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ORIGINAL

ANALYSIS OF INTERACTIVE SPORTS ADVERTISING MODE INNOVATION BASED ON BIG DATA AND VR TECHNOLOGY

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ABSTRACT

As traditional advertising methods become less effective, there is a growing demand for engaging, immersive experiences that foster deeper emotional connections with brands. Leveraging big data analytics provides valuable insights into consumer behavior, enabling targeted campaigns that enhance engagement and brand loyalty. The sports advertising landscape is rapidly evolving due to technological advancements. Traditional advertising methods are becoming less effective as consumers seek more engaging and personalized experiences. Therefore, based on big data and VR technology, this paper studies the innovation of interactive advertising mode. The research shows that the average percentage of people who occasionally contact or participate in some interactive advertisements is about 42.39%. In comparison, the average percentage of people who frequently contact or participate in some interactive advertisements is about 23.38%. The average percentage of daily and almost no interactive advertisements is about 8.22% and 19.72% respectively. It can be clearly seen that the occasional and frequent proportion is higher. The interaction based on big data and VR technology promotes the rationalization of advertising industry structure, and the innovation of advertising technology triggered by big data promotes the elevation of advertising industry structure.

KEYWORDS: Big Data; VR Technology; Interactive; Advertising Mode.

1. INTRODUCTION

With the rise of digital media, consumers increasingly expect interactive and immersive experiences. VR technology can enhance engagement by allowing users to experience sports in a virtual environment, making advertisements more appealing. Advertising is the product of modern civilization and people's emotional needs. It is an important embodiment of urban economic development and cultural values. In recent years, as one of the fast-spreading sports advertising media, sports advertising has been greatly developed. It exists in every corner of public life and reflects a wide range of social problems. Most advertisements are still presented in the form of vision, or express information in the form of visual and auditory senses. Designers try every means to put a large amount of sports advertising information into people's brains, but they never pay attention to how much effective information the audience receives. It is self-evident how much effect this forced and repeated sports advertising has received (Ahn, 2020; Belanche et al., 2017a). Nowadays, the types and channels of media that the audience contacts every day are numerous, followed by the corresponding change of media consumption behavior mode, and the audience firmly holds the information choice in their hands. If multi-sensory, interactive and even creative application methods can be combined in sports advertising design works, there will be a chemical effect. Print media sports advertising will also have a strong visual and sensory impact, create a great atmosphere on the scene, so that the audience will have great interest and gladly accept sports advertising information (Latorre-Román et al., 2023). Therefore, this paper studies the innovation of interactive sports advertising mode based on big data and VR technology. The essence of VR technology is that consumers use special media devices to mobilize their multiple senses in an imaginary state. This comes down in one continuous line with the innovative concept of sports advertising pursuing content and form. With VR technology, computer and network technology can effectively integrate. In the form of VR technology virtual reality, people form a form of communication in the process of using computers, which is the immersive feature in virtual reality (Miroshnyk et al., 2020). In order to provide effective sports advertising services to customers, sports advertising companies need to obtain the data resources needed for sports advertising production and release through market research. Interactive sports advertising of VR technology uses technological innovation such as real-time interaction to show the effect, and dynamic, game-based scene display will bring greater interactive charm to the audience. From the analysis of big data users' needs: based on users' emotional needs, interactive sports advertising of VR technology completes the direct transmission of information in the form of interactive communication and uses lively teaching technology to help realize the interactive experience process, leaving a deep impression on the public (Zou, 2020). In the development process of interactive sports advertising of VR

technology, we have obtained resources based on different survey technologies, and also demonstrated different efficiency of sports advertising product production and release services under the support of such BD resources (Belanche et al., 2017b). Interactive sports advertising is an interactive experience sports advertising based on new media, including interactive projection, holographic image, spherical screen image, virtual reality VR and other forms of expression. Analysis from big data display effect: traditional public service sports advertising adopts static and linear communication mode. The big data development of VR technology in the interactive sports advertising industry is on the rise, but it is still relatively backward compared with foreign countries. We lack a lot both in terms of technology and design concept, or we just know but do not deeply understand its characteristics, and do not really integrate it into the design (Meng & Huang, 2022). The interaction and VR technology has promoted the rationalization of the sports advertising industrial structure, and the sports advertising technology innovation triggered by has promoted the upgrading of the sports advertising industrial structure. Under the joint action of the two, big data brings about the optimization and upgrading of the sports advertising industry structure. This paper mainly puts forward the following innovations: Due to the openness of the Internet, the continuous enrichment of data types, the continuous improvement of data mining technology and other reasons, the classification of big data accurate interactive advertisements is more complicated. Different from the relative solidification of traditional sports advertising types, the subdivision types of VR technology-based interactive sports advertising based on big data are more open and diverse. But generally speaking, the three main standards of sports advertising, namely, display mode, transaction means and orientation method, determine the specific types interactive sports advertising. Interactive sports advertising attracts audience's curiosity and satisfies audience's immersive emotional communication by making use of dramatization and dynamics, which has unique communication advantages in the deep communication of information. In the design process, in addition to following the actual requirements of the product, it is also necessary to give users different experiences from the aspects of senses and emotions, so as to achieve in-depth communication and improve users' recognition and love for the product. The precision sports advertising model based on big data is not a "whim", but the inevitable result of the collision between the marketing ideas of "precision guidance" and new technologies. However, the emergence and rapid growth precision sports advertising is by no means a "small innovation". It is a new energy for the Internet to change the outbreak of information dissemination industry, and will definitely reconstruct the industrial base, industrial chain, industrial ecology and operation mode of the future sports advertising industry. The overall structure of this paper consists of five parts: The first chapter describes the background content and significance of interactive sports advertising mode. The second chapter mainly introduces the related research of interactive sports advertising

and the research content of interactive sports advertising based on big data and VR technology. The third chapter tells about sports advertising interaction design and the application of sports advertising interaction design based on big data and VR technology. The fourth chapter is the simulation experiment, and summarizes the contents and results of the experiment. The fifth chapter is a summary of the full text.

2. Related Work

2.1 Research on Interactive Sports Advertising

As a means of spreading information, sports advertising plays an important role in contemporary social life. The transmission of information has changed from a single passive input type to a multi active communication type, which broadens the channels of information transmission and also builds a shared space. Explain what development advantages interactive design will bring to public service sports advertising, and how to better play interactive functions. It is expected that in recent years, interactive sports advertising activities have been frequent, and the third climax of interactive sports advertising research has appeared in the sports advertising academia. Nizam N Z, et al. believes that interactive sports advertising provides the audience with participatory forms or links, takes "people" as the source of thinking, and pays attention to people's feelings (Nizam & Supaat, 2018). It is not subversion, but breakthrough. It is not only the brand but also the participants who are excited. Han K S proposed that interaction is the core link between users and advertisers, as well as a strategic method of user experience, so ensuring the display and organization of interactive sports advertising itself is a prerequisite for achieving the final effect. The apparent problem of interactive sports advertising is that its popularity is not high, while the real problem lies in the organization and display (Han, 2020). Azmy M A, shows that innovative thinking is embodied in the design of public service advertisements, and ideology, design and viewing features are organically combined to attract and inspire people (Azmy, 2017). It breaks through the past single line transmission, and spreads advertisements to more people, so that people can feel the user experience in advertisements, thus promoting the future development of sports advertising. Azmi M A proposed that traditional advertisements mainly rely on video, images, sounds and words to attract audiences. In order to explain the product benefits clearly, relatively detailed sports advertising content and repeated delivery are usually used. As viewers, audiences are easily bored (Azmi, 2017). Krishnamurthy V, et al. showed that each kind of media has its own unique effect on consumers, and interactive sports advertising now mostly exists on the network (Krishnamurthy et al., 2016). It is undeniable that the network has dynamic and interactive characteristics in audio-visual perception and control operation, which is very consistent with the requirements of interactive sports advertising in the media, but a single media delivery must

have limitations. JF Fondevila Gascón, et al. summarized that sports advertising in the "Internet+" perspective can present new artistic sparks, present more innovative and rich sports advertising to the public, and make the public and sports advertising closely linked (Fondevila-Gascón et al., 2021). Qutp M M, et al. conducted research on sports advertising effect based on sampling survey. The survey methods and measurement results on sports advertising cognition and attitude directly reflect the characteristics of sports advertising feedback, and also reflect the shortcomings of traditional sports advertising effect survey (Qutp et al., 2019). Yang X believes that advertisers no longer only focus on creative methods in the competition, but also pay more attention to the needs of consumers, and pay attention to the technical expectations of the audience on the sports advertising media in sports advertising. Advertisements no longer only use plots to pull the audience, but also use the environment to attract the audience (Yang, 2020). Qu S breaks through the previous research on public service sports advertising in the form of traditional image and text expression, and actively explores the development form of future sports advertising with the help of "Internet+" vision and interactive design, providing valuable reference for it (Qu, 2021). Tan W H, et al. believes that the current media sports advertising management pays more attention to the application of technology than the traditional sports advertising management. In the process of media integration, the enterprise resources are mobilized through technical means to carry out marketing activities to realize the value process of enterprise products and services (Tan et al., 2018).

2.2 Research Content of Interactive Sports Advertising of Big Data and VR Technology

Sports advertising has gradually developed from the initial pure product and service notification to the communication with brands. Brand communication emphasizes giving consumers sufficient information, rendering the communication power and influence of strong brands, so that consumers can make judgments according to their own wishes. Therefore, based on BD and VR technology, this paper studies the interactive sports advertising mode. In the process of sports advertising activities, sports advertising information dissemination activities, consumer feedback marketing activities and new market behaviors that affect the use of sports advertising are called interactive behaviors. VR sports advertising refers to a new form of sports advertising that can load information on real objects by using virtual reality technology. In the process of sports advertising, the audience purposefully participates in sports advertising and interacts with VR sports advertising. Sports advertising monitoring of BD technology can complete the real-time feedback and real-time adjustment of sports advertising information, which is of great significance for improving the efficiency and effectiveness of sports advertising. VR technology integrates sports advertising videos, which can fully display product functions and features. People are not limited to watching product performance and

product appearance, but can experience this product for themselves. The pursuit of sports advertising communication effect is restricted not only by the BD resources supplied and configured by traditional sample survey technology, but also by the context of mass communication. It is even more necessary to adapt to the characteristics of the mass communication context to find the most appropriate effective communication strategy to obtain the sports advertising effect, or even there is no other way. In the process of VR sports advertising video viewing, consumers receive information in a one-to-one manner, and the audience can feel and experience the scene of video sports advertising as if they were there. Such accurate and convenient service greatly improves the efficiency of BD sports advertising.

3. Research Methods of Interactive Sports Advertising Model Innovation

3.1 About Sports Advertising Interaction Design

Interactive sports advertising design is a sports advertising design that breaks through the past one-way communication, emphasizes the interaction between the sports advertising works and the audience, and even completes the sports advertising design works through the participation of the audience, and improves the sports advertising through the participation of the audience, so as to achieve the transmission of information. The emergence of interactive sports advertising is the use of advanced information technology to spread and forward sports advertising information through mobile phones and other media. It transforms the original passive acceptance into active promotion, greatly improving the position of sports advertising in people's minds, and meeting the living needs of consumers while promoting enterprise publicity (Yang & Hermann, 2018). Interactive technology refers to a new technology, including voice interaction technology, sensor technology, virtual reality technology, and augmented reality technology, that emphasizes the realization of two-way interaction between people, people and the environment, and people and machines. Interactive sports advertising has the characteristics of rich communication information, diversified forms of expression, dynamic content and high value. Interactive sports advertising uses dramatization and dynamism to attract the audience's curiosity and satisfy the audience's immersive emotional communication. It has unique communication advantages in terms of in-depth communication of information. In the design process, in addition to following the actual requirements of the product, we should also start from the senses, emotions and other aspects to give users different experiences, so as to achieve in-depth communication and improve users' recognition and love of the product. The introduction of planning has greatly improved the standardization of sports advertising operation, guaranteed the working efficiency of sports advertising operation, made the planning and decision-making of sports advertising activities more reliable, and thus made

the achievement of sports advertising communication goals more effective. When we look at strategy winning and its generation, organization and management rules together, we will find that a hundred years of modern sports advertising history has finally formed a set of institutionalized sports advertising operation rules, as shown in Figure 1.

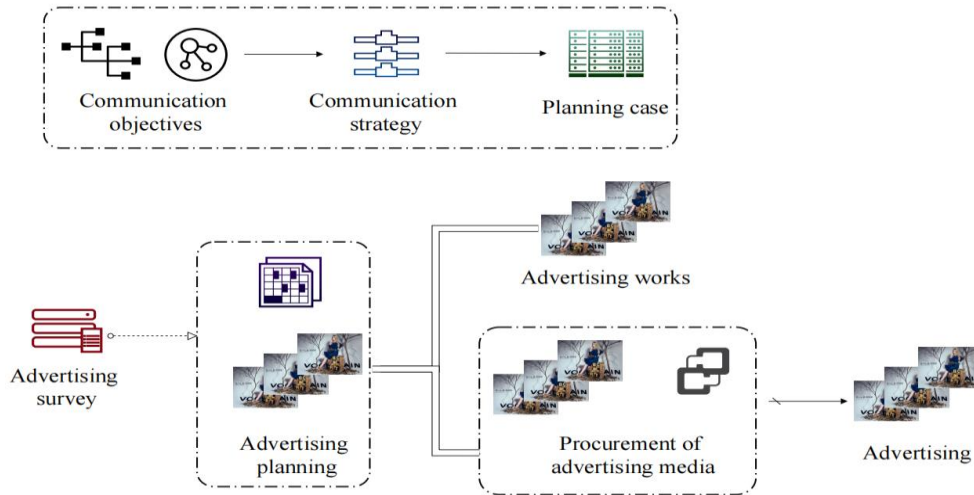


Figure 1: Interactive Advertisement Operation Under the Strategic Communication Management System

Generally speaking, people's interaction in life and work, political, economic, cultural and educational activities is also interaction. Therefore, today's word interaction is widely used in various fields such as literature, art and commerce. The design of sports advertising is to compare mobile email to football, and the email transmission between friends is like the transmission between football. The reception, access and reply of information are like passing, dribbling and shooting, which fully reflects the interaction between friends, strengthens the connection between sports advertising and people, and finally improves the user experience. Interactive sports advertising is based on the fact that two users have similar behaviors, so their preferences may be similar, thus making recommendations. Usually, the formula or cosine similarity calculates the similarity between two users. As shown in formula (1):

$$w = \frac{|N(u)|}{|N(v)|} \quad (1)$$

$N(u)$ refers to the collection of users u behavior on items. $N(v)$ represents the collection of users v behavior on items.

Or cosine similarity:

$$w = \frac{|N(u) \cap N(v)|}{|N(v) \times N(v)|} \quad (2)$$

However, users use cosine similarity to calculate the similarity. When the number of users is not large, both the time complexity and space complexity are high. Therefore, in order to facilitate the calculation, we establish an "item user" matrix. Therefore, for each item i , we can get a user u preference for it, as shown in Formula (3):

$$p(u, i) = \sum w_{uv} \times r_{vi} \quad (3)$$

r_{vi} means that user v is interested in i , and in some scoring systems with different grades, it is based on the score given by the user. Based on the above ideas, we can define the similarity of two different items as follows:

$$W_{ij} = \frac{|N(i) \cap N(j)|}{|N(i)|} \quad (4)$$

Using the scores of different users on different items, the matrix from "user-items" to "items-items" is established.

When designing interactive mobile media advertisements, we should imitate people's operating habits as much as possible, so as to enhance the convenience and efficiency of interactive operations, reduce users' resistance, give people a comfortable and pleasant experience, and strengthen interactive effects. But it's not limited to people. Today's interaction has generally referred to the effects produced by any individuals who can interact and influence each other. The subjectivity of the audience is reflected, so they are more willing to participate in it. Sports advertising interactive design is based on the design works of traditional print advertisements, and by giving them interactive forms, the audience can have emotional communication with the graphic design works (Yu et al., 2020).

The new interactive design of print sports advertising attracts audiences in various ways, and it allows the audience to participate in it, and receives feedback from the audience in the process of participation, so as to achieve a good information transmission effect. In interactive sports advertising communication, the feeling of the whole advertisement after browsing is the key content of user experience data collection. For example, the visual effect of the whole advertisement, the degree of difficulty in the interactive process, the clarity of the advertisement, etc. Only by strengthening the effect of interactive sports advertising can users' resistance to sports advertising be reduced, so as to improve the popularity of enterprises and promote their further development.

3.2 Research on Application of Sports Advertising Interactive Design Based on Big Data and VR Technology

The full application of big data and the support of the digital

communication context will upgrade the "hard won" communication of integrated marketing communication planning to the integrated communication marketing planning. The content of the planning will vary from the collaborative use of single sports advertising and other marketing communication means to enrich the creativity, communication marketing strategy and service system based on clear consumer portraits, accurate access and real-time optimization. With the rapid development of media, people are more specific in understanding things (Wang & Liu, 2019).

In the real-life process, sports advertising information is spread wantonly. The main purpose of broadcast sports advertising information is that people can recognize the product brand in order to stimulate sales. As we all know, broadcast sports advertising information needs to use media, and VR video sports advertising came into being. The interactive sports advertising under VR technology turns the audience into participants, and the audience's viewing angle is expanded to 360 °. It forms a perception of three-dimensional images, which is interesting and attractive, and strengthens the effect of sports advertising information dissemination. Sports advertising interaction design is more likely to interest the audience. Whether the design works give the audience surprise or amazement. No matter what attracts people, people will pay more attention to it because they have the same or similar experience or feelings, or because it is related to people's vital interests, which adds a new feeling to the audience. Due to the openness of the Internet, the continuous enrichment of data types, the continuous improvement of data mining technology and other reasons, the classification accurate interactive sports advertising is more complex. Different from the relative solidification of traditional sports advertising types, the segmentation types of VR technology and interactive sports advertising based on more open and diverse. However, in general, the three main criteria of sports advertising display, transaction means and orientation method determine the specific type interactive sports advertising (Effendi & Januar, 2019).

The precision sports advertising model is not a "whim", but an inevitable result of the collision of "precision guided" marketing ideas and new technologies. However, the emergence and rapid growth precision sports advertising is by no means a "small innovation". It is a new energy for the Internet to change the outbreak of the information communication industry, and will certainly reconstruct the industrial foundation, industrial chain, industrial ecology and operation mode of the future sports advertising industry. These new changes make the sports advertising operation completely different from the mass communication context, traditional sample survey and traditional database era. The sports advertising operation of sports advertising interaction design based on big data and VR technology is shown in Figure 2.

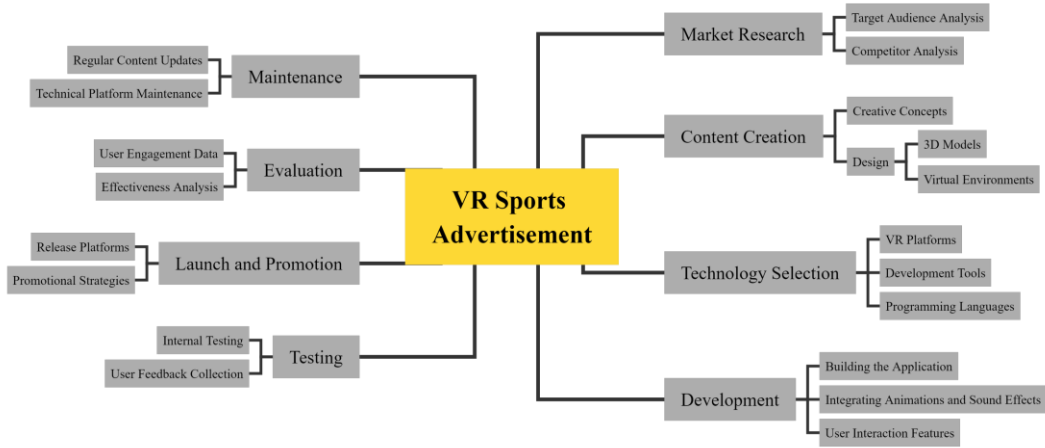


Figure 2: Advertisement Operation of Sports Advertising Interaction Design Based on BD and VR Technology

Under the system specification, the sufficient data supply and intelligent data service provided by big data technology are not only the starting point and foundation of interactive advertisement operation, but also serve the whole process of interactive sports advertising and provide real-time companion support for the feedback and optimization adjustment of big data effect implemented in each link. After the similarity between two items is obtained by sports advertising interaction, the interest of user u in an item j is calculated by formula (5):

$$p_{uj} = \sum w_{ji} r_{ui} \quad (5)$$

Among them, $N(u)$ is the collection of items that users like, and w_{ji} is the k item that best matches the r_{ui} characteristics of the item. The user u interest in an item i can be obtained. After using the time information, we can improve it through the following formula (6):

$$sim = \frac{\sum u \in N(i) \cap N(j)}{|N(i)| |N(j)|} \quad (6)$$

Use is defined as follows:

$$\phi(t_{ui} - t_{uj}) = \frac{1}{1+\alpha} \quad (7)$$

$\phi(t_{ui} - t_{uj})$ is a time weighting factor, and its value varies according to different needs. The percentage of the total recommended items actually recommended correctly in the recommended list is shown in Formula (8):

$$Pr e c i s i o n = \frac{\sum_{u \in U} R}{\sum_{u \in U} R(u, N)} \quad (8)$$

The percentage of N recommended articles generated in the actual relevant articles of users is shown in Formula (9) and Formula (10):

$$Recall = \frac{\sum_{u \in U} R(u, N)}{\sum_{u \in U} T(u)} \quad (9)$$

$$Recall = \frac{\sum_{u \in U} R(u, N)}{\sum_{u \in U} T(u)} \quad (10)$$

$R(u, N)$, a N long recommended list for user u , and $T(u)$, a collection of items that users like in the test collection.

With the application of VR technology to interactive sports advertising, the target customer can watch and walk freely in the virtual reality system, mobilize the audience's various feelings, experience the sports advertising content, and after receiving the information, the audience can rely on cognitive experience to play their imagination and imagine the effect after use in the human brain. It has brought unprecedented sense of scene to the majority of target customers, enabling them to produce a sense of reality. VR technology can transform product images into virtual objects, which can experience the product personally. The audience can integrate into the product advertisement, even they are the protagonists and spokesmen of the advertisement, immersed in it and explore the product characteristics. It greatly stimulates their desire to buy, and also makes the sales volume of products rise rapidly. Big data precision interactive sports advertising not only breaks through the problem that traditional precision marketing is difficult to launch on a large scale, but also makes up for the "extensive" operation of traditional interactive sports advertising, becoming a new industrial form of interactive sports advertising with a trend.

4. Analysis and Discussion of Results

In this chapter, the interactive design of sports advertising is selected for experimental research. Sports advertising is transformed from passive traditional way of transmitting information into a new format of people taking the initiative to absorb information, which makes people deeply feel and understand, and then causes the public to resonate and interact with it, and then it is implemented from some aspects of the interactive design and application of sports advertising. It can be clearly reflected from Figure 3 that the prospect of interactive sports advertising is still very optimistic. Residents are satisfied with the overall attitude of interactive sports advertising, and the highest proportion of satisfied data from the figure is as high as 67.09%. Secondly, it is very satisfied, with the highest proportion of 38.24%. Finally, dissatisfaction, with the highest rate of 26.55%. Compared with other forms of sports advertising, interactive sports advertising embodies its own advantages, and the recognition

of a new type of sports advertising by the public is the basis for its future development. This should also attract the attention of advertisers, and don't let the success of individual cases cover up the overall deficiencies.

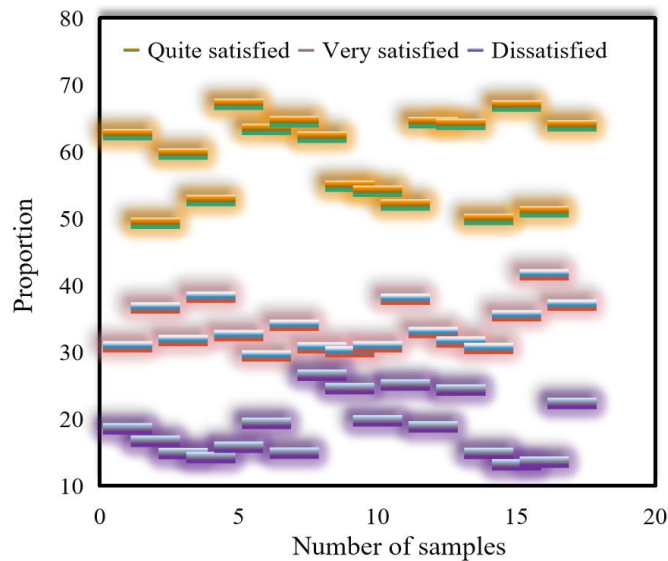


Figure 3: Attitude of Citizens Towards "Interactive Sports Advertising" Compared with other Existing Forms of Sports Advertising

Figure 4 conducts a study on the attitude of citizens of the same age group towards "interactive sports advertising". It can be found that people aged 18 to 35 have the highest acceptance, while those aged over 50 are significantly lower. It reflects the age of the current interactive sports advertising target audience, and conceives the inspiration for consumers, especially the insight into the characteristics of media contact. While grasping the changes of consumers' contact with media, the attention to the emerging new media cannot be ignored.

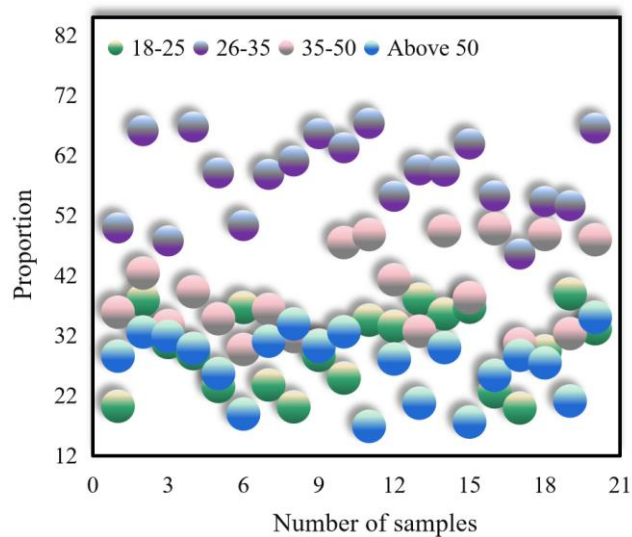


Figure 4: Citizens' Attitudes Towards "Interactive Sports Advertising" of Different Age Groups

In this experiment, the frequency of residents' contact or participation in interactive advertisements was investigated, and the following four options were obtained: daily contact or participation in interactive advertisements, frequent contact or participation in interactive advertisements, occasional contact or participation in some interactive advertisements and almost no contact or participation in interactive advertisements. The experimental results are shown in Figure 5.

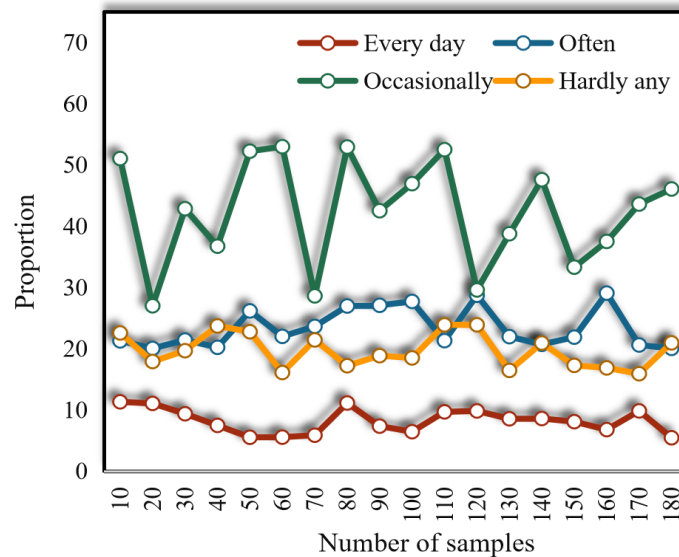


Figure 5: Frequency Of Residents Contacting or Participating In "Interactive Sports Advertising"

Figure 5 shows that the average proportion of people who occasionally contact or participate in some interactive ads in this sampling is about 42.39%, while the average proportion of people who frequently contact or participate in some interactive ads is about 23.38%, and the average proportion of people who contact or participate in almost no interactive ads is about 8.22% and 19.72%, respectively. It can be clearly seen that occasionally and often account for a higher proportion.

This experiment conducted a survey on the types of "interactive sports advertising" that residents are satisfied with, and obtained four categories, namely, online games (A), outdoor games (B) related to brands, various theme activities held by brands on portal websites (C), and participation in the outcome evaluation of open "micro film sports advertising" (D). Through experimental research on the above four projects, it can be seen from Figure 6 that people prefer to participate in the interactive sports advertising through electronic media compared with the general forms of interactive sports advertising. The most prominent is online games. 55.96% of people are satisfied with the interactive advertisements of online games.

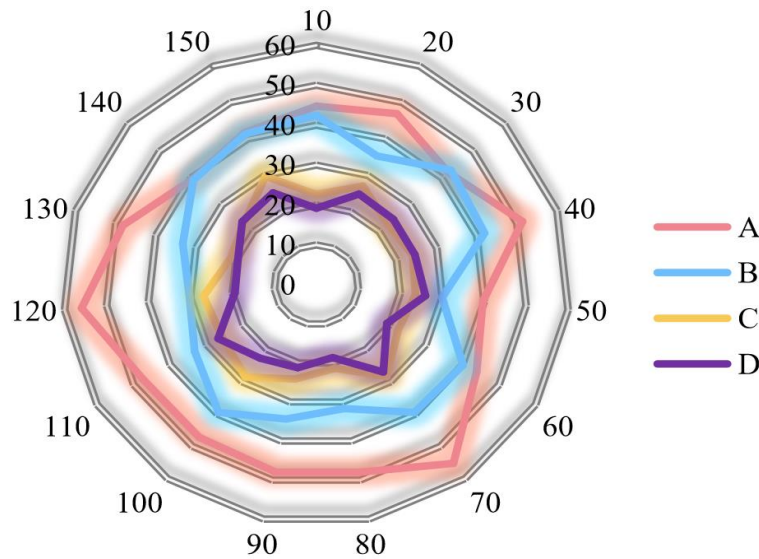


Figure 6: Types of "Interactive Advertisements" that Residents are Satisfied with

In China, the research on the optimization of video websites and advertisements has made some achievements. When searching papers, we set three keywords: "sports advertising products", "sports advertising innovation" and "sports advertising on video websites" to search the subject of Chinese academic journals. As of July 5, 2022, there are 21,457, 7,247 and 184 papers that meet the subject conditions, respectively. The database search results are shown in Table 1.

Table 1: Data Sheet

SOURCE OF LITERATURE	KEY WORD	SEARCH RESULT
GENERAL LIBRARY OF CHINESE ACADEMIC JOURNALS NETWORK PUBLISHING	Sports advertising products	21457
	Sports advertising Innovation	7247
	Video website advertisement	184
DISSERTATION	Sports advertising products	6013
	Sports advertising Innovation	3516
	Video website advertisement	35
FULL TEXT DATABASE OF INTERNATIONAL CONFERENCE PAPERS	Sports advertising products	303
	Sports advertising Innovation	127
	Video website advertisement	4

The research on sports advertising innovation and optimization is mostly based on the network background. On the one hand, it is how to optimize and transform traditional sports advertising by using the Internet; on the other hand, it is the research of online sports advertising. Most of the papers focusing on video websites focus on the operation, profit model, content production,

audience and copyright of video websites.

In the early days, the duration of patch ads was generally 16~35 seconds, but at present, the duration of patch ads on video websites generally exceeds 60 seconds, and the middle patch ads will be inserted many times during the video broadcast. Especially the comprehensive video websites represented by Youku and Tudou, and the long video websites featuring copyright dramas such as iQiyi, the length of patch advertisements before the dramas are broadcast is one minute. Therefore, statistics are made on the duration of patch advertisements before the hit drama on various video websites, as shown in Table 2.

Table 2: Statistics of the Duration of the Pre-Show Placement Ads on Various Video Websites

	AVERAGE DURATION	MAXIMUM	MINIMUM VALUE	MODE
YOUKU	99	113	16	96
IQIYI	82	82	82	82
TENCENT VIDEO	76.5	92	76	76

According to statistical Table 3, the duration of front patch advertisements of several major video websites is more than 60 seconds. Youku's front patch advertisement has the longest time, which is 113 seconds. Most of the time, the front patch advertisement lasts for 96 seconds. The shortest sports advertising time of the front patch is 16 seconds. Not only that, but the number of patch advertisements is gradually increasing. According to the statistics, it is shown in the table.

Table 3: Statistics of Patch Advertisements in Popular Plays on Video Websites

	NUMBER OF INSERTED ADVERTISEMENTS	DURATION
YOUKU	3	62
IQIYI	3	31
TENCENT VIDEO	2	16

It can be seen from the data in Table 3 that at least one advertisement will be inserted in the middle of a 45-minute TV episode. The length and frequency of the middle post advertisements vary among video websites. Youku has the longest sports advertising time, reaching 62 seconds. Tencent video has a small number of medium posts, with a duration of 16 seconds. It can be seen from the data in Figure 7 that the average daily consumption of sports advertising cost is more than 4000 yuan, and the daily consumption on November 11 is 18000 yuan. A total of 4.89 million exposures were obtained, with the highest click through rate as high as 1.8%, and a good drainage effect was obtained.

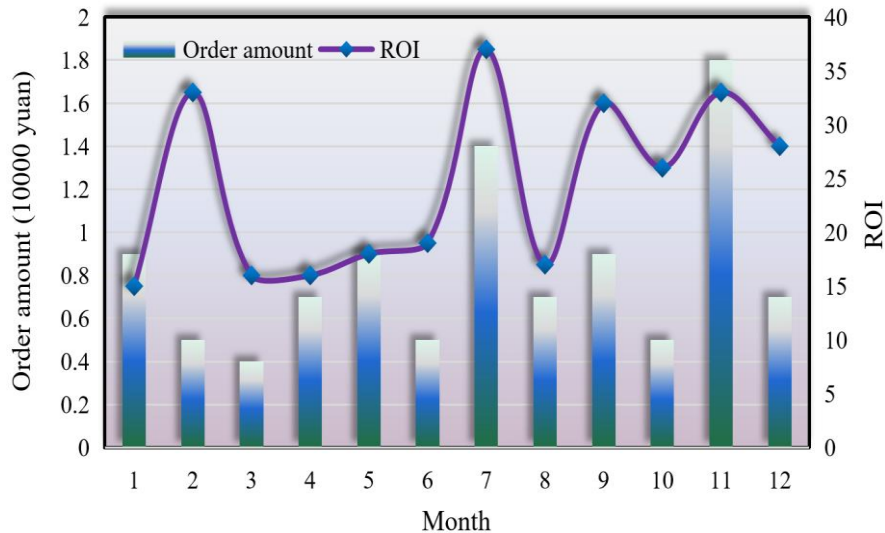


Figure 7: Sports advertising Effect of Case I

It can be seen that positioning and targeting the audience in multiple dimensions, forming "small data" related to the audience, and targeting the target audience for delivery can effectively improve sports advertising exposure. Sports advertising designers should start from the "people" of interactive design, combine interactive design with humanistic spirit, and believe that sports advertising design must have common advantages, creativity and interactivity to make contributions to the beauty and fashion of society, And make greater contributions to the construction of socialist spiritual civilization, achieve good drainage effect, and achieve the dual effect of brand marketing and effect marketing.

5. Conclusions

As VR technology becomes more mainstream, it is crucial for sports advertisers to adapt their strategies accordingly. Researching innovative modes of interaction will help brands stay relevant in a rapidly changing technological landscape. Interactive sports advertising has unique planning and creativity, which endows sports advertising with a unique artistic form and presents it to the public. It effectively promotes different media, and promotes the spread of sports advertising rapidly. Therefore, based on big data and VR technology, this paper studies the innovation of interactive sports advertising mode. With the help of big data and VR technology, interactive sports advertising uses interactive design thinking to innovate interactive experience forms, and applies the principles of instant feedback, initiative and immersion of interactive sports advertising to design practice. Interactive outdoor sports advertising is inextricably linked with user experience. Interactive design is a means to realize the development of user experience in a good direction, and it is also the most popular and effective method of user experience at present. Perfect user physical examination is the key factor affecting the success of interactive outdoor sports advertising. With the increasing role of social media in sports

marketing, innovative advertising modes that utilize VR and big data can enhance shareability and virality, expanding the reach of campaigns.

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