by using science and self-made technology, and alleviate the waste of water and electricity resources in public toilets in China. At the same time, it makes use of the deep operation of flow, develops public toilets, and excavates the advertising value of public toilets, so as to realize "keeping toilets by toilets", and reduce the national infrastructure expenditure on the basis of not damaging

the rights and interests of users. This will promote the sound development of China's public toilets reform.

The target market will be citizens in the first and second tier cities. On the one hand, the people in the first and second tier cities have higher wages, pursue more refined life and pay attention to the comfort of life. Comparatively speaking, the spiritual demand is more urgent and the market demand is bound to be greater. On the other hand, considering the flow of people, large shopping malls and busy commercial streets (such as Nanjing Road) in first and second tier cities are the best choices for the project to be put into the target market in the first batch. The business model focuses on the in-depth operation of the flow, and carries out marketing in three steps: paying close attention to users, audience diversion, user activation and transformation, so as to realize "keeping toilets by toilets".

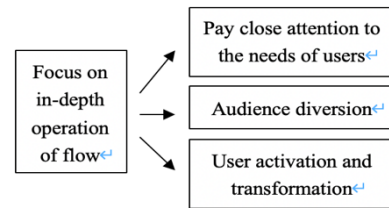


Figure 1. three steps of marketing

In terms of paying close attention to users' needs, providing more intelligent and convenient hardware facilities, private space and feedback mechanism for users' needs can greatly improve users' satisfaction, stimulate users' needs and create flow.

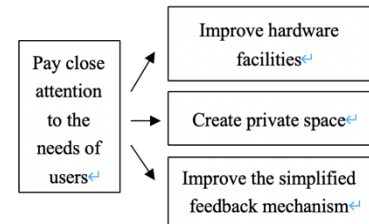


Figure 2. three ways to focus on users' needs

When it comes to improving hardware facilities, firstly, the toilet chooses to install intelligent closestools, providing disposable cushion sanitary film which can eliminate the user's concern about unsanitary. The intelligent closestools also have the functions of inductive cover opening, hip cleaning, seat heating, automatic deodorization, automatic toilet flushing, etc. Secondly, it is equipped with intelligent inductive trash can to reduce the user's need to contact the facilities and make it more convenient and sanitary. Thirdly, each compartment is equipped with an independent induction triangular washing table, and a vanity mirror with lighting function is arranged above the washing table, which can meet the user's needs of finishing instruments and avoid the embarrassment of women's making up at public washing table. Fourthly, the corresponding aromatherapy is equipped according to the artistic theme of the compartment to avoid the odor caused by the non circulation of gas in the confined space. Fifthly, there are two floor mirrors and two dryers in both import and export department of toilets. In addition, independent applets are developed and put on WeChat

and Alipay platforms. Users can easily pay by binding and landing. At the same time, the facility reduces users' need to touch the facility, improving the convenience and hygiene, and reducing the cleaning cost of the facility.

At present, people attach great importance to the privacy and freedom of space and information. In response to this demand, for one thing, the public toilets separate each user in the form of a small compartment, equipped with sound insulation materials, which can not only block the spread of noise when going to the toilet, reduce the embarrassment of noise producers, but also create their own private space to handle some emergencies which urgently need for a quiet place. For another, by playing light music, the noise produced by the user when going to the toilet can be further reduced, and the discomfort produced by other users can be reduced.

Feedback mechanism plays an important role in public management. Effective feedback can timely and accurately feedback the market demand direction and share, and promote the improvement and development of public toilet system. Considering that the tedious feedback is easy to get cross purposes, which leads to invalid feedback impact analysis results, and even causes users' boredom psychological results. With reference to the feedback mechanism of shared bicycles, basic questions such as single choice can be raised after the payment is completed, such as "Is the product damaged?" or "What are the damaged facilities?" Such a form is convenient and fast. Anonymous feedback mailbox is also set up on the developed applet for users to feedback.

The function of netred intelligent environmental protection public toilets is not limited to the traditional public toilets to solve the physiological needs of users, but to provide value-added services on the basis of improving the basic functions, so as to broaden the functions, expand the audience, stimulate the demand and improve the flow.

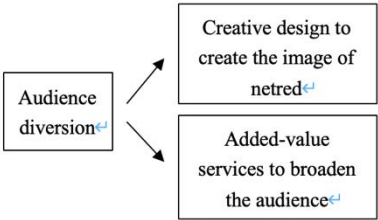


Figure 3. two ways of audience diversion

Through the appearance of the theme form and the design of the advertising wall, young groups are attracted and let users take photos to "punch in" with the appearance of high beauty value. At the same time, the desire to publish photos on social media can get free publicity on social platforms. The interior walls of each compartment are decorated with different wallpapers, and the corresponding aromatherapy atmosphere is used to stimulate users' needs with mystery and surprise. At the same time, the right lower corner of toilet paper in public toilet prints short

answers according to the principle of "answer book", which improves the interest and provides positive energy for users.

In each compartment and in front of the closetool, a touch-screen display and handle are placed, and some single games (game elements combined with advertiser elements) that can be completed in a short time are set inside, so as to improve the entertainment, increase the flow and hence directly increase the income. Based on the prototype of automatic beverage vending machine, a small-scale retailer is established at the entrance of public toilets, which is equipped with daily necessities such as paper towels, female sanitary napkins, band aids, disposable raincoats, drinks, etc., to solve the urgent needs of users. Moreover, the water saved by the user using the intelligent environmental protection public toilet will be fed back to the user in grams through the applet, providing ranking and integral accumulation services, to stimulate the user's demand and improve the user's awareness of energy conservation.

According to the information from WeChat and Alipay, such as gender, age, area, payment preference, etc., advertisements can be delivered more accurately and efficiently which can improve the efficiency of putting them into effect. Furthermore, through the data analysis of the user's click on the touch screen display and the advertising in the applet, the preferences of specific users are roughly determined which helps provide further data basis for the subsequent targeted advertising and improve advertising revenue efficiently.

### B. Comparison

TABLE I. COMPARISON IN VALUE ORIENTATION AND MARKETING STRATEGY

	value orientation	marketing strategy
Traditional business model	meet the physiological needs of users	normal operation only
New business model	meet the physiological and psychological needs of users; realize environmental protection through self-made technology to save water and electricity	make use of advertising to generate income in depth operation flow

TABLE II. COMPARISON IN ECONOMIC PERFORMANCE AND SOCIAL BENEFIT

	economic performance	social benefit
Traditional business model	free or just a small fixed base fee	limited to meet the basic needs of the society and lack of derivative benefits
New business model	reduce the user's toilet spending while achieving considerable revenue from advertising through in-depth operation of flow; reduce the government's infrastructure construction expenditure	new technology is used to save resources; applets are used to feedback, improving the awareness of environmental protection; the Internet is conducive to the timely collection of users' data, contributing to government's investigation of infrastructure and the realization of rational allocation of resources.

TABLE III. COMPARISON IN COST

	cost
Traditional business model	basic cost only
New business model	the cost of water-saving and power-saving technology, value-added services is high

### C. Cost structure

TABLE IV. COST AND INCOME STATEMENT

Cost (per toilet per month)		Income (per toilet per month)	
Charge for water	¥ 808.80	Advertisement	¥171,381.30
Charge for electricity	¥ 526.72	Fees paid by scanning code	¥ 12,420.00
Personnel remuneration	¥ 3,800.00	Other income	¥ 3,000.00
Instrument and equipment	¥10,463.80	Total	¥186,801.30
Rent	¥29,952.00		
Applet	¥ 11.10		
Other costs	¥ 700.00	Profit	¥140,538.58
Total	¥46,262.72	Not real profit	¥ 16,640.00

Since the target location of public toilets is Shanghai at first, the cost and income of this table refer to the price level of Shanghai, and the flow of people in R 1 is the reference.

The not real profit refers to the addition of public service advertisements without charge, and its benefits are expressed in RMB only.

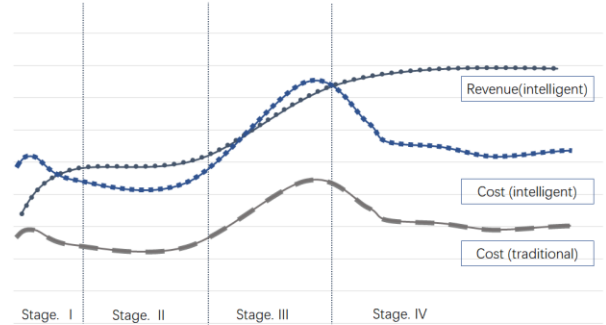


Figure 4. cost and revenue stage table

In the Stage I, a small number of public toilets will be put into operation. Due to the rapid growth of flow and income, the income and cost of the public toilets initially put into operation in the Stage II will tend to be stable. In the Stage III, the number of public toilets will be expanded rapidly. A large amount of investment will cause the income to be temporarily less than the cost. In the Stage IV, the project will be stable and the income of the public toilets in operation will grow rapidly and tend to be stable.

### IV. CONCLUSION

The following conclusions can be drawn.

Firstly, at present, most of the public toilets in China are faced with such problems as poor environment, single function, high cost, and low market demand, which seriously hinder their popularization and further development. Secondly, netred intelligent environmental protection public toilets can stimulate market demand and targeted advertising, improve advertising efficiency and income generating capacity, realize toilet maintenance and reduce financial expenditure by using flow thinking and deep operation of flow. Thirdly, netred intelligent environmental protection public toilets use modern science and technology to save water and electricity, implement the concept of environmental protection and improve public awareness of energy conservation, which play an invisible role in public service advertising so as to reduce costs. Fourthly, netred intelligent environmental protection public toilets provide diversified and humanized service functions, such as entertainment, private space, small retail center, etc., shifting the focus from meeting users' physiological needs to psychological needs, and putting forward a new idea of public toilet reform.

Although this paper describes the business model in detail, there are still some limitations: first, the benchmark income in this revenue model is based on Shanghai, and no other areas are discussed; second, this paper is mostly qualitative analysis, lack of sufficient data for quantitative analysis; third, after the first batch of public toilets are put into stable development, for the

later user retention and internal operation of public toilets There is no detailed discussion in this paper. Therefore, these aspects need to be further discussed and analyzed in the later research, and to improve the business model.

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