



# Analysis of the Current Development of Air Purifiers-- Taking Xiaomi Air Purifier as an Example

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**Abstract.** The air purifier is an indoor electrical appliance that targets the medical industry, people who allergic to fine particles, and people want to enjoy quality of life. It has been dominated by the IQAir and Philips brands in a niche market for decades. Around 2013, air pollution became more and more serious, at the same time people's health awareness was awakened by the social media campaign, which created a huge demand. In response to the severe pollution that Chinese was facing, Airpal entered the market. They enhanced air purification intensity and introduced PM2.5 digital display technique. In the years that followed, many companies saw the future of the industry is very profitable so they entered the market. In this period, the market was full of marketing techniques in order to win the competition. But after a few years the market started to go downhill again and a significant amount of companies left the market. By using the PEST model, this paper analyzes the external factors that played significant effect in the market, and then use the SWOT and 4P models to conduct a case study on Xiaomi, a representative brand in the industry, so as to offer some references for future studies about the air purifiers.

**Keywords:** Health, Air pollution, Air purifier, Xiaomi company

## 1 Introduction

Today's studies on air purifiers are generally only measured for a particular brand, without segmentation, and without detailed market analysis. This can somewhat affect the depth of research into the sector and lack of data to support it. They focus on the technological innovations adopted by purifiers and the changes in market sales. However, the timing of the publication of these studies is not very effective. The market for air purifiers is highly variable, especially in light of the fluctuating economic structure of the epidemic, which has led to a different distribution of consumer spending than before. There is very little recent information available, no formal data studies, only approximate analyses, a phenomenon that stems from the decline of the industry as a whole and the consequent decline in academic analysis of this sector. This paper further explores how some of the issues that have occurred in recent years have impacted the air purifier market. In the second part of the paper, the PEST model is used to analyze the external conditions of the macro market. In the third part, the SWOT model is used

to analyze the current situation faced by Xiaomi's purifier market. The company's case is also explained in detail from a micro perspective through the 4Ps. This paper may offer some references for future studies about the air purifiers.

## **2 Changes in demand for air purifiers**

In 2013, air pollution exploded in northern China due to an exponential increase in the concentration of PM<sub>2.5</sub> particles caused by the excessive use of non-clean energy sources, mainly coal. A media documentary on air pollution, "Under the Dome" [1] exploded almost overnight, its author Chai Jing used her daughter's tumour before her daughter was born as a guideline, visited several factories to find the root cause of the pollution and awaken people's awareness of their health.

Air purifiers then came into the limelight and became an essential appliance in many homes. These products mainly use filters to absorb, decompose and kill pollutants in the air to convert them into harmless gases, which are then blown into the room by a fan to accelerate the circulation [2]. There are many different models to choose from depending on the needs of different scenarios.

According to AVC, the market for air purifiers saw sustained and substantial growth in the market during 2015-2017 with a growth rate of 96% for new businesses [3]. But after 2017, the government's investment in haze control work ushered in significant results, according to the Beijing Municipal Environmental Protection Bureau released the "2017 Beijing Environmental Status Bulletin" Beijing's air quality met the standard days, that is, the number of excellent and good days is 226 days (PM<sub>2.5</sub> index in <100), an increase of 50 days compared to that in 2013 [4]. The consumer consciousness believes that the purpose of purchasing an air purifier is to purify the home of harmful particles such as PM<sub>2.5</sub>, and as the haze dissipates, this appliance is no longer needed. This means that the demand for air purifiers has declined.

Sales are seen to be declining year on year in AVC's data on the retail sales of purifiers in China from 2018 to 2021. In 2018 it was 5.29 million units, in 2019 a total of 4.66 million units were recorded as sold, and in 2020 and 2021 only 3.8 million and 3.71 million units were sold respectively [3].

## **3 Analysis of the current status of air purifiers**

### **3.1 PEST analysis**

The PEST model was introduced by American scholars Gerry Johnson and Kevan Scholes in 1999. The four letters stand for political, economic, society and technology, which are widely used to assess external factors of a market. The PEST model is also a useful tool to understand the market, the position of a company, its business direction and potential [5]. The following section uses this model to assess the external environment faced by the air purifier market.

**Political factors.** Firstly, with regard to political factors, on 15 September 2015 the National Standard for Air Purifiers, as revised by the National Standards Committee, set out the basic technical specifications for air purifiers in terms of "clean air volume" and "cumulative purification volume", i.e. the air purifier the air purification capacity of the product and the continuity of the purification capacity. The noise limit of air purifiers is divided into 4 levels from low to high. The energy efficiency level of air purifiers for different pollutants has been upgraded to two levels: qualified and high efficiency [6]. This regulation eliminated many non-compliant companies from the market.

**Economic factors.** In order to prevent the further spread of the outbreak, a large number of people with intensive contact with the virus were quarantined and people were advised not to leave home unless necessary, with companies working from home and students attending classes at home. According to China Business Intelligence [8] in the first quarter of 2020, 25 provinces and cities showed negative GDP growth, including the province where the outbreak originated, with a GDP growth of -39.2%. This disaster has dealt a serious blow to China's economy. Data from the Sky Eye search showed that a total of 460,000 businesses closed down in China during this period [7]. The offline sales channel for air purifiers was blocked during this period, with many businesses closing their offline shops due to lack of income and the need to pay rent. A large number of companies withdrew from the market because they could not support the huge operating costs

**Social factors.** The market for air purifiers has become smaller after the haze has been effectively addressed by the Chinese government, and the main target customers include newborns and pregnant women, as they have a greater need for indoor air quality. Newborns in particular are more vulnerable and can suffer from leukaemia if they inhale too much formaldehyde during this period. However, the birth rate of China's resident population has been declining in recent years. According to the China Business Information Network, the birth rate was 13.57% in 2016 but only 7.52% in 2021, as shown in Figure 1 below. As a result, the market demand is decreasing.

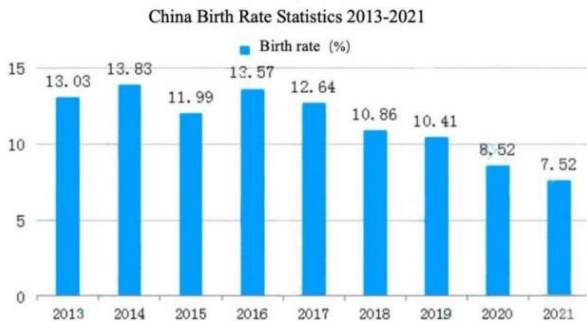


Fig. 1. China Business Information Network [8]

**Technological factors.** Air purifier technology continues to change and innovate, iterating in response to market demand. From the initial physical filtration and adsorption technology, electrostatic dust removal, negative ions and ozone generator functions have been added, followed by nanotechnology, HEPA, photocatalytic technology, and now innovative products such as air purifier fans have been combined with home appliances. This development takes into account the green concept of sustainable development and the fact that multifunctional products have become more user-friendly to better meet people's daily needs [2].

### 3.2 Price changes in the air purifier market

According to CMM statistics in January 2019 the top 10 air purifiers in the Chinese market had a price range of RMB 2500 - RMB7100, with the Philips brand occupying the top spot in terms of sales, with an average brand price of 3227. The highest priced brand AQ Smith (RMB 7141) was ranked 4th in the list [9].

On December 2020, the statistics showed that the average price range of the top 10 brands occupied the highest sales decreasing to RMB1200-RMB 5700, with the previous highest priced AQ Smith brand products trading at an average price of RMB 5738[10]. Notably, the average price of the lowest priced Xiaomi brand was less than one-half that of the second lowest priced Panasonic brand.

In July-September 2019, a research team tracked market data on Chinese e-commerce platforms and found that the Xiaomi brand appeared most frequently during this period followed by Philips Haier and others. Xiaomi has quickly attracted a large number of consumers with its own branded traffic and brand awareness, leading in sales online [11].

This demonstrates that the market has become more competitive, but it also forces brands to do research and development in technology development. Each company reduces costs and makes progress in the productivity and output of machines and employees respectively, so that there is more room for lower prices to attract more consumers. Especially after the outbreak of the CPVID-19 in 2020, when company and school closures became the norm to prevent the spread of the epidemic and people's incomes were uncertain during this period, people would be more inclined to choose cost-effective products.

## 4 Analysis of Xiaomi air purifier

### 4.1 SWOT analysis of Xiaomi air purifier

SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats, and is an acronym used to assess the internal and external factors of a business enterprise [12]. On December 9, 2014, Xiaomi's purifier was officially introduced to the market. Within a year's time, the sales volume of this machine exceeded one million. In four years, it surpassed the sales of all machines in the same category to become number one. Xiaomi was founded back in 2010, and in 2011 they officially launched their mobile phone and received a very good response. They also gained their first customers for their brand.

In August 2013, Xiaomi completed a new round of funding, valuing the brand at US\$10 billion and becoming the fourth largest internet company in China.

**Strengths.** For Xiaomi Air Purifier their main advantage is that they carry their own traffic. It has its own online forum, where they invite people with a strong interest in the Xiaomi brand to present their product needs in the product planning. In terms of product design, the brand's core users will participate in the beta version of the software to give feedback, and Xiaomi will improve on its shortcomings based on this feedback. At product launches they will also carefully design and set up offline launches to ensure that customers have a memorable experience. These deep interactions ensure brand loyalty [13].

Most notably, Xiaomi has its own whole-house smart system. Users can download the "Mi Home App" to control all Xiaomi-branded appliances in their homes, and can also turn on devices in their homes via the voice control system. The Air purifier can also be added to Xiaomi's system, allowing users to turn on the Air purifier in advance via the app when they arrive home, so that they can breathe fresh air even in hazy conditions.

**Weakness.** In terms of disadvantages of the Xiaomi brand, the Xiaomi purifier will be too noisy in order to maximize their purification effect. This product will often be placed in a room, and if the decibels are too high, it will affect the users' rest.

CADR is a metric used to assess the purification capacity of an air purifier. Although Xiaomi officially proposes a maximum CADR value of 406m<sup>3</sup>/h, which is comparable to high-end purifier brands such as Blue air. However, to achieve this value, Xiaomi needs to turn up the purifying wind gear to the maximum, and the noise of running at that level will reach 70 decibels, which is seriously more than indoor personnel can tolerate, especially during sleep which will cause some disturbance. If the purifier is lowered to sleep mode, the reduction in airflow at this level will reduce the CADR value to around 190m<sup>3</sup>/h under acceptable noise conditions [14].

**Opportunity.** Xiaomi has to a large extent seized the opportunities it can reach, for example in terms of internet market share Xiaomi itself maintains a positive relationship with its users. For sales in the online e-commerce channel there is a complete system in place to run this single transaction after the user has placed an order. In terms of logistics, Xiaomi is responsible for the core part and outsources the rest of the work to other organizations so that quality control is guaranteed. For possible after-sales issues, Xiaomi has also arranged for 24-hour online customer service to ensure that feedback is given to users efficiently. This complete process makes for a good customer experience and attracts a lot of traffic, so it quickly captures a large market share.

**Threat.** Xiaomi entered the market relatively late, and there were many companies that took up most of the market share as early as 2013. In particular, some foreign companies such as the Swiss brand IQ air have existed since 1963, so some consumers who

are not "Xiaomi fans" may prefer to choose these brands with a longer history. In addition, the barrier to entry for air evaporators is not too high, and if other large home appliance companies want to enter the market, they may reinforce the price war by offering lower prices than Xiaomi.

## 4.2 4Ps analysis of Xiaomi's marketing theory

The "4Ps" theory of the marketing mix was born in the United States with the introduction of the marketing mix theory, created by Neil Borden in 1953, which implies that market demand is more or less a response to marketing variables or sales factors. In order to find some market impact, firms must effectively combine these elements to meet market demand and maximize profits. McCarthy in 1960 summarized the marketing mix elements into four categories: product, price, place and promotion [15].

Firstly, in response to Xiaomi's product price, they went mass market with a low price, with the first generation of the purifier going on sale for even less than RMB 1,000, when the average price in the market was around RMB 3,000. This allowed them to quickly open up the market to families who were health conscious but could not afford the high cost.

Their products have evolved from a single purifier at the beginning to today's purification fan. As today's overpopulation has led to many people having to live in small spaces. This is especially true in big cities like Beijing and Hong Kong where the housing problem is even tighter. If two large appliances are placed in an already small space, it is a waste of space and the combination of the two becomes more effective. In addition to this, as the haze season is winter, people don't need to use the air purifier for a large part of the summer, which would leave the product unused. But with the addition of the fan function, people can breathe the freshest air while riding in the cool, thus not only increasing the utilization of the machine throughout the year, but also increasing the demand for Purification fan.

Xiaomi's sales channels are mainly online platforms, which has the great advantage of reducing operating costs and therefore allowing them to sell their products more competitively at lower prices. In addition to this, because of Xiaomi's positive relationship with customers in online forums and their complete online sales system, online sales can increase the awareness of their products through retweets from users. Offline, Xiaomi's products are also present in some of China's leading electrical outlets such as Suning Tesco and their own shops, where they are no less popular than other brands that sell offline [11].

For promotions, there are some major sales days that are unique to China, and in e-commerce platforms such as Jindong and Taobao, they push prices to freezing points. This is to attract more users to experience them.

## 5 Xiaomi's marketing tactics

The celebrity effect refers to how celebrities can raise the profile of a property and increase exclusivity. Celebrity endorsements will bring publicity and build brand image to raise awareness and attract more consumers.

At the end of the 2022 Winter Olympics, Xiaomi followed the trend by inviting the first gold medalist, Yang Qian, to be the brand's spokesperson, while patriotic sentiment was high and many people had a sense of national pride for the glory Yang Qian had achieved. So, there will be many fans of Yang Qian and some patriots to support the domestic products so spend. In addition, compared to hiring some popular stars to do endorsement, the cost of Olympic champions is relatively low, and the short-term specific period of placement will bring better results, because consumers are not always rational.

## 6 Conclusion

This paper summarizes the past and present market comparison of air purifiers. Air purifiers once existed to clean up the haze and were once a large and competitive market. But after the pollution has been well managed, so the market demand is greatly reduced and the main audience groups are now pregnant women and newborns, who are sensitive to the living environment. In addition, the quality standards set by the state, the impact of the epidemic on the economy has resulted in a massive increase in operating costs. Nowadays, only brands with core technology that can be produced at low prices and have a big reputation can continue to benefit. Using data-based information to make an analysis, this paper hopes to be useful to future researchers. Admittedly there are some limitations to this article as most of the information used in this article is secondary information and the information and research is limited to the Chinese market and may not be generalizable to other economies.

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