Research on Data Mining Model of Marketing Innovation Strategy Based on Neural Network

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Abstract: *Aiming at the problems of imperfect innovation system and lack of effective business model in the application of neural network technology in marketing innovation strategy, this paper takes the home appliance market as the research object based on marketing theory, selects Xianyang Branch and Weinan Branch of Midea Group in Shanxi as research cases, and conducts research by analyzing their marketing strategies in the application of neural network technology. Among them, Xianyang Branch adopts innovative marketing model, implements the combination of online sales and physical store sales, carries out event marketing and network marketing, expands the marketing scope with the help of e-commerce platform, promotes with consumer demand as the center and provides personalized services; Weinan Branch adopts traditional marketing model, mainly relying on exclusive store channels, and promotion activities are carried out around price and gifts. There is a lack of promotion methods that meet the personalized needs of users, and brand promotion is mainly based on merchants. The research results show that the average turnover of home appliances of Xianyang Branch is 61.5 million yuan, which is much higher than the 54.44 million yuan of Weinan Branch; its average market share growth rate is 9.55%, which is significantly higher than the 4.88% of Weinan Branch. It can be seen that the marketing innovation strategy based on neural network can effectively improve the market performance of enterprises, and enterprises should actively use this strategy to enhance their market competitiveness.*

Keywords: *Neural Network, Marketing Strategy, Marketing Innovation Strategy, Marketing Model, Data Mining*

1. Introduction

Recently, the emergence and advancement of new IT industries such as neural networks, big data, cloud computing, and 5G mobile communications have changed people's thinking and behavioral habits, making all walks of life face various challenges and opportunities. Among them, neural network technology is advancing by leaps and bounds, and has steadily become an indispensable core technology for modern enterprises. Neural network related industries will constitute an emerging industry with a scale of one trillion yuan. In the world, neural network is regarded as a national key development strategy. Neural networks are widely used in smart agriculture, traffic monitoring, smart furniture, power systems, telemedicine, in-vehicle applications, and smart cities.

With the rapid development of neural networks, the Internet has shifted from a technical direction to an industrial direction, bringing more choices and more changes to the marketing activities of enterprises. This requires enterprises to constantly innovate marketing methods, expand development space, adapt to market changes, and stand out in the fierce market competition. The advent of the neural network era has brought consumers more choices and more freedom of choice. Therefore, enterprises must make positive changes in the use of marketing models and methods to meet consumer demand for products and services. In this case, the marketing methods of enterprises are more and more closely related to neural networks, and the degree of reliance on neural networks is also greatly increased. Under this situation, major enterprises should actively explore the needs of marketing in the Internet era, expand traditional marketing methods, update marketing concepts, establish new marketing methods, and improve marketing capabilities. Although China's neural network industry has made great progress, the application of neural network technology in marketing innovation strategies has just started, there is still a lot of room for development, and there are still a series of development bottlenecks and restrictive factors. First, the innovation system is not sound enough. Many domestic enterprises and universities are actively engaged in the research of neural network technology in the

enterprise field, but they have not been able to build a logical innovation framework. Second, there is no shortage of effective business models. China has seen the adoption of neural networks in various industries and fields. Due to the relatively low level of intersection between industries, it is unable to promote the progress of the entire industry, which in turn greatly affects the development of neural networks. This paper analyzes the home appliance market based on marketing theory, discusses the impact of marketing innovation strategies on the market, and then puts forward marketing innovation suggestions based on the home appliance marketing of Midea's Shanxi Xianyang Branch and Weinan Branch.

2. Related work

At present, research in the field of marketing focuses on core issues such as consumer behavior, channel integration and strategy optimization. Domestic and foreign scholars have discussed the limitations of traditional marketing models. Cioppi systematically reviewed 117 digital transformation and marketing literature from 2014 to 2020 and constructed a macro-micro dual-layer framework [1]. Ye analyzed the current application of big data analysis in marketing, differences in research methods and future directions according to the "theory-context-characteristics-method" framework [2]. Jadhav will conduct a theoretical analysis of the various benefits that small and medium-sized enterprises have gained from digital marketing, which help organizations improve productivity in different ways. The mind map will give the impact of small and medium-sized enterprises on their various performances in rural and urban areas. This study will provide further space for digital marketers to bring changes to their marketing operations [3]. Pearson proposed the fifth generation of IMC model, emphasizing the consideration of the triple bottom line of profit, society and environment, and exploring its strategy, communication media and new directions of measurement [4]. Research generally believes that with the advent of the information age, marketing communication is transforming from mass media to addressable media, and consumers are transforming from passive recipients to active participants, which requires further innovation in marketing theory and practice to adapt to market changes.

The cross-research of neural network technology and marketing is still in its infancy, but its application potential has attracted widespread attention. Existing research mainly focuses on the role of neural networks in data processing, consumer demand prediction and marketing process optimization. Tiukhova used dynamic graph neural network to predict key "influencers" in social recommendations and combined it with time series modeling to improve the effect of target marketing [5]. Wang proposed that neural networks replace traditional discrete choice models to optimize product portfolio strategies and support pricing and promotion decisions [6]. Churchil used neural networks to analyze the impact of consumer touchpoints on purchasing behavior and used Shapley values to evaluate the effects of each touchpoint [7]. Mulc's Transformer-based neural network model is used for marketing mix modeling, which can capture long-term communication effects and improve attribution accuracy [8]. Although existing research has involved the technical characteristics of neural networks and preliminary exploration of marketing applications, there is a lack of systematic empirical analysis of marketing innovation strategies driven by neural networks, especially insufficient practical verification in specific industry scenarios. To this end, this paper takes two branches of Midea Group as cases, combines marketing theory with neural network technology, and constructs a marketing innovation strategy data mining model based on neural network by comparing and analyzing the practical effects of innovative marketing models and traditional marketing models, providing practical reference for corporate marketing upgrades.

3. Marketing innovation strategy technology research

3.1 Neural Network Technology

Neural network refers to connecting objects with radio frequency identification equipment, infrared sensors, GPS and other equipment, and then connecting to the Internet through a mobile communication network or other means to form an intelligent network. It completes the intelligent management of objects and data collection and analysis through computers or mobile phones [9-10]. Combined with the Internet, it expands the coverage of neural networks and incorporates objects in the objective world into the Internet. It forms a wider information interconnection between things, things and people, and people, so that on the basis of the original Internet, a more complete and broader information technology socialization structural framework is established. In a neural network,

perception is the foundation of its work, and sensors are added to each node in a communication network, extending the network's influence to unconscious objects. The final result of the neural network presents an intelligent form, from the basic perception equipment to the transmission network equipment, all have certain intelligent processing capabilities. In general, a neural network is a diverse intelligent network. With the rise of neural networks, information and communication technology has been applied to all aspects of society, changing people's lifestyles in a more convenient, faster and smarter way [11]. The ultimate goal of neural network is to realize the information interaction between things, it should have the following three functions: comprehensive perception, reliable transmission and intelligent processing, as shown in Table 1.

Table 1 Basic functions of neural network

Comprehensive perception	Use RFID, QR code, sensors and other perception recognition and positioning technologies to obtain object information in real time
Reliable transmission	Connect the object to the WAN, and through the integration of various networks, services, and terminals, the object information is transmitted accurately in real time
Intelligent processing	Analyze, process, mine and integrate the massive data information transmitted to realize intelligent control and decision-making

The neural network system architecture includes three layers: perception interaction layer, network transmission layer and application service layer. The three-layer structure, each with its corresponding function, is connected to each other, but remains independent. The perception and interaction layer is the core part of the neural network. When it senses physical information from the outside world, it initially processes and converts it into electrical signals, which are processed by different sensors. The network transport layer is responsible for the effective transmission of data, the application service layer implements the corresponding application functions according to the collected data, and the information flow is transmitted from the bottom layer to the top layer. Figure 1 shows the flow of information at three levels of a neural network.
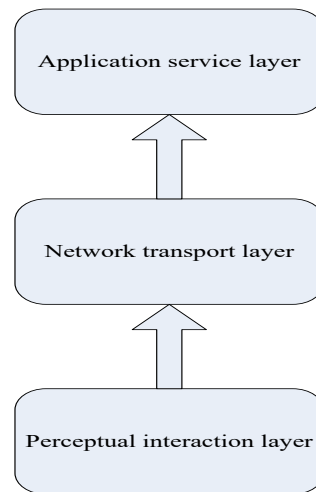
Application service layer

Network transport layer

Perceptual interaction layer

Figure 1 Information flow diagram of three-layer structure of neural network

The intelligent level of interaction mainly uses intelligent technology and network technology to build sensor network [12]. Sensor networks are divided into wireless sensor networks and wired sensor networks. Wireless sensor networks can be accessed through ZigBee wireless transmission, WiFi, Bluetooth and other technologies. The main elements of the perception layer are sensors, cameras, RFID readers and electronic signals, as well as sensors corresponding to functions. The network transmission layer includes wireless transmission network, Internet and some information processing platforms. Its function is to distribute the collected data at the landscape level to achieve the purpose of two-way transmission of control information and landscape data. Among them, the collection, storage, analysis, search of intelligent data, and decision-making knowledge and technology based on intelligent data behavior are the main technologies involved at the network level. The application service layer is the neural network data collection terminal. This layer combines the discovered external information with the user's needs to realize the application of neural network understanding. It can be a computer application or an automatic controller that controls the device. For surveillance systems, optical surveillance software usually needs to process and analyze the information.

At the heart of neural networks is the integration of physical and IT infrastructure to locate, transfer, store, integrate, and use information between objects and people. The neural network is characterized by the complete connection of visual recognition, communication transmission and intelligent management [13-15]. The information communication, moving process, and architecture between the three levels of the entire neural network are shown in Figure 2, and the basic technologies at each level are shown in Table 2.
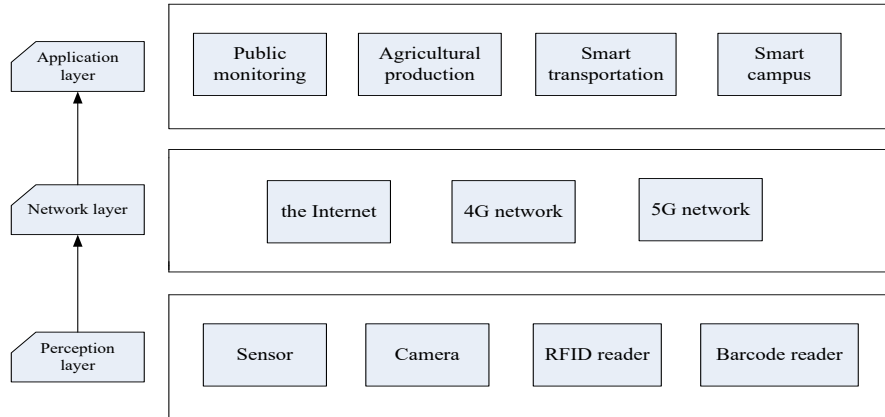

Figure 2 Neural network architecture diagram

Table 2 Key Technologies of Neural Networks

Perception layer	Sensor technology, RFID technology, QR code technology, ZigBee technology, positioning technology, etc.
Network layer	Internet, mobile communication network, wireless sensor network, etc.
Application layer	M2M technology, cloud computing technology, artificial intelligence technology, data mining, etc

3.2 Influence of Neural Network Technology on Marketing Management

The impact of neural network technology on marketing management has the following aspects, as shown in Figure 3.
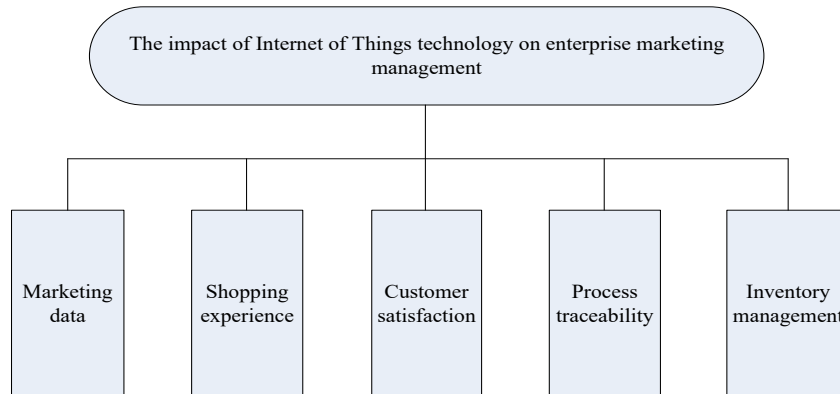

Figure 3 The impact of neural network technology on marketing management

(1) The application of neural network technology can make marketing data more reliable

Traditional marketing data mainly comes from manual collection, obtained through questionnaires, telephone calls, etc. Later, even if some office software or platforms were used, some basic data depended on manual input, so the accuracy of data information was not reliable [16-17]. The neural network technology will not cause data and information errors due to human factors, because the information processing and transmission generated by the neural network technology completely adopts an intelligent system [18]. The collection of a large amount of user data can provide an important reference for the marketing department to analyze the market. It can also analyze the current market situation of the enterprise and predict the market prospect of the enterprise, so as to more accurately grasp the market trend and provide more accurate data information for marketing.

(2) The application of neural network technology can make the shopping experience more personalized

Neural network technology helps predict user needs and deliver solutions more efficiently. The data obtained by neural network technology can help the marketing department to learn more and more about the user's living habits, so as to design and carry out relevant marketing activities in a targeted manner. Connected devices can share and use data more efficiently, such as product usage conditions, environmental factors, brand preferences, and more. Neural network technology can help users discover in advance that the currently used products are outdated, and launch alternative products in a targeted manner.

(3) The application of neural network technology can improve customer satisfaction meter

Neural network technology enables marketing departments to analyze customer buying patterns and behaviors to understand what is most popular with customers, so that they can design and deliver targeted shopping experiences based on consumer preferences. While improving customer satisfaction and engagement, neural network technology can also predict possible complaints in the market, allowing for targeted problem resolution.

(4) The application of neural network technology can realize the traceability of the whole process of product production

Under the neural network technology, the products produced by the enterprise can realize the traceability of the whole production process, that is, consumers can see the whole process of each product from the procurement of raw materials to the completion of finished product production. The traceability of the whole process of product production can be presented to consumers is the entire production management process of the product, which is not only the demand of consumers, but also the higher requirements of the market for production enterprises. The traceability of the whole process of product production allows consumers to know the raw material information and production information of the product before purchasing the product, allowing consumers to more objectively and accurately evaluate the quality and safety of the product. Specifically, the first is the traceability of raw material information. Raw material suppliers provide relevant information on raw materials, including name, origin, quality inspection information, grade, etc. Second, the production process information can be traced back. The entire production process of the enterprise should be monitored and documented. Based on relevant national management standards, each stage of production and its operational procedures should be standardized. Unnecessary production and management steps should be reduced to improve the overall level of management and enhance work efficiency.

(5) The application of neural network technology can provide more convenient inventory management and more efficient logistics

Under the neural network technology, enterprises can improve the efficiency of their own logistics after using new technologies such as radio frequency identification chips, wireless networks, and wireless sensors. The source of each operation process of logistics can be traced back to get more accurate results. Among them, the role of the radio frequency identification chip is to help warehouse personnel find the correct items faster, send out-of-stock information in time, and replenish goods in time. Neural network technology can also effectively avoid problems such as dislocation and loss of items, which greatly improves the management ability of the market.

In contrast to traditional marketing, neural network marketing empowers consumers to transition from passive observers to active participants, significantly enhancing user engagement and interactivity. At the same time, it redefines the role of media, moving from mass communication to targeted, addressable media—embodying the concept that every individual can function as a media channel. This evolution enables marketing communication to occur anytime and anywhere, shifting its focus from a marketer-driven model to one centered around the consumer. In addition, we will strengthen consumer initiative and voluntary marketing, and change the media communication plan, based on the timeliness of data, It enables the marketing effect to measure and strengthen the return on promotion investment in real time, optimize the marketing communication effect, realize the transformation from traditional integrated marketing to new integrated marketing, and strengthen the key influence of big data. The Internet is not a simple superposition of traditional marketing and network technology, but a fundamental change in the relationship between the two, subverting traditional marketing strategies.

The relationship marketing model based on communication, on the one hand, the brand carries out a cross-functional integrated marketing communication mix through enterprise operation, sales,

communication and other levels, so that marketing runs through the entire enterprise operation, forming a unified strategy at all levels within the enterprise and at the production stage; On the one hand, brands carry out relationship marketing through stakeholders including employees, investors, financial departments, governments, suppliers, competitors, consumers, and the media, so that the two interact and form an intra-brand marketing model. And enhance the brand value outside the enterprise. The marketing process has changed from the single-line relationship marketing in the past to the interactive relationship marketing that belongs to the category of brand marketing communication theory. 3D Marketing Communication Strategy Model. Then the emergence of digital marketing communication theory more fully reflects the theoretical direction of marketing communication in the Internet age, that is, marketing communication theory has shifted from integrated marketing communication (more precisely, integrated brand communication) to digital marketing communication. The communication-based relationship marketing model is shown in Figure 4.
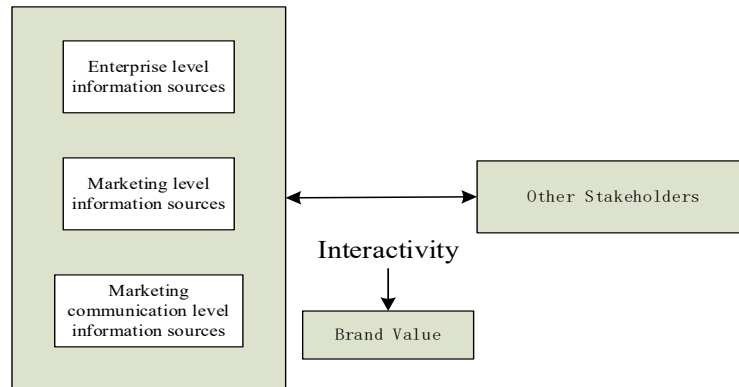

Figure 4 Communication-based relationship marketing model

3.3 Marketing Management Innovation Strategy Driven by Neural Networks

This paper will analyze the marketing management innovation strategy driven by neural network from the following aspects, as shown in Figure 5.
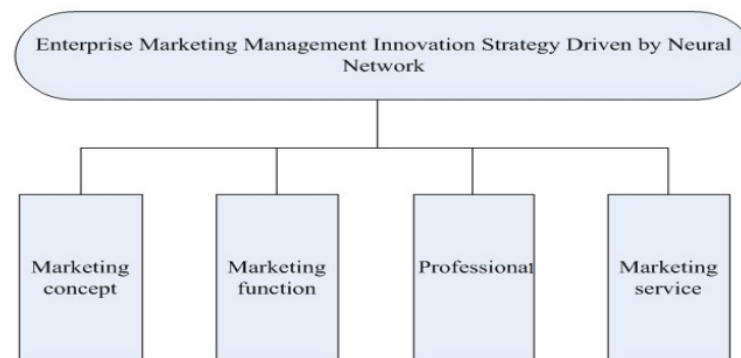

Figure 5 Neural network-driven marketing management innovation strategy

(1) Change the marketing concept and update the neural network marketing model

With the development of the times, the needs of consumers have undergone earth-shaking changes, becoming more and more personalized, diverse and demanding. Therefore, changes in consumer demand have brought greater challenges to marketing management. With the help of neural network technology, marketing management can detect various behaviors of consumers, aggregate data, and analyze various needs of consumers, so as to customize marketing services in a targeted manner.

(2) Strengthen consumer knowledge education and expand marketing functions

Due to the integration of neural network technology, the technical content of services and products provided by enterprises has greatly increased. Therefore, helping consumers learn and master relevant product knowledge has also become an important task of marketing management. Different from the previous consumption situation, consumers have already mastered product knowledge and use skills before purchasing products; products and services combined with neural network technology require

consumers to gradually master product knowledge and use skills after use. Therefore, after-sales of marketing management needs to take on a lot of work, including real-time tracking education and optimization of consumers using products after purchase. With the use of high-tech products, new problems can only be continuously discovered during use. At this time, the marketing department of the enterprise needs to follow up in time. In addition, the marketing department of the enterprise needs to update and optimize in time according to the usage of consumers.

(3) Recruiting and training professional talents

When the technical content of a company's products and services becomes more complex, the need for professional talent becomes increasingly critical, as only skilled professionals can help maximize the enterprise's economic benefits. To fully leverage neural network technology in daily marketing management, companies must not only recruit new professionals with expertise in this field but also provide training for existing employees to enhance their skills and efficiency, thereby building a more competent and professional team.

(4) Establish a customer value-oriented marketing service system

The integration of neural network technology makes the traditional marketing service system no longer applicable. Specifically, the boundaries between pre-sale, mid-sale, and after-sale services in the traditional marketing service system are too obvious, while products and services that incorporate neural network technology require pre-sale, mid-sale, and after-sale integration. , that is, no longer emphasize the importance of pre-sale, in-sale and after-sale. On sale and after sale. Moreover, the importance of the after-sales link is even more prominent, because most of the problems that occur during the use of products and services are very likely to appear in the post-purchase use situation.

4. Design of Midea Electric Appliance Market Transaction Experiment

This paper takes the Xianyang Branch and Weinan Branch of Midea Group in Shanxi as research samples, and selects the home appliance sales data of the two branches in 2020 as the research data source. Among them, the Xianyang Branch adopts an innovative marketing model that integrates neural network technology, covering online and offline integration, event marketing, network marketing, etc. The Weinan Branch adopts a traditional marketing model, mainly based on specialty store channels, focusing on price and gift promotions. The indicators used in the study include home appliance turnover, profit, consumer satisfaction, sales growth rate and market share growth rate. By comparing and analyzing the differences between the two branches in the above indicators, the actual effect of the innovative marketing model driven by neural networks compared with the traditional marketing model in improving corporate operating efficiency and market performance is evaluated.
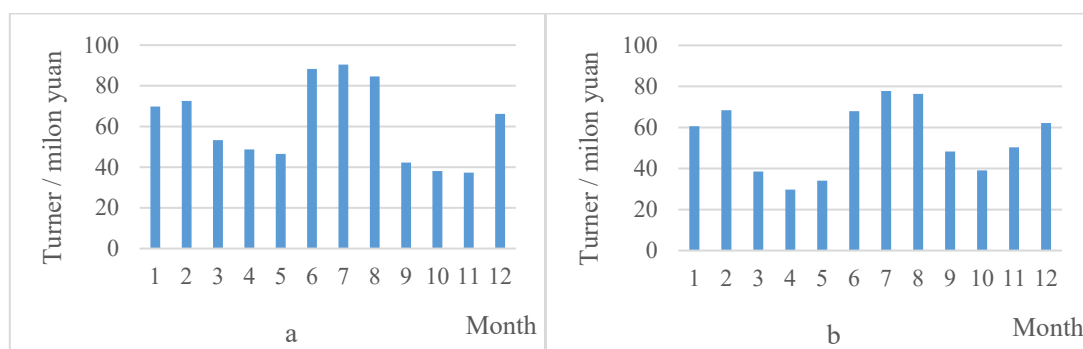
(1) Turnover

Figure 6a shows the monthly turnover of home appliances of Xianyang Branch in 2020
Figure 6b shows the monthly turnover of home appliances of Weinan Branch in 2020

Figure 6 The turnover of household appliances of the two companies in 2020

As can be seen from Figure 6, the average turnover of household appliances in Xianyang Branch in 2020 is 61.5 million yuan, and the average turnover of household appliances in Weinan Branch in 2020 is 54.44 million yuan. Among them, the sales volume of home appliances in June, July, August, December, January and February was relatively large, and the Xianyang Branch had the largest volume in July, reaching 90.4 million yuan. Weinan Branch's turnover in July was 77.8 million yuan. In September, October, November and March, April and May, the transaction volume of home appliances

was relatively small. The turnover of Xianyang Branch in November was only 37.3 million yuan, which was greatly affected by the off-season. The revenue of Weinan Branch in October was 39.1 million yuan, which was smaller than that of Xianyang Branch due to the off-season. Overall, the home appliance turnover of the Xianyang branch is higher than that of the Weinan branch.
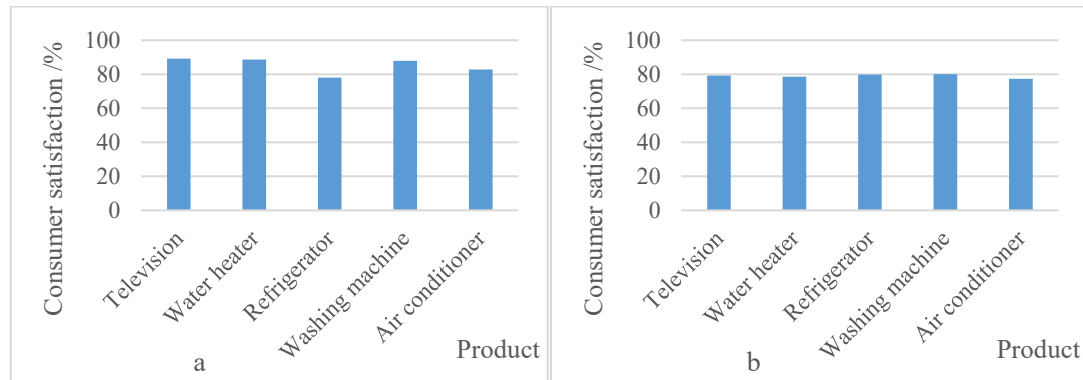
(2) Consumer satisfaction

Figure 7a shows the satisfaction of after-sales consumers of Xianyang Branch in 2020 for different home appliances
Figure 7b shows the satisfaction of after-sales consumers of Weinan Branch with different home appliances in 2020

Figure 7 After-sales consumer satisfaction of home appliances

As can be seen from Figure 7, after-sales consumers in Xianyang Branch have the highest satisfaction with TV sets, at 89.2%. This was followed by satisfaction with washing machines and water heaters, at 87.9% and 88.6%, respectively, with refrigerators relatively low at 78%. After-sales consumers of Weinan Branch have an average satisfaction rate of about 80% for these five home appliances. Since the Weinan branch mainly adopts store-style marketing, consumers can come to repair the after-sale electrical appliances if they fail, and consumers' satisfaction with different electrical appliances is relatively balanced.

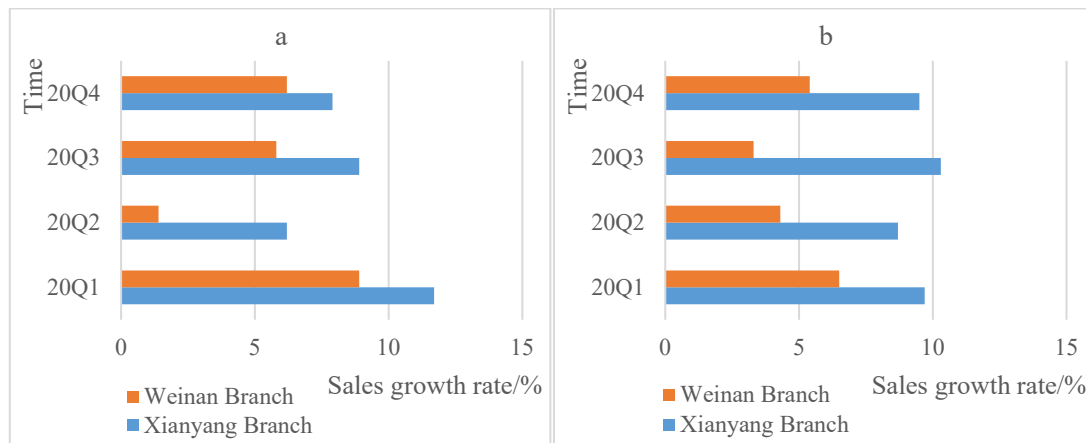(3) Sales growth rate and market share growth rate

Figure 8a shows the appliance sales growth rate for each quarter of the two companies in 2020
Figure 8b shows the appliance market share growth rates of the two companies in each quarter of 2020

Figure 8 Quarterly sales growth and market share growth for both companies

As can be seen from Figure 8, in the first quarter of 2020, the sales growth of home appliances in Xianyang Branch was the largest, at 11.7%. The growth rates in the second, third and fourth quarters were 6.2%, 8.9% and 7.9% respectively. The average sales growth rate was 8.68%. In the first quarter of 2020, the sales growth rate of home appliances in Weinan Branch also reached a maximum of 8.9%. The growth rates in the second, third and fourth quarters were 1.4%, 5.8% and 6.2% respectively, and the average sales growth rate was 5.58%. In the third quarter of 2020, the home appliance market share of Xianyang Branch increased the most, reaching 10.3%. The growth rates in the first, second and fourth quarters were 9.7%, 8.7% and 9.5% respectively, and the average growth rate of the market

share was 9.55%. In the first quarter of 2020, Weinan Branch ranked first in the home appliance market with an increase of 6.5%. The growth rates in the second, third and fourth quarters were 4.3%, 3.3% and 5.4% respectively, and the average growth rate of the market share was 4.88%.

5. Discussion

With the rapid development of science and technology, corporate sales in the wireless network field has become a major research topic. In order to make the company grow rapidly, it is necessary to collect and analyze product information according to the actual situation of the company, so as to improve the company's position in the market, and continuously improve the company's marketing process to promote the company's growth. company. .In the field of informatization, in order to improve the quality of the company's products, it is necessary to comprehensively analyze the sales of the products, and combine marketing innovations to further contribute to the company's sustainable development.

Midea Electric Appliances Xianyang Branch innovates its promotional strategies through event marketing, network marketing and other methods, as well as user experience-based promotional strategy innovations to maintain the stickiness of consumers and achieve market goals.

One is the innovation of marketing concept. Xianyang Branch takes consumers as the center and provides customers with more convenient and faster services through event marketing and network marketing. Compared with traditional marketing methods, it is a change of non-price competition.

The second is product strategy innovation. Xianyang Branch uses the e-commerce platform to expand the marketing scope, makes full use of neural network technology, realizes two-way interaction, collects consumer demand information, and creates personalized products for consumers.

The third is the innovation of marketing methods. Based on neural network technology, Xianyang Branch uses communication network technology to effectively mobilize corporate resources, thereby implementing market activities and realizing the entire process of effective sales of the company's products and services. Its essence is mainly to realize the marketing strategy of enterprises through network technology, that is, to pay attention to the mutual coordination and unity of logistics, capital flow and information flow, and to obtain corresponding profits through the satisfaction of consumers.

Network marketing is to use mobile terminals such as mobile phones and tablet computers as communication media to conduct market research on consumers, formulate marketing strategies, and deliver personalized real-time information to target audiences to achieve sales goals. Event marketing can effectively increase sales in the short term, especially for terminal stores such as holidays and store celebrations. Its promotion methods mainly include product specials, trade-ins, gifts, lottery, remote promotion, etc. At the same time, it is necessary to adhere to the quality and service of products for a long time, protect rights and interests and sincerely protect the experience of consumers to achieve the expected results, otherwise it will violate the laws of market operation. Through the use of modern information technology, the use of equity incentives, entrusted management, and the integration of Renda and other means to optimize and reform the organizational structure of the enterprise to achieve a win-win situation for enterprises and consumers. Through brand-driven, product technology innovation, large-scale underwriting, etc., it meets the individual needs of consumers on the premise of ensuring product quality, and formulates corresponding precise marketing strategies for different consumer groups. Network marketing, word-of-mouth marketing, and experiential marketing are several new marketing methods that have emerged in recent years. Its marketing effect is remarkable and can be used for actual marketing activities.

6. Conclusion

In the face of increasingly fierce market competition, companies that do not do marketing are bound to face bankruptcy, and in order to achieve sustainable development in market competition, they must fully realize the important role of marketing in enterprise development. Due to the large market environment, the company's marketing methods are relatively simple, thus limiting the company's development. Today, with the rapid development of neural network technology, developing new marketing methods has become a very important issue. Therefore, in the context of the information age, enterprises should continue to innovate in terms of products, prices, promotions, and marketing to meet customer needs. Improve the marketing management level of the entire enterprise, improve the overall

efficiency and market competitiveness of the enterprise. To sum up, neural network is a major change facing the current marketing development. Enterprises should actively carry out and implement network marketing, word-of-mouth marketing, and experience marketing according to their own actual conditions, so as to ensure that enterprises are in an invincible position in the fierce social and economic competition.

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