

Research on Potential Market Trend of High-Fidelity Headphones

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ABSTRACT. *With the continuous aggrandizing demand for superior level of mental amusement, more and more people are now inquiring for better performance of digital productions, including headphones. Favored by the speeding development of acoustic technology, such as Bluetooth, truly wireless technology and noise-cancellation, high-fidelity headphones, other than normal headphones, are enabled to provide us with agile, dynamic music perceptions. However, the market of Hi-Fi (High Fidelity) headphones is still in a burgeoning state for its expensiveness and unpopularity. The article anticipates the potential trend of Hi-Fi headphone market based on data analysis, and draws conclusions in perspective ways to facilitate companies and customers to better understand and handle the market and techniques conditions of Hi-Fi headphones.*

KEYWORDS: *High-fidelity headphone, Hi-fi, Headphone market, Wireless technology, Noise-cancellation*

1. Introduction

High Fidelity headphones & earphones (hereinafter refer to as Hi-Fi headphones), which represent the frontlines of the most cutting-edge acoustic technologies and were massively invented by prominent acoustic engineers, are sneaking into people's life. In spite of equipping advanced techniques and fancy appearance, Hi-Fi headphones were unpopular until these years. Back to then, about ten years ago, people showed little interests in Hi-Fi products for its appalling price and unpracticality, instead, they only required a pair of "sound-able" players. Nonetheless, auditory enjoyment was gradually accentuated when salaries rose and headphones somehow became indispensable and portably carried by everyone. People started to pay attention to their auditory sense, thus they became a bit of captious when selecting headphones. Another climax of headphones reached as soon as Apple Inc launched its brand new AirPods, which brought the epoch of truly wireless headphones into people's sight.

Undoubtedly, headphones have gradually become a necessity for people's lives. One can enjoy one's world through headphones, free from the influence of the surrounding environment. With the development of new acoustic technology, the type, design, and sound quality of headphones have also been continuously improved and changed. By providing an excellent noise reduction system and high sound quality, the eardrum gets the same sound as a live performance, and thus more and more exquisite headphones stand out.

While audiophiles' demand for high-quality music continues to grow, so makes the demand for high-fidelity equipment. This is what we call Hi-Fi headphones. Hi-Fi headphones are defined as terms used to describe high-end headphones, with a primary focus on sound quality for consumer music lovers. Because the product is aimed at consumers who are looking for high-quality products, sellers must ensure the standard music genre that most consumers can hear, while improving the quality of design and wearing comfort.

As the pursuit of better sound quality headphones will be the trend of the future, it is certain that the demand for high-end headphones will significantly increase. Among various high-end headphones, wireless technology has become the dominant technology in the semiconductor industry due to the convenience of wireless technology, which turns wireless headphones to a popular buying trend for headphone enthusiasts. Therefore, with more and more applications on mobile platforms, wireless devices are the single most important driving force in the electronics market. On the other hand, the continuous development of noise-cancellation technology has also helped users solve the problem of external noise interference. Although noise-cancellation and wireless technology are the mainstream of the current headphone market, these features are not apparent to the Hi-Fi headphone market because resolution and fidelity are the primary considerations for Hi-Fi headphones. Many headphone companies are now developing a technology that can apply these technologies to a product at the same

time. However, the pursuit of wireless and noise reduction technology is undoubtedly a new challenge for Hi-Fi headphones. Judging from the current development of Hi-Fi headphones, the Hi-Fi headphone market is still not saturated and will face considerable challenges in the future, but there is still much space for development.

2. Significance and Influences

As you can imagine, headphones are consumables with about 1- or 2-year alternations for its easily abrading and fragility of precise interior constructions, rendering customers to keep refreshing them. Besides, headphones, especially Hi-Fi headphones, have customer-stickiness, which means those who have amused by Hi-Fi headphones are not willing to purchase for headphones of inferior levels. Along with matured acoustic technologies and ascending material standard of people's life, it's easy to infer that Hi-Fi headphones will occupy a large part of the market share in the future.

Undisputedly, the era of Hi-Fi headphones is coming soon. With more and more people noticing that “we know Bugatti among the best cars, Burberry among the best fashion brands, Apple among the best smartphones, but we know nothing about the best headphones”, customers will focus more on the ability of high-end headphones, which means they are more willing to pay for the acoustic amusing instead of “acoustic hearable”.

The Hi-Fi headphones market is still in a burgeoning state. Though it's in infancy, it has great potentials for the reasons referred above. Thus, data-based analysis on potential market trend of Hi-Fi headphones are influential for investors and manufacturers on conducting the directions of capitals of investments, offering suggestions and necessary information to favor profitable businesses. Furthermore, customers' perspective in the article is significant for suppliers and retailers to understand the aiming-group and the choice of product design. On the contrary, the content can also help customers comprehend the unfamiliar headphones market, and facilitate people to have a better comprehension on Hi-Fi conceptions.

3. Research Method

The purpose of this research is to analyze and predict the potential development model of this immature headphone market by using Hi-Fi headphones.

Based on the latest developments in the headphone market technology, we predicted the development trend of the high-fidelity headphone market, proposed several perspectives based on these forecasts, and found some relevant papers and materials to support these arguments. Meanwhile, we mainly analyze the needs of customers and the trends of product and technology development in the market. For example, we searched for information about some of the latest Hi-Fi product versions, as well as papers on the development of wireless technology for Hi-Fi headphones. We have also found out several articles on noise reduction Hi-Fi headphone products from multiple manufacturers in order to learn more about the development of Hi-Fi noise reduction headphones.

4. Literature Reviews

4.1 Increasing Headphone Market Size

Similar to other consumer products, analysis of headphone market size stands as a crucial role to infer the future trend of sales. While society nowadays has a vast development on network technologies, with people spending more time surfing through online social platforms, headphones have become one of their essential tools in everyday life. NASDAQ has released a report showing that rising usage of electronic devices such as smartphones, tablets, etc. drives the headphone market into heyday during recent years, with increasing popularity on streaming of videos and music, and other social media platforms such as YouTube [1].

4.2 Trending Technological Developments on Headphone Market

In addition to technological advancements, noise-cancellation is going to push the market growth forward and expand its demand size on headphones. Manufacturers are also going to enhance more features on headphones to aggrandize their availability [1]. Moreover, wireless technology is another popular trend that most conventional headphones are heading towards. With people's higher budget and recognition on headphone products, progressively domestic new brands started to rise continually relying on its excellent product function with relatively lower price than other internationally famous brands and some gradual official listing has even

narrowed the gap in technology among different brands, with reflections on various rankings and features of attention. According to the report posted in the first half of 2019, the Bluetooth headphone demand has dramatically increased its attention to 42 percent, ranking as the first popular headphone demand feature [2]. The second most popular feature of headphones is devoted to games and movies category due to the rising gaming market and high popularity involved. However, the attention of gaming headphones also decreased slightly because of the decreasing popularity of survival games like PUBG. Additionally, Hi-Fi headphones remain in third place of attention, which depicts that more consumers have focused on this type of featured headphones.

5. Perspectives on Market and Techniques of Hi-Fi Headphones

5.1 Potential Growth in Hi-Fi Headphones Market

The global Hi-Fi (high-fidelity) earphone & headphone market will continue expanding in the future due to plenty of key factors, for example, increasing use of mobile phones and other portable devices. According to the study, the global headphones market size is anticipated to reach USD 15.80 billion by 2025, registering a CAGR of 5.9% driven by augmenting the use of portable devices [1]. By 2019, people of 68% own smartphones in China and 77% in the U.S., and the proportion of smartphone owners is still expected to upsurge [3]. People nowadays are mostly using smartphones to power their headphones, and with the consciousness of self-spaces growing, increasingly people will demand headphones to provide personal auditory amusement. Besides, our digital habits of using wearable devices will help the headphone market grow [4]. Fetch out our smartphone, find a song we like, put on headphones, and start to do what we should do—that is how most people do to start the whole day. People are now getting accustomed to this kind of lifestyle, and such habits will help to keep a high market demand in the headphones market.

Another critical factor in growing the Hi-Fi headphone market is the demand for sound quality. In May 2019, Qualcomm surveyed about 6000 people in total with every 1000 ones distributed in the U.S., U.K., China, Japan, India, and Germany. According to the research, sound quality has been the top impetus for four years for people to buy audio devices. About 63% of people believe that high resolution is of importance for headphones. According to Figure 1 shown below, the sound quality remains the most significant point for headphones. There is 36% of the population accentuates truly wireless function, equalizing with the function of active noise-cancellation. The rest of the people, about 63% of the population, will consider Hi-Res audio when purchasing headphones. [5]

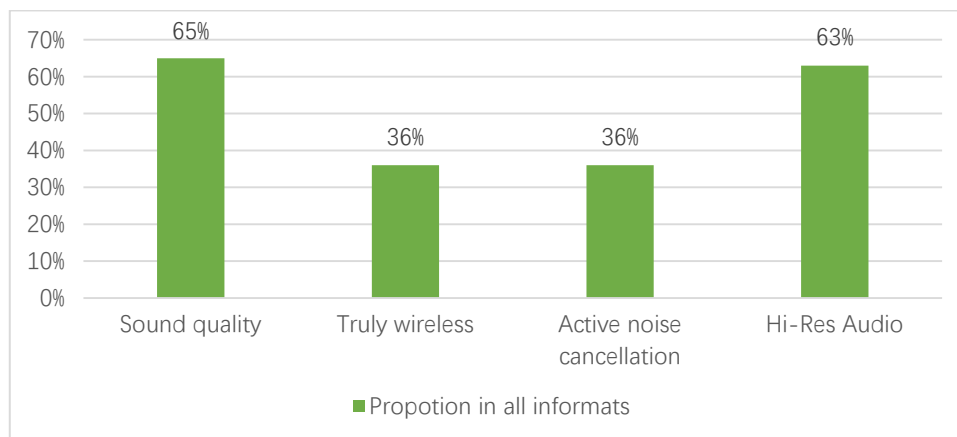


Fig.1 Focal Features for Purchasing Headphones

Furthermore, APEC is the largest and fastest-growing region of Hi-Fi audio system so far, and North America occupies the second-largest market of Hi-Fi with steady growth, which signifies nearly half of the global population is in need with well-qualified headphones and the demand will only be increased further [6]. With the increasing demand trend for both headphones and sound quality, the Hi-Fi headphones market will be foreseeably expanded within a few years.

5.2 Trend of Wireless Hi-Fi

In China, the proportion of wireless headphones selling on the e-commerce platform is more than 50% in 2019, and the year-on-year growth of truly wireless headphones exceeds 630% by the end of 2018 [7]. The boom of truly wireless headphones is contributed by the newest update of Bluetooth protocol-Bluetooth 5.0. Truly wireless headphones, compared with normal wireless ones, allow signals to transmit from smartphones to headphones directly instead of transmitting via an additional module wiring two buds, which realizes the uselessness of wire. Truly wireless headphones are the leading trend of the headphones market, and more and more companies adjust their flagship products to adapt to the newest Bluetooth protocol in order to participate in the primary market. Under this situation, wireless will tend to be the main revolution of Hi-Fi headphones.

Audio device manufacturers have witnessed and increased shipment of devices with various connectivity solutions such as Bluetooth, Airplay, and SKAA. The portable devices also have contributed to the demand for wireless Hi-Fi systems [8]. For Hi-Fi headphones, music quality and fidelity always come first. Bluetooth 5.0 protocol is a widely acknowledged technique to enable the Hi-Res audio in the wireless technology and ensure the high quality of music playing. APTX Low Latency by Qualcomm is a high-resolution Bluetooth protocol prevalent in the Android system, which is claimed that it can serve listeners with CD-level music quality.[9] Benefited from highly efficient code programming, APTX Low Latency protocol would offer people higher entertainment experience compared with AAC, which is also a Bluetooth protocol developed by Dolby Lab. AAC is now widely used in smartphones, for instance, all series of iPhones, but it cannot standardize the Bluetooth today.[10] LDAC, equipped with the highest code rate of all protocols, is the protocol provided by SONY and is the technique closest to the Hi-Fi market [11]. Using devices with LDAC, it is possible to listen to Hi-Res Audio with wireless headphones. According to Table 1, all the new products manufactured during the end of 2019 till February in 2020 are wireless, some even support the newest Bluetooth 5.0. More wireless headphones are attempting to be labeled “Hi-Res Audio” and trying to obtain more delegates of Bluetooth protocols.

Table.1 Newest Headphone Products by Major Manufacturers

Headphone type	Bluetooth version	Protocol supported	Hi-Res Audio	Wireless
Sony WH-H910N	5.0	LDAC	Yes	Yes
Sennheiser PXC550II Wireless	5.0	AAC, APTX, APTXLL	No	Yes
Beyerdynamic Xelento Wireless	4.2	AAC, APTXHD, APTX	Yes	Yes
Audio-technica ATH-CKS5TW	5.0	SBC, AAC, APTX	No	Yes
Hi-FiMan DEVA	4.2	SBC, AAC, APTX, LDAC	No	Yes
Information comes from Taobao e-commerce platform				

As Apple canceled a 3.5 mm headphone port on iPhones, it leads to the chase of portability of wearable devices. It compelled customers to use wireless devices-Air pods. Apple and other smartphone manufacturers created a demand for portability, and today it is increasing drastically. Besides, by October in 2019 in China, the number of inventory smartphones with Bluetooth 5.0 and without a 3.5 mm port is up to 1310 million, occupying 12.5% of the whole market. Due to the high increments of wireless-compelled smartphones, it can be sure that there will be 2390 million truly wireless headphone demand only in China [12]. Driven by wireless trends and the breakthrough of a technological stranglehold on Bluetooth, it is common for Hi-Fi products to join such parties.

5.3 Trend of Noise-Cancellation Hi-Fi

In recent years, sales and demands for noise-canceling headphones have proliferated, and most headphone companies have launched noise-cancellation series. However, in the Hi-Fi headphones market, few noise-canceling products have appeared for the time being. Despite the perspective from the market demand or technological development, Hi-Fi headphones will gradually join the trend of noise-cancellation technology.

Firstly, for audiophiles seeking sound quality, there is also a massive demand for noise-canceling headphones. In modern society, people spend a lot of time traveling and commuting. The roar of vehicles and noisy human voices cause a lot of noise interference. Noise-cancellation headphones can adequately reduce these noises and restore a quiet environment, which is why it has exploded in these two years. With the advent of the age of portability, if people want to enjoy the sound fidelity of Hi-Fi headphones anywhere and

anytime, they definitely need this kind of technology to ensure sound insulation. Therefore, the demands for noise-cancellation headphones and Hi-Fi headphones are not contradictory. If achieving “all-in-one” is applicable, it will markedly become popular.

Additionally, the development of active noise-cancellation (hereinafter refer to as ANC) technology can gradually support the high sound quality requirements of Hi-Fi headphones. There are two types of noise-cancellation technologies: active and passive. Nowadays, the so-called noise-canceling headphones are mainly referred as those who utilize ANC because passive noise-cancellation, which reduces external noise interference through physical isolation, has limited effects. The primary resistance of noise-canceling Hi-Fi headphones production is that the current ANC technology will undermine the sound quality of the headphones. Perhaps in feedback noise-canceling schemes, the redundant canceling signals generated by the built-in microphone and the sealed earpiece for better noise-canceling effect will degrade the sound quality of reproduced sounds [13]. However, some proposals have been put forward to reduce the impact of ANC on sound quality. Audio-Technica publishes a series of patents for noise-cancellation headphones during 2018 and 2019, in which propose many solutions for the sound quality problem. For instance, they have designed a noise-canceling headphone with better sound quality by using feedforward schemes and preventing degradation in the sound quality caused by the sounds leaking from a vent hole for adjusting sound quality in the feedforward headphones [13] (Details shown in Figure 2 below). What’s more, through the application of its QN1 HD noise-cancellation processor to WH-1000XM3, Sony has obtained consumers’ double recognition of the ANC capability and the Hi-Fi sound quality. With the manufacturers’ pursuits for more advanced technology that allows both noise-cancellation and sound quality, it is possible to see more ANC Hi-Fi headphones products in the future market.

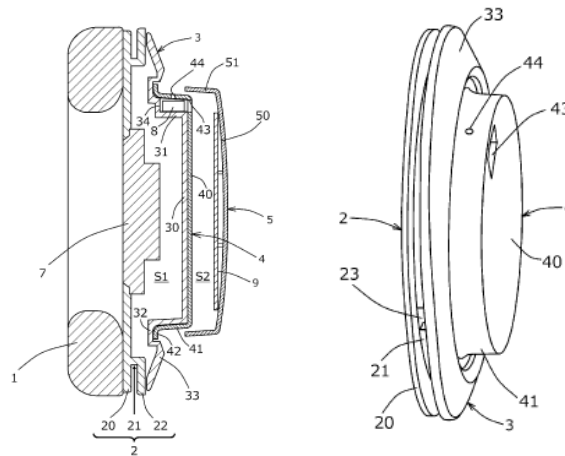


Fig.2 Cross-Sectional Front View of a Left Earpiece and Perspective View of Its Housing Unit from the Audio-Technica Invention [13]

The housing unit has an interior and an exterior. A vent hole (23) establishes communication between the air chamber (S1) and the exterior of the housing unit, which helps adjust sound quality. The highlight of the design is that a sound collecting hole (44) disposed in a particular position will prevent the emitted sounds from the vent hole (23) from being collected by the external microphone (8).[13]

6. Conclusion:

The current headphone market has more mature technologies than other typical consumption markets regardless of its well-developed structure and function of headphones. While new technologies such as wireless and noise-cancellation have effectively escalated the headphones sales volume, manufacturers are competing for their innovations and product differentiations by creating more diverse appearances of headphones with better quality in sounding and wearing to motivate consumers’ purchases. With more progressive technologies emerged, additional people preferred to have multifunctional high-end headphones. Instead, manufacturers have transformed conventional headphones into more convenient and versatile ones in order to keep abreast of fast-paced modern life. Since better high-end headphones would be a future trend due to a healthy economic increment over the past years, it is possible to forecast the demand for high-end

headphones will steadily increase as the market moving forward. Hi-Fi headphones, on the other hand, will also be influenced positively because of the expansion of the market, and increased quantity demanded, with the market trending toward wireless and noise-cancellation technologies' utilizations.

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