



# Research on the Development Bottleneck and Countermeasures of Air Purifier Industry in China

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DOI: 10.32629/memf.v5i3.2368

**Abstract:** Since the outbreak of COVID-19, the public's attention to air quality has increased significantly, which has subsequently boosted the attention of air purifiers. After research, it is found that at the present stage of China's air purifier industry lags behind compared with foreign countries, it can be seen that China's air purifier industry has more or less problems in the development process. This paper discusses the current development bottleneck of the air cleaning industry, hoping to provide certain reference value for the sustainable development of the industry.

**Keywords:** air purifier, industry, bottleneck, countermeasures

## 1. Industry overview

### 1.1 Development process

Domestic air problem was the first concern in 2003, the outbreak of SARS in China, the public began to establish the concept of air quality, and very few people have buying foreign air purifier. As the domestic real estate market heated up after 2005, formaldehyde poisoning incidents emerged after new house decoration, the public began to pay attention to formaldehyde problem; Since 2012, with the frequent domestic haze weather and the high PM2.5 concentration, the public gradually began to pay attention to the air quality problem, and air purifier began to enter the public view. Since the outbreak of COVID-19 in 2019, the public has become increasingly aware of the importance of clean air to human health. In addition, the country vigorously popularize the knowledge of indoor environment, strengthen the control of environmental air quality, so that the environmental protection industry develops rapidly, so that the air purifier industry (hereinafter referred to as the air cleaning industry) rapid development. The market share of domestic brands is gradually increasing and continues to grow, but there is still a certain gap compared with foreign brands. The rapid development of the industry has brought to the increase of enterprises producing air purifiers, which also leads to a wide range of domestic air cleaning products, but the lack of high-end products cannot meet the demand of the market. After the issuance of the new national standard, the product power of domestic products has a rapid growth, and even has surpassed the posture of foreign brands[1].

### 1.2 Industry characteristics

#### 1.2.1 The air purifier industry is still in its infancy in China

In recent years, the air cleaning industry has shown a momentum of rapid development, but for now, it is still in the initial stage of development. Compared with developed countries in Europe and the United States, the penetration rate of air purifier products in China is less than 2%, and even far lower than the user ownership of traditional home appliances such as air conditioners, refrigerators and washing machines. From this point of view, the future of China's air purifier market growth space is sufficient.

#### 1.2.2 Consumption upgrading is a powerful driving force to promote the development of the air cleaning industry

Residents' consumption concept has shifted from the satisfaction of quantity to the pursuit of qualitative leap, especially in the pursuit of quality and healthy life. At the same time, the continuous improvement of residents' disposable income also promotes the further optimization of the consumption structure. As a purification tool to continuously supply fresh air, and filter dust, PM2.5, ozone and other pollution sources, air purifier is essentially to provide users with a comfortable indoor air environment and improve the quality of life. In the background of health consumption upgrading, the development potential of air net industry is inestimable.

#### 1.2.3 Product intelligence and functional diversification

As the epidemic gradually fades and the public health awareness is further enhanced, the demand for air purifiers will gradually expand in the future. The function of air purifier gradually changes from a single focus to the comprehensive improvement of indoor air. In addition to sterilization, dust removal and haze removal, there is also whether the air purifier

can be used more intelligently and conveniently to carry; whether the purifier can add the functions of incense, Bluetooth speakers, fans and other products; whether the battery life of portable air purifier can be longer; whether the price of air purifier is friendly, etc[2].

## **2. Industry development status quo**

### **2.1 Strong support of national policies and the integrated development of various industries**

Up to now, China has issued a series of policies conducive to the development of the air cleaning industry, providing a strong support for the development of the industry. On April 25, 2022, The State Council issued the Opinions on Further Releasing the Potential of Consumption and Promoting the Sustainable Recovery of Consumption, vigorously developing green home decoration and encouraging consumers to replace or buy green energy-saving home appliances, environment-friendly furniture and other household products. At the same time, "China's Home Appliance Industry" 14th Five-year "Development Guidelines" also clarified the overall development goal of China's home appliance industry during the "14th Five-year" period is to continuously improve the global competitiveness, innovation and influence of the industry. By 2025, China is expected to become a global leader in home appliance technology innovation, thus promoting the deep integration of new technologies such as big data, the Internet of Things, cloud computing, artificial intelligence, 5G and home appliance products. China's policies, whether for the release of consumption power or the deep integration of the air industry and other industries, to a certain extent, better meet the needs of the air industry consumption upgrading.

### **2.2 Industry supervision is gradually strengthened, and industry standards are gradually optimized**

For the traditional air cleaning industry, the air purification effect testing units marked by different brands of air purifiers are not unified, the market threshold is low, the lack of unified industry regulatory standards, and the lack of professional supervision in the service process affect the development of the industry. However, on October 14, 2022, the State Administration for Market Regulation and the Standardization Administration officially approved the release and release of the national standard of "Air Purifier", which was implemented on May 1, 2023.

### **2.3 Insufficiency of customer demand stimulation and large space for market development**

According to the survey, the penetration rate of air purifiers in China is 28 percent in the United States, 17 percent in Japan, and only about 2 percent in China. From 2017 to 2020, the annual growth rate of air purifier production is about 5.9%. In 2021, the output of domestic air purifier market reaches more than 218.3 million units, an increase of about 8 million units compared with 2020, and a year-on-year growth of 3.8%. The output growth rate is considerable. However, in 2022, China's retail sales of air purifiers were 4.83 billion yuan, down 18.7 percent year on year. Overall, the air purification industry demand has a downward trend. Grasp customer demand is the first priority, stimulate customer consumption, promote the development of the industry obstacles and long. It can be seen that China's space net industry still has a considerable space for development.

### **2.4 There are barriers to technological upgrading, and there is not much room for innovative breakthroughs**

The air cleaning industry has developed for many years, and all kinds of technologies are constantly innovating and upgrading. So far, HEPA filter as the main filter, is still the mainstream of air purifier technology. Traditional air purifiers usually use the principle of "adsorption" of activated carbon to remove formaldehyde, but the treatment effect is very little. At present, there are large barriers to technological upgrading. Although plasma, UV UV, photocatalyst, anion and other technologies can disinfect and purify the air, they often cannot meet the standards of energy conservation and environmental protection because of the production of secondary pollutants. At present, enterprises use multiple mainstream technologies for product development, and it is difficult to achieve innovative breakthrough in purification technology for a long time. Water gating technology, GreenHEPA antibacterial aldehyde dual-effect filter, and deep purification technology are the latest innovative technologies, but they are not widely used in the industry. There is still a lot of room for innovation and creation in both mainstream and emerging technologies.

## **3. Industry development bottleneck**

### **3.1 Customers' weak awareness of air purification**

According to the 2019 National Health-2022 Insight report, the public no longer takes physical illness as the only criterion to judge health, mental health and other high-quality living conditions such as good sleep and good diet, but few

consumers mention keywords such as breathing and air purification. It can be seen that although the public's health concept has been upgraded comprehensively, most people's health awareness in air purification and the awareness of air purification products are weak. According to statistics, indoor air pollution is 68 percent of the source of the disease[3]Therefore, it is urgent to improve the awareness of air purification and closely related to the health needs of consumers.

### 3.2 Slow development of product technology iteration

At present, the main demand for air purifiers in the market comes from the three scenarios of home, business and industry, so the core technologies applied are still physical purification and chemical purification[4]. In 2022, the largest proportion of the retail sales of air purifiers were still released before 2014. Although the industry has achieved the diversified development of the brand, fundamentally, the purification principle is similar to a certain extent, and the relevant technologies in the industry can be used for reference, the product iteration is slow, and the technology development is slow.

In addition, China's main technological innovation areas focus on filtration materials and electrostatic adsorption, photocatalyst and ion technology three aspects[4]. At the present stage, the innovation of air purification technology takes the upgrading of filtration and purification capacity as the main key direction, which ignores the coordination of noise reduction technology, use optimization of consumables and upgrading of intelligent level, lacks the ability to expand to multiple latitudes, and the layout of technological innovation is limited.

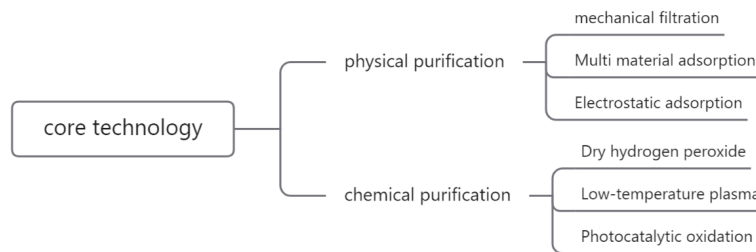


Figure 1. Main core technologies of air purifier

### 3.3 Market supervision is relatively difficult

In recent years, environmental problems have heated up the air purifier market, causing the upsurge of public attention under the action of many factors, and many enterprises are no exception. China's air purifier industry brand is growing fast, and the air purifier market gradually broke out. But the rise of the number of brand also caused the consequences, air purifier brand on the market, purification principle is diverse, purification effect is good and bad are intermingled, the original national standards cannot effectively cover the air purifier under the new period technology, types and demand, plus the new crown outbreak of hot market demand again, lead to many enterprises to benefit and exaggerated propaganda or false propaganda. At present, although the new national standard has been promulgated, but there are always some enterprises to take risks.

During the epidemic period, the development of the industry sank, the overall stability of enterprises was frustrated, the brand survival of the fittest led to the acceleration of the industry reshuffle, and the frequent market access and withdrawal greatly increased the difficulty of supervision. At the same time, the product quality supervision project is still arduous. According to the national supervision and spot check of the quality of household appliances released by the State Administration of Market Regulation in March 2022, the discovery rate of unqualified air purifiers was the highest.

## 4. Industry development countermeasures

### 4.1 Government-enterprise cooperation to improve customer awareness

It is still insufficient to rely solely on the government or enterprises to raise consumer awareness. The government and enterprises should jointly carry out extensive social science popularization and education, guide the public to correctly understand the impact of indoor air pollution on health, strengthen the popularization of the importance of indoor purification, further enhance the public's awareness of the prevention of indoor pollution risks, pay attention to indoor air purification, and improve indoor air quality. At the same time, enterprises can actively implement environmental protection measures such as energy conservation and emission reduction, through their own exemplary role, to win the public goodwill, guide the public to pay attention to air quality and participate in the action to improve air quality.

## 4.2 Innovation combination to achieve technological upgrading

At present, the air purifier products on the market are mainly a composite combination of various purification technologies. At present, the industry is still faced with pain points such as insignificant purification effect, formaldehyde difficult to remove, frequent filter replacement, so it can be seen that the existing technology is still difficult to meet the public demand for higher air quality in the environment. When air purifier products become common household appliances, the public awareness of the product gradually increases, which means that the core technology of the product will become the main reference factor for consumers to buy empty net products. For working enterprises, it is necessary to achieve effective breakthroughs in product technology, insight into consumer demand, and make effective innovation combination. At the same time, increase technology research and development efforts to achieve multiple performance innovation of products.

## 4.3 Improve the system and standardize the market order

The 14th Five-Year Plan points out that we should "improve the fair competition system, improve the policy framework of fair competition, and build the implementation mechanism of fair competition policy covering before, during and after the event." The competition mechanism is one of the main mechanisms for the market to effectively allocate resources, and the fair competition system provides institutional guarantee for the role of the competition mechanism, which restricts the violations of enterprises. We should strengthen the publicity and popularization of the new national standard, and promote the rational production of enterprises and the rational consumption in the market. In addition, the government should standardize the production process of the industry, supervise the industry research and development, production, sales and other environments, form a unified supervision and management system, carry out sampling inspection on the quality of products sold in the market from time to time, and make the sampling results public to the public. Enterprises that deliberately cheat customers will be punished according to law and regulations, and the credit blacklist will be banned from the market.

## 5. Literature review

This paper reviews the development process of the air cleaning industry and analyzes its development characteristics. After market research, it explains the development status of the industry from four aspects: national policy, industry supervision, customer demand and technology upgrading. At present, the development prospect of the industry is optimistic. Based on the current situation, the research found that the industry is mainly faced with bottlenecks such as weak awareness of air purification, low awareness of products, slow iteration of product technology, difficult to achieve innovative breakthroughs, and difficulty in market supervision. This paper puts forward the corresponding countermeasures and suggestions accordingly, hoping to provide the reference value for the healthy development of the industry.

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