

Analytical Study on the Correlation between the Functionality of Virtual Idols and Fan Satisfaction under the Chinese Market

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Abstract

Virtual idols have aroused wide attention as a novel product of the idol industry in the digital era over the past few years. The population of China determines that virtual idols have a huge fan market. As a digital cultural product closely connected with fans, virtual idols are important to gain insights into the correlation between fan satisfaction and virtual idol functions. In accordance with the KANO demand model, this study first classifies and explains the specific functions of virtual idols into four quadrants, including attractive, must-be, 1D (One-Dimensional), and indifferent. Subsequently, the satisfaction of fans of virtual idols with specific functions in each quadrant are analyzed using a questionnaire. This study suggests that virtual idols have one attractive quality, three 1D quality, two must-be quality, and five indifferent quality functional elements. This study qualitatively analyzes the functional elements of virtual idols through fan satisfaction based on the KANO model, which provides valuable help for future research in the field of virtual idols and producers in this field.

Keywords: Virtual idol; Digital products; Kano model; Fan consumption

1. INTRODUCTION

China's virtual digital culture has been leaping forward over the past few years, and the number of avatars is rising. Virtual idols are a type of avatars and belong to identity-based avatars, which are products of technology and society and can satisfy the needs of fans through singing and dancing. Virtual idols exhibit high plasticity in product design, and they are promoted and operated like real idols. They change with users' needs to satisfy their diversified needs [1]. The operation of virtual idol-related industries primarily comprises anchor content production, offline activities, short videos, comics, novels, music, peripherals, brand linkage and other directions, which can be summarized as fan economy model and KOL content operation model in accordance with the different ways of fan increase. China is affected by COVID-19 prevention and control, consumers pay more attention to spiritual consumption, and the demand of Chinese consumers in cultural and entertainment consumption will increase in the future. The existing active platforms for virtual idols in China are mainly live and short video platforms (e.g., TikTok, Bilibili, and

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HUYA). As of May 31, 2002, this study counted nearly 200 virtual idols with over 10,000 fans on the TikTok platform, of which 32% of the virtual idols have fans between 10,000 and 100,000, 16% have fans between 100,000 and 1 million, 2% have fans are between 1 million and 100 million, and 50% of the virtual idols have over 100 million fans. Fig. 1 depicts the curve of total consumer spending for virtual idols by fans on the Chinese video website Bilibili platform from April 24, 2019, to July 15, 2022, and the curve tends to generally increase in total spending.

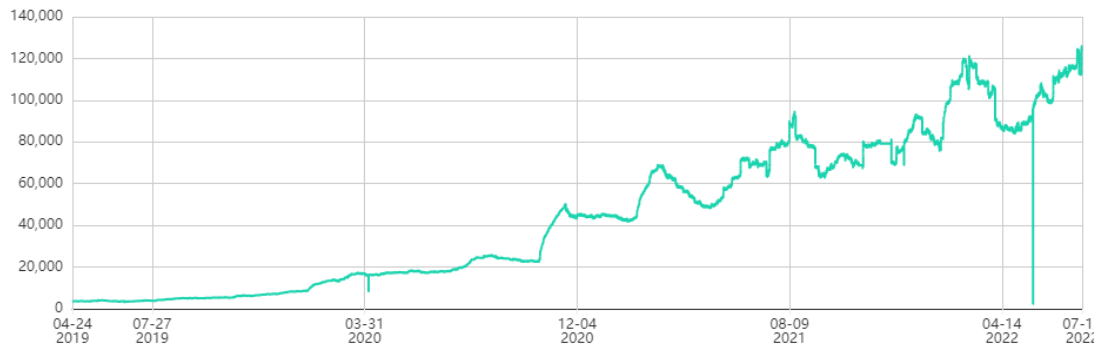


Figure 1. Fans' consumption trend for virtual idols on Bilibili platform

Fig. 2 presents the income statistics of 3797 virtual idols in Bilibili in this study. The data document the number of virtual hosts with different fleet sizes (Data recorded on: April 19, 2022) [2]. Bilibili has designed a consumption mechanism, in which the respective anchor has a "fleet", and fans want to "get on board". The "ship ticket" is classified into three classes, including paying 198 RMB every month to be a "captain", and paying 1998 RMB to be a "governor". The highest class is "Governor" paying 19,998 RMB a month. After analyzing the statistics and frequency, it is found that 49.1% of the virtual idols have 0 fleets, 45.7% have 100 fleets or less, and 5% of the virtual idols have 100-1000 fleets. From the overall perspective, although the total consumption is rising, most virtual idols do not have high income, and the polarization is significantly serious.

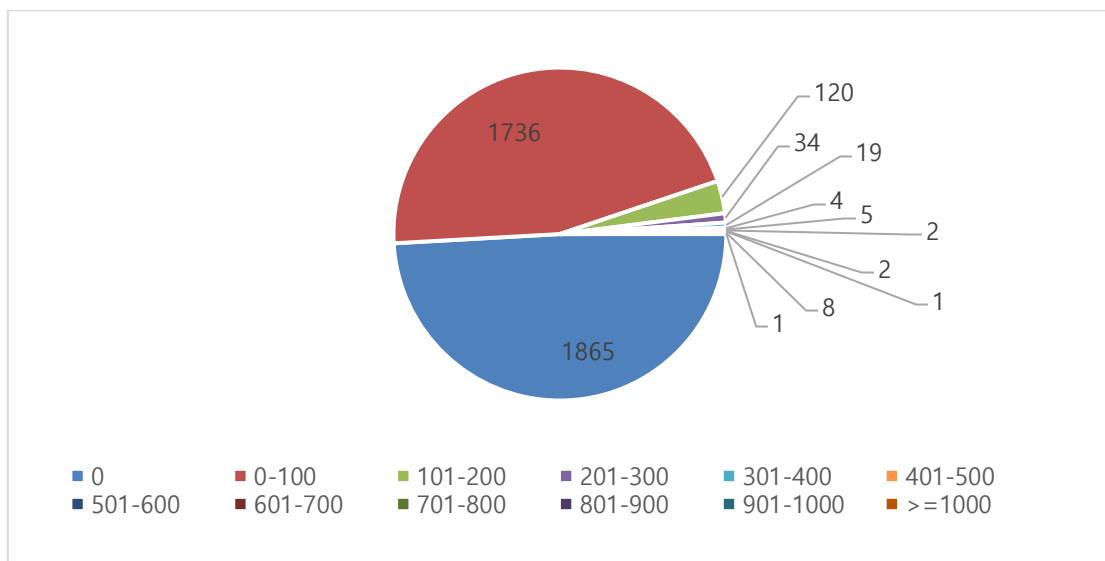


Figure 2. Number of virtual hosts with different fleet sizes

For the correlation between aggregate supply and demand and aggregate demand, investment forms production, while consumption is the final demand. There is a non-negligible connection between virtual idols and fans. Virtual idols perform based on artificial intelligence and virtual reality technology to satisfy the spiritual, cultural, and entertainment needs of fans [3]. Existing research has placed a major focus on the consumption culture and fan culture of virtual idols, whereas the number of virtual idols in China is large, and rare virtual idols make fans consume. This issue has not been investigated thus far. In this study, the functional elements of virtual idols are determined using literature survey and questionnaire method, and the functional requirements of fans for virtual idols are investigated and counted in accordance with the theory and method of KANO model. The functional requirements are classified by the survey data. Lastly, the classification results of functional requirements are analyzed and clarified.

2. DETERMINATION OF THE FUNCTIONAL ELEMENTS OF VIRTUAL IDOL

2.1 Analysis of The Correlation Between Functions and Requirements Based on Kano Model

The function is the property of the product that can meet a certain need of the consumer, and the demand of the consumer takes on a critical significance in the function of the product, from the consumer's point of view, the function of the product is divided into two aspects: material need material need and spiritual need, and the different needs of the consumers themselves will lead to different needs of the consumers for the above two functions [5]. The KANO model analysis method is based on the analysis of the effect of consumer demand on user satisfaction. It is implemented mainly through standardized questionnaire research, as well as by dividing the elements constituting product quality evaluation according to user experience and separating the basic elements that satisfy qualified products and those that attract the attention. The distinction is made between elements that satisfy the basic elements of a qualified product and those that attract more customer satisfaction [7]. According to the correlation between different types of quality characteristics and user satisfaction, Professor Noriaki Kano classified product quality characteristics into five categories as follows. The first category is must-be quality, including the basic requirements of users for products or services, which are the "must have" attributes or functions of products. When it does not meet the user's needs, the user is highly dissatisfied; when it meets the user's needs, the user may not show satisfaction. The second is the 1D quality, representing the user's satisfaction status and the demand satisfaction degree is proportional to the demand. If the above demand is satisfied or good performance, user satisfaction will increase significantly; if the demand is not satisfied or bad performance, user dissatisfaction will also increase significantly. The third category is the attractive quality, representing the demand that will not be over-expected by the user. Once the demand is satisfied, even if the performance is not perfect, the user shows a very high satisfaction status; even when the expectations are not satisfied, the user will not therefore show significant dissatisfaction. The fourth is indifferent quality, referring to the demand that does not affect user satisfaction whether it is satisfied or not. The fifth category is the reverse quality, referring to the quality characteristics that cause strong dissatisfaction and lead to a low level of satisfaction. Numerous users simply do not have this demand after the provision of user satisfaction will decline. Yin S, Cai X, Wang Z, et al. (2022) determined the correlation between gamification dimensions of health and fitness applications and user satisfaction using the kano model. Meri Andriani, Heri Irawan, Nanda Rizqa Asyura (2021) used kano model to identify customer's service quality of hotel dissatisfaction and provide design recommendations to improve service quality. Budiarani V H, Maulidan R, Setianto D P, et al. (2021) argued that understanding customer needs and satisfaction is essential for product development and used the kano model to assess the effectiveness of digital wallet service quality. Garibay C, Gutiérrez H, Figueroa A. (2010) investigated the

digital library of the University of Guadalajara (Mexico) using a combination of the Quality Function Deployment (QFD)-Kano model as a useful tool to assess the quality of services [4]. The study suggested that by listening to the voice of the customer, relevant information can be acquired about issues that should be improved to increase customer satisfaction. Xu K, Chen Y V, Zhang L, et al. (2019) proposed a method for requirements analysis using the fuzzy Kano model. This method allows software companies to quickly collect users' requirements to improve the quality of their software.

In brief, the kano model classifies product features based on user satisfaction. Subsequently, it can be adopted to indicate the extent to which this function can increase satisfaction or eliminate the effect of very dislike by the percentage for the categorization of functional attributes. With the rapid advance of the Internet and digital technology, more scholars have gradually used the kano model to investigate digital products. Accordingly, this study uses the kano model as an effective research method to explain the correlation between consumers' satisfaction with virtual idols and the functions that virtual idols possess. Moreover, it extends the research area of the kano model and makes a valuable contribution to future research regarding the same digital products.

2.2 Functional Attributes of Virtual Idol

Virtual idols are divided into four types according to the field of development. The first type refers to the virtual singers represented by Lotte and Hatsune Miku. The second type is a company that turns existing characters in anime, games, and movies into virtual idols. The third type refers to the virtual idols independently designed by the company and appear in the form of videos or pictures in social entertainment platforms. The fourth type is a virtual anchor that uses a virtual image for live -streaming activities. Fig. 3 presents the different types of virtual idols. The above four types of virtual idols are divided into 2D virtual idols and 3D virtual idols from the perspective of presentation [5-8]. The functional elements of virtual idols refer to the functions and attributes of virtual idols, which can be classified into two categories (including basic functional elements and additional functional elements). The former is the most basic functions and attributes of virtual idols, which are the functional elements required by all virtual idols. Additional functional elements represent the additional functions and attributes of virtual idols based on the basic functional elements, which are not necessarily the functional elements contained by the respective virtual idol.



Figure 3. From left to right: Hatsune Miku, AYAYI, Liu Yexi, Kizuna AI

The commercialization of virtual idols is based on fan economy, which mainly refers to the operational revenue-generating behavior on top of the correlation between fans and idols. A fan is a person infatuated

with or worshiping a certain idol or idols. A fan community is considerable individual fans who form a group since they like the same idol. A consistent consumption behavior is generated among the respective fan in the fan community. The core of fan economy is the connection between fans and idols, which is built on the fans' infatuation or worship of idols [8, 9]. The economic profit growth of fan consumption increases the connection between fans and products, increases user stickiness, and turns consumers into fans, thus spreading the effect and economic benefits through word-of-mouth of fans. The research data suggest that nearly 70% of users like the appearance/voice of avatar images, followed by the works of avatars. Fans naturally have the desire to explore further when exposed to a certain trait that matches their own interests, and this emotional preference is also a representation of their own personality. The strong creative atmosphere around virtual idols and the variety of different styles of works also testify to this strong, individualized desire for self-expression among teenagers. From the perspective that digital social platforms become a mechanism for digital communication and interaction between fans and virtual idols, Bui, My-Trinh, et al. (2021) investigated the effect of fans' identification with virtual idols on prosocial correlations, which in turn increased behavioral loyalty and purchase intentions. The study confirmed that higher levels of aspirational identification are positively correlated with higher levels of prosocial correlations, which then sequentially trigger higher levels of behavioral loyalty and purchase intentions. In brief, virtual idols cover a wide range of genres, and the rapid expansion of virtual idols over the past few years has led to the generalization of the concept, which is no longer limited to idols generated out of thin air. Besides, some idols derived from games and anime are involved in the scope of virtual idols. Virtual idols have external and internal qualities that consumers recognize. They have deep learning functions, can communicate and interact with the public, have no real life and thoughts, while presenting a "personified" visual image. They are capable of simulating the image of real idols to operate and participate in activities (e.g., cultural performances, news broadcasts and marketing campaigns). Thus, the basic qualities of virtual idols should comprise beautiful appearance, comfortable voice, and resonant character traits.

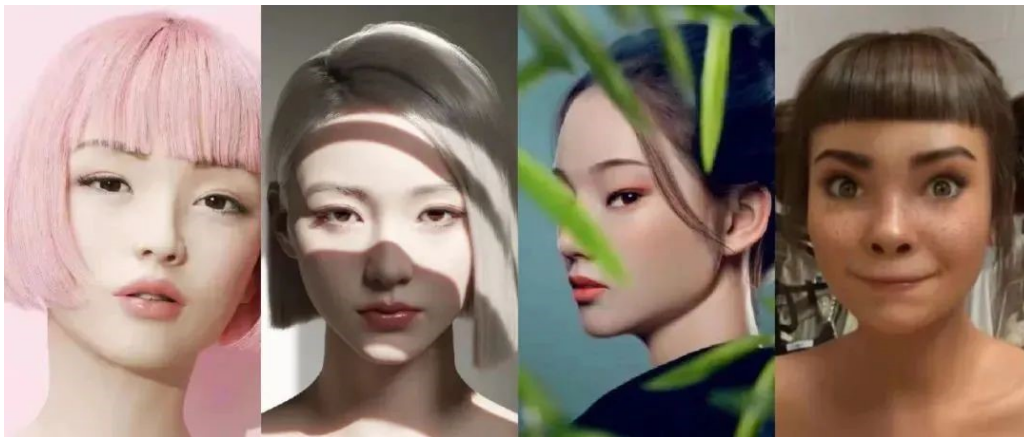


Figure 4. Left 1 is IMMA from Japan, left 2 is AYAYI from China, left 3 is LING from China, left 4 is Miquela Sousa from USA

The additional quality elements of virtual idols are set by the respective virtual idol producer. First, virtual idols primarily contain three types from the perspective of profitability, firstly, virtual idols with music creation and singing as the major focus. This type of virtual idol is highly dependent on fans, and most of them are operated with UGC-based participatory development ideas. For instance, the most widely known Hatsune Miku and Luo Tian Yi pertain to the category of virtual singers. Since 2009, Hatsune Miku's

development company Crypton and other affiliated companies have held concerts or commemorative events in Japan on March 9 or August 31 each year. Besides Japan, Hatsune Miku concerts have also been held in Los Angeles, Bangkok, Hong Kong Taiwan, Shanghai, Beijing, Chengdu, Guangzhou, and other cities. Second, virtual idols that are mainly webcasters. This type of virtual idols mainly through the way of virtual live to attract fans and development, more lifelike companionship. For instance, the group A-SOUL, which has both singing and dancing ability and spends a lot of time live-streaming on B-site, relies on its unique style and the actor's cute disposition to attract many fans. Thirdly, virtual idols mainly focus on fashion. The above virtual idols look like models, dress trendy, and have highly similar looks to real people, but mainly appear in pictures on social media platforms (e.g., Instagram, RED, and Sina Weibo). Fig. 4 presents representative virtual idols, including Miquela Sousa, IMMA, AYAYI, and LING(翎).

For the operators, the most common way to profit is that fans buy albums, concert tickets, and live-streaming bounties for virtual idols, etc. A fan community of virtual idols is generated when the operation of the fan base reaches a certain level. From an objective point of view, virtual idols are virtual characters that do not reject others, but remove the pressure of face-to-face communication and become a shortcut for them to experience emotions instead (e.g., friendship), thus bringing an alternative emotional compensation. Taking this as an opportunity, they can also find corresponding interesting groups on the Internet and use their knowledge of virtual idols as their social capital to communicate with others more easily and comfortably and expand their interpersonal range. In several cases, the early creators of the same person will begin to seek profits for themselves after their creations have matured, and some particularly good creators will be contracted by the operating companies, thus leading to a virtuous cycle of virtual idol content output, and the degree of fan input to virtual idols will also affect the demand for virtual idol functions. Advances in media technology have boosted the development of social media, thus creating a strong connection between the general public audience and the direct participation of idols. The power that idols gain in front of their agents refers to the support of their fans. In several cases, the early creators of the same person will begin to seek profits for themselves after their creations have matured, and some particularly good creators will be contracted by the operating companies, thus leading to a virtuous cycle of virtual idol content output. The degree of fan input to virtual idols will also affect the demand for virtual idol functions. Fans can affect the agency's strategy to idols through their continuous support of idols, idols constantly need fans' support, and fans can witness the birth and growth of an idol [10-12]. Yi xuan Zhang (2021) investigated the quasi-social interactions in the virtual app Lysn Bubble and suggested that virtual social apps satisfy fans' desire for intimacy and break through the previous barrier of two-way communication between idols and fans. For some fans of virtual idols, a sense of engagement and agency takes on a critical significance. Fans of virtual idols prefer immersing themselves in a virtual dream that is always shiny and full of goodwill than in a real-world idol. Fans are deeply involved in the virtual idol's personality, image, songs, dances and music videos. It is this sense of equality that makes fans of virtual idols feel obsessed. Whether it is a real idol or a virtual idol, the basic psychology of fans includes projected identity, value compensation, projected emotional fantasy, and the sense of accomplishment of "raising". In conclusion, the additional functional elements of virtual idols include live-streaming function, forum discussion function, social platform interactive function, offline interactive function, holding concert function, talent performance function, trendy dressing function, and product endorsement function. The virtual idol quality elements comprise three basic functional elements and eight additional functional elements. Table 1 lists the virtual idol functional elements and their brief descriptions.

Table 1. Virtual idol functional elements and their brief descriptions

No.	Functional elements	Description
1	Pretty appearance	The appearance of the virtual idol is compounded by consumer aesthetics.
2	Comfortable voice	The voice of a virtual idol pleases fans.
3	Resonant personality traits	Virtual idols have personalities that resonate emotionally with fans.
4	Function of forum discussion	Fans can share, exchange or get information about their favorite virtual idols with others in relevant forums.
5	Function of live-streaming	Fans can interact with virtual idols in real time and give rewards to their favorite virtual idols.
6	Function of social software interactive	Fans can comment and chat to the virtual idol's dynamic through the social software, while the virtual idol will also generate different message responses according to the fan's message.
7	Function of offline interactive	Fans can interact with virtual anchors in real-life events.
8	Function of hosting concerts	Virtual idols have the function of making and singing songs and starting concerts.
9	Function of talent show	Virtual idols have talent skills such as dancing and performing.
10	Function of fashion dress up	Virtual idols dress up in accordance with the trend of the times.
11	Function of advertising endorsers	Virtual idols become the advertising spokesperson of one or more products.

3. VIRTUAL IDOL FUNCTIONAL QUALITY CLASSIFICATION BASED ON KANO MODEL

Fans' satisfaction is different for the 11 functional elements of virtual idols. The kano model is used to classify the functional requirements of virtual idols by the correlation between quality characteristics and fans' satisfaction.

3.1 Questionnaire design and data collection

The questionnaire is designed in two parts. The first part is the basic information of users, including gender, age, education level, and whether they have hobbies related to virtual idols. The second part refers to the main body of the KANO questionnaire, containing 22 questions on the satisfaction of virtual idol functions. For the respective function element, respondents were asked to select one of the five options of "dislike, barely accept, indifferent, take for granted, and like" for the respective question. The questionnaires were distributed to consumers who became fans of virtual idols. To provide a comprehensive, objective, and realistic response to the research questions, the education and geographical distribution of the respondents were randomized to exclude possible problems caused by the homogeneity of the respondent types. A total of 603 questionnaires are sent using the Internet only in this study due to the objective reasons of COVID-9, and 174 invalid questionnaires are excluded to obtain 429 valid questionnaires.

3.2 Analysis of survey results

First, the KANO questionnaire is aggregated and the frequencies of positive and negative answers for each feature are counted, and their ratios are calculated to obtain the ratio matrix of the KANO model for each quality requirement, where A denotes attractive, M is must-be, O represents 1D, I is indifferent, R is reverse,

and Q is questionable answers with questionable results. Better-Worse coefficient indicates the degree to which a feature can increase or eliminate the effect of dislike. Better is the satisfaction coefficient after adding a feature. The value of better is generally positive, representing that user satisfaction will increase if the product provides a certain feature or service. Worse is the coefficient of dissatisfaction after elimination, which is usually negative and suggests that the user's satisfaction will decrease if the product does not provide a certain feature or service. The closer the value is to -1, the more significant the effect on user dissatisfaction, and the faster the satisfaction will decrease. As a result, the features with higher absolute scores for both coefficients should be given priority in accordance with the better-worse coefficient. According to the statistics of 429 "Virtual Idol has the feeling survey of functional elements", the KANO model ratio matrix of virtual idols with functional elements is obtained, as listed in Table 2. The KANO model ratio matrix of functional elements is obtained, and the KANO attribute categorization can be obtained according to the values of A, M, O, I, R, and Q. According to the results in Table 2, among the 11 functional elements for which the virtual idols have functional elements, there are one attractive functional element, three 1D functional elements, two must-be functional elements, and five indifferent functional elements, no reverse function.

Table 2. KANO model ratio matrix of virtual idols with functional elements

Virtual Idol Function	KANO Properties						Better-worse Coefficient	
	A	M	O	I	R	Q	better	worse
Function of fashion dress up	17.72%	25.17%	35.90%	19.35%	1.86%	0%	54.64%	62.23%
Comfortable voice	16.55%	24.24%	28.67%	27.97%	2.56%	0%	46.41%	54.31%
Function of advertising endorser	16.32%	20.51%	35.90%	24.24%	3.03%	0%	53.85%	58.17%
Pretty appearance	39.86%	19.58%	14.22%	24.24%	2.10%	0%	55.24%	34.53%
Function of live-streaming	16.55%	42.42%	21.45%	17.02%	2.56%	0%	39.00%	65.55%
Function of talent show	16.08%	41.49%	20.75%	19.11%	2.56%	0%	37.80%	63.88%
Function of hosting concerts	14.45%	16.32%	23.08%	43.36%	2.80%	0%	38.61%	40.53%
Function of social software interactive	14.92%	13.99%	22.84%	47.55%	0.70%	0%	38.03%	37.09%
Resonant personality traits	13.52%	15.38%	20.75%	48.48%	1.86%	0%	34.92%	36.82%
Function of offline interactive	14.45%	12.59%	21.45%	49.18%	2.33%	0%	36.76%	34.85%
Function of forum discussion	13.99%	15.85%	21.45%	45.69%	3.03%	0%	36.54%	38.46%

4. VIRTUAL IDOLS HAVE EACH FUNCTION ELEMENT ANALYSIS

4.1 Analysis of Survey Results

The attractive functional element of virtual idols is pretty appearance. When a virtual idol does not have this feature or is of poor quality, the satisfaction of fans does not decrease; when a virtual idol has this quality or is of good quality, the satisfaction of fans will significantly increase. For fans, they are easily attracted by the beautiful appearance of virtual idols from the beginning, and they have the desire to explore the next step because of the recognition of the appearance. However, because of the different aesthetic views, will not affect the satisfaction of fans even if the appearance of virtual idols does not meet the fans' perception of beauty. In the case of Chinese virtual idol Hua Xiaolou, the producer modified the virtual idol's initial image of a child to a six-headed female figure, adding design aesthetics and details, and instead of resistance from the original fans, it has gained more fan support and increased market recognition.



Figure 5. The left is the image of Xiaolou Hua before the revision, and the right is the image after the revision.

4.2 Analysis of 1D Functional

The 1D functional elements of virtual idols include comfortable voice, function of fashion dress up, and function of advertising endorser function. When the virtual idol has the above three functional elements and the quality is good, fan satisfaction increases; fan satisfaction decreases when the virtual idol does not have the above quality elements or the quality is poor. Virtual idols can be integrated into the daily life of fans through three functions, such as comfortable voice, function of fashion dress up, and function of advertising endorsers, Virtual idols can be integrated into the daily life of fans through three functions, such as comfortable voice, function of fashion dress up, and function of advertising endorsers, to bring fans closer to each other.

The core components of a virtual idol include image and voice, where the voice comes from the direct use of a real person's voice or recorded synthesis. The Japanese virtual idol Hatsune Miku is taken as an example. Hatsune Miku's original voice is provided by the famous Japanese voice actress (voice actor) Fujita Saki. Since CRYPTON considers that Fujita Saki's voice matches Hatsune Miku's "idol quality" very well. For fans, there is a positive correlation between the voice and the person's looks. Fans are inclined to judge a person's personality, height and weight, age, sexuality, and even socio-economic status due to their voice. They will have the illusion that people with good looks will have good voices; in contrast, fans will think that people with bad voices will also have bad looks. As a result, virtual idols with good voices will increase fan satisfaction, whereas they will decrease fan satisfaction.

The fashion dress up function of virtual idols brings fans the freedom to indicate their individual fashion attitude. This aesthetic, unlike the real life, is the vital point in fans' feelings towards virtual idols. Virtual idols and real idols have something in common. Fans are dependent on idols to provide stimulation and meaning in their daily life. The cognitive structure of fans changes in modern life, and the pursuit of fashion brings fans the pleasure of mood. Thus, when the fashion trend dressing function of virtual idols is improved, fans' satisfaction will increase; in contrast, fans' satisfaction will decrease.

The advertising endorsers function of a virtual idol is employed as a standard for fans to assess the ability of the idol. Fans trust the idol, so the business will trust the idol, the product endorsement ability of a virtual idol is indirectly affected by the popularity of the fans, fans will feel that what they do for the idol is recognized and facilitates the growth of the idol. As a result, the optimization of the product endorsement function of a virtual idol will increase the satisfaction of the fans; in contrast, it will decrease the satisfaction of fans.

4.3 Analysis of Must-be Functional

The must-be functional elements of virtual idols comprise live-streaming, performing dance, as well as

talent show. When virtual idols have the above two functional elements and the quality is good, user satisfaction will not increase. Nevertheless, user satisfaction decreases significantly when virtual idols do not have the above functional elements, or the quality is poor.

Live-streaming is a form of expression with a sense of presence and real-time interaction, regardless of the dimension of space and time. Virtual Live-streaming, on the other hand, strengthens the outreach and connotation of traditional Live-streaming and traditional virtual animation, and the real origin of virtual idol Live-streaming makes fans feel the sense of social presence of companionship growth. Virtual live-streaming is essentially an online social activity. Unlike the sense of social distance brought by video-based virtual idols (e.g., Hatsune Miku), virtual live-streaming characters change with the live environment since the live broadcast needs to be real-time feedback. Furthermore, the companionship of the live-streaming is dynamic and random. In principle, if the correlation between the actor and the virtual idol setting is balanced, then the fans can always witness the growth of the virtual idol, and the virtual idol can accompany the fans. Accordingly, the live-streaming function of virtual idols is a imperative function for fans. To be specific, not providing this function will reduce the satisfaction of fans, whereas providing this function will not significantly increase the satisfaction of fans.

Virtual idols' talent show is an audiovisual enjoyment for fans, and a requirement of fans for virtual idols. The advancement of technology and the improvement of industry chain ecology have significantly reduced the production threshold and cost of producing virtual idol content. Fans watching virtual idols' talent show satisfies fans' needs physiologically, and it is another manifestation of self-identification. To gain a sense of belonging. the function of talent show of virtual idols is a necessary function, and the satisfaction of fans will decrease if this function is not provided. Nevertheless, the satisfaction of fans will not increase significantly if this function is provided.

4.4 Analysis of Indifferent Functional

The indifferent functional that virtual idols have include social software interactive, hosting concerts, personality traits, offline interactive, and forum discussion. The presence or absence of the above five functional elements of virtual idols does not change much for fan satisfaction, which means that fans are not highly concerned with the above functional elements. At present, most virtual idols still need performer control. Only a few virtual idols driven by artificial intelligence can do social software interaction with fans, and fans gain a full insight into the immaturity of the technology. Thus, fans do not care the function of social software interaction. Singing or holding a concert requires huge costs (e.g., the virtual girl group A-SOUL), which costs nearly 2 million RMB for a single song production and approximately 20 million RMB for an offline concert. Unlike live idols, virtual idols tend to be perfected through the will of fans, and fans gain a greater sense of security and dependence. As a result, resonate fans do not care the character features. Virtual idols are originally driven by technology. They exhibit the physical characteristics of real people and are favored by most fans. They live in the virtual world and can generate commercial value of the idol image. whether the real existence is not of great significance, while whether it can bring fans a good feeling is of critical importance. Accordingly, fans do not care offline interaction and forum function.

5. CONCLUSIONS

In this study, the satisfaction of Chinese virtual idol fans with the functional elements of virtual idols is studied based on the Kano model, and it is determined that virtual idols have one attractive functional element, three 1D functional elements, two must-be functional elements, and five undifferentiated functional elements. Kano model prioritizes the functions as must-be needs > 1D needs > attractive needs, so the 11

virtual idol functions prioritized in this study are ranked as: live-streaming > talent show > fashion dress up > advertising endorser > comfortable voice > pretty appearance > five indifferent functions. This study provides theoretical help for the optimization of virtual idol production. Pretty appearance is an attractive functional element, live-streaming and talent show are must-be functional elements, comfortable voice, fashion dress up and advertising endorser are 1D functional elements. Producers satisfying virtual idols with live-streaming and talent show functions. Subsequently, the focus should be placed on developing virtual idol voice, fashion dress up, and advertising endorser functions. Finally, the stress should be placed on optimizing the appearance design of virtual idols since the improvement of beautiful appearance functions is faster for fan satisfaction. No reverse functional elements of virtual idols were found in this study, and subsequent studies will further investigate whether virtual idols have reverse functional elements.

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