

Research on the Application of Big Data Analytics in Corporate Marketing

Sirui Huang^{1,*}, Haoran Xiong², Qizhen Bao³

¹Graduate School, Guangdong University of Finance, No.527, Yingfu Road, Tianhe District, Guangzhou, China

²Farmer School of Business, Miami University, 2054, 800 E. High Street, Oxford, OH 45056, USA

³Xi'an Gaoxin No.1 High School, No. 23, Tang Yan Road, High-tech Zone, Xi'an, Shaanxi Province, China

*Corresponding author: hsr20182019@163.com

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Abstract: In the era of big data, data contains a great potential value. Big data analysis can provide important support to improve enterprises' information development and scientific decision-making and become an essential part of enterprise marketing. This paper introduces the concepts of big data analytics and marketing and provides an in-depth analysis of the opportunities brought by big data analytics to enterprise marketing and the current challenges that it encounters. Based on this, practical application strategies are proposed, including enterprises putting consumers first when using big data analytics, protecting user privacy, continuously adjusting and optimizing marketing tactics based on big data feedback, and offering management assurance. This study contributes to the advancement of the enterprise precision marketing model and assists enterprises in making better use of big data, both of which have practical significance and value.

1. Preface

With the rapid development of the economy, China has achieved significant progress in science and technology fields, especially the Internet and computer technology, which started in the late 1960s. Premier Li Keqiang proposed for the first time in the government work report at the third session of the 12th National People's Congress in 2015, "Develop an 'Internet+' action plan, promote the combination of mobile Internet, cloud computing, big data, Internet of Things, etc. with modern manufacturing, and promote e-commerce, industrial Internet, and Internet finance healthy development." Since then, the Internet and computer technology have advanced significantly in many fields due to the combination of official promotion and market demand, tremendously promoting China's economic development.

In the new economic form of "Internet+", people's work and life are linked to big data. Whether it is social software chatting, online shopping, taking the subway and bus card, or mobile payment, people's daily behavior will generate a large amount of data. Therefore, big data analysis can be used to not only provide useful information for enterprise marketing but also to satisfy the individualized needs of users better and improve the consumer experience.

On the other hand, big data is a two-edged sword, and there are still certain problems and limitations in its practical application. Thus, using the advantages of big data to realize better enterprise marketing is a critical topic that deserves our attention and solution.

This paper begins with big data and marketing concepts, then goes on to analyze the impact of big data analysis on marketing and identify its shortcomings. Finally, this paper proposes big data analysis methodologies and efficient marketing models to assist enterprises in more efficiently using big data in marketing.

2. Overview of Big Data and Marketing

2.1 Overview of Big Data

2.1.1 Big Data Concept

Big data, or mega data, refers to massive, high-growth, and diverse information assets that require new processing models to have greater decision-making, insight, and process optimization capabilities [1], often reaching petabytes (1024 TB) in size.

Different organizations have different definitions of Big Data: McKinsey & Company defines Big Data as a collection of data that is so large that it greatly exceeds the capabilities of traditional database software tools in terms of the acquisition, storage, management, and analysis. The Mobile Information Technology Research Center's definition of Big Data, on the other hand, is based on enterprise development. It proposes that Big Data is an emerging data management technology that helps enterprises use massive data assets to gain real-time, precise insight into dynamic changes in unknown logical domains. At the same time rapidly reshape business processes, organizations and industries.

To sum up, big data technology refers to a new type of data with obvious advantages such as more data categories, faster processing speed, and large data volume compared to traditional database processing capability. However, the relatively low data value density of Big Data means that there is relatively little useful data in the continuous extraction of the data, which reduces the efficiency of data analysis [2].

2.1.2 Development of Big Data

With the rapid development of artificial intelligence, cloud computing and other technologies, the global data volume is expanding and increasing without limit. The data unit is growing rapidly from GB at the very beginning to ZB nowadays. According to China ICT statistics, the global data volume generated in 2016 was 18 ZB; in 2017, it was 26 ZB, with an annual growth rate of about 44%; in 2018, it reached 33 ZB, with an annual growth rate of about 27%; in 2019, it was 41 ZB, with an annual growth rate of about 24%; and in 2020, it reached 50.5 ZB, with an annual growth rate of about 23%, as shown in Figure 1 and Table 1.

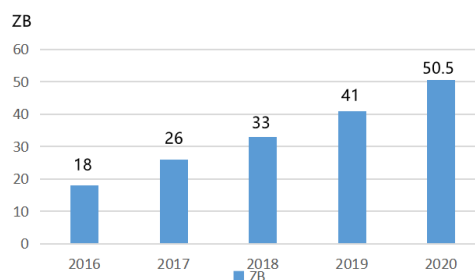


Figure 1: Global annual data generation 2016-2020 (in ZB)

The analysis of the global annual data volume generated and the annual growth rate from 2016 to 2020 shows that the global annual data volume generated shows an increasing trend year by year. Although the annual growth rate has slowed down, the growth trend is still obvious. Accordingly, the global data volume is expected to increase tenfold by 2025, from 18 ZB in 2016 to about 163 ZB [3].

Table 1: Global Annual Data Generation and Annual Growth Rate, 2016-2020

Year	2016	2017	2018	2019	2020
Data Volume(ZB)	18	26	33	41	50.5
Annual Growth Rate (%)	/	44	27	24	23

Moreover, according to IDC statistics of 2018, China generates about 23% of global data, higher than that of the US and Japan but lower than the EMEA (Europe, Middle East, and Africa) region, as shown in Figure 2.

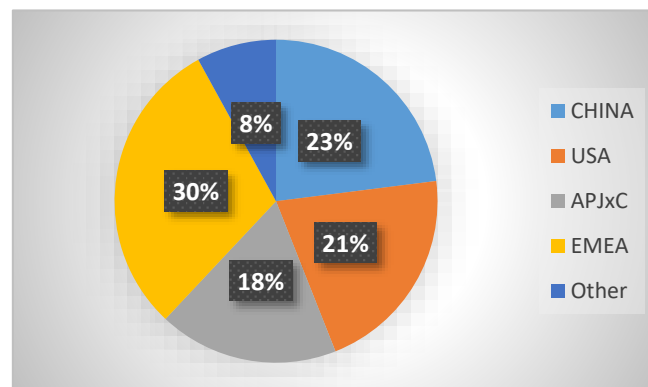


Figure 2: The regional distribution of global big data storage volume in 2018 (unit %)

The above analysis shows that big data is still one of the most valuable assets in the world. With the help of big data technology, we can mine, analyze, and integrate existing data for various purposes, allowing us to predict the future trend of data, identify market laws, and provide critical support for improving the information development and scientific decision-making of enterprises.

2.2 Marketing concepts based on big data

Marketing is a marketing behavior that mainly refers to how companies tap into and target the needs of consumers and promote their consumption. Big data-based marketing is the collection of real-time data via many channels and its in-depth analysis to achieve precise positioning and projection of target users' preferences and needs. Then, using various marketing methods and channels, different products and services are pushed to the corresponding consumers to promote their purchase and consumption. Practice demonstrates that precision marketing based on big data can help companies save a great deal of money on personnel and materials. At the same time the sales effect is excellent, all of which contribute to considerably improving the interests of businesses.

3. The impact of big data analytics on social economy

With the rising capabilities of computers to handle data and the accumulation of data, we have now entered the "big data era." Since 2014, when "big data" was first mentioned in the government

work report, China has realized the significance of data. In the Outline of Action to Promote the Development of Big Data issued in August 2015, the State Development [2015] No. 50 put forward: "Data has become a national strategic basic resources.", which means that the development of China's big data industry began to take off. Since then, China has continued to implement supportive policies and measures.

For example, in 2016, the 13th Five-Year Plan officially proposed the implementation of the National Big Data Strategy. In May 2020, the Ministry of Industry and Information Technology issued the "Guidance on the Development of Industrial Big Data" to coordinate the construction of a national industrial big data platform, promote the comprehensive collection and open sharing of industrial data and stimulate industrial data with policies market vitality. While in May 2021, the National Development and Reform Commission issued the Implementation Plan for the Arithmetic Hub of the National Integrated Big Data Center Collaborative Innovation System, which requires guiding the development of mega and large data centers in clusters to build data center clusters.

The Chinese government acknowledges the impact of big data on the economy and society and places a high value on its application in economic and social growth, as evidenced by a series of plans, policies, and programs issued by the government above. As a result, big data influences and changes how the country and governments make decisions and manage their resources.

At the company level, an increasing number of enterprises are using big data in marketing and management decision-making services, attempting to improve their competitiveness in the industry by utilizing big data's enhanced decision-making, insight, and process optimization capabilities. For example, before the deployment of big data analysis, crop production was mostly based on market conditions to alter supply and demand. If the market behaves well, production will be increased; if the market behaves badly, supply will be lowered, which will most likely result in market adjustment owing to market lag. Following the application of big data analysis, it is possible to understand potential consumer demand through online booking and other channels, as well as analyze consumer preferences through the feedback from previous years' sales, thereby encouraging producers to adjust to demand and avoiding economic losses caused by market lag and blindness. As can be seen, big data applications are strongly linked to human production and life, and they have a long-term positive impact on the social economy.

4. The impact of big data analytics on business marketing

In the era of big data, data has gradually become the core asset of enterprises. Big data analysis takes user demand as the fulcrum to establish a digital marketing system that scientifically regulates supply and demand, effectively addressing the issues of spontaneity, blindness, and lag in earlier market regulation [4]. As a result, enterprises must rely on big data technology to quickly and accurately understand consumer market information and seize market opportunities while also being aware of the problems that currently exist in the application of big data analytics in enterprise marketing to better utilize big data for the benefit of enterprises.

4.1 Opportunities of Big Data Analytics for Corporate Marketing

4.1.1 Tapping into the real needs of consumers and improving consumer experience

As is known to all, the main current contradiction in Chinese society is the contradiction between the people's growing need for a better life and the unbalanced and insufficient development. One of the manifestations of the people's growing need for a better life is the increasing demand for the quality of products and services provided by enterprises. By using big data analysis, enterprises can fully understand consumers' needs through massive data such as product search records, purchase

history records, and purchase intentions on search sites such as Baidu, Google, 360 or other shopping sites such as Taobao and Jingdong, to discover or evaluate consumers' consumption habits and preferences. They can also analyze consumers' consumption behaviors and predict their consumption trends.

Thus, enterprises can improve and supplement customer information based on the results of data analysis. They can also develop targeted precision marketing strategies, like individualized products, services and marketing programs, to provide consumers with a diverse and personalized consumer experience. This model of precision marketing not only increases the likelihood of consumer spending but also effectively improves the efficiency of the business at a minimal cost.

4.1.2 Promote cross-selling and expand consumer reach

Cross-selling is a marketing method that taps into the multiple needs of existing consumers and sells a variety of other related services or products to satisfy their requirements. Companies can use big data analysis to not only explore different consumers who favor the same product but also the demand for different products that the same consumer prefers. Companies can create cross-cutting marketing models based on relevant data, allowing them to broaden the scope of consumer consumption and thus improve marketing revenue.

4.1.3 Promote marketing model innovation

The classic business marketing approach is frequently a one-way marketing behavior. Companies conduct relevant research and forecasting before product creation and design and then distribute sales through advertising. This marketing model can run well in the past because, in that era, consumers' product needs are relatively single, often focusing only on the function and price of the product.

However, consumers' needs are diversified and changing rapidly in the Internet era, even pursuing more personalized and unique products and services. Under the influence of this shift, the traditional marketing model is often eliminated due to lagging market demand orientation. On the contrary, enterprises can develop marketing strategies fit for their development based on real-time, precise data information analysis results, establishing distinctive marketing models.

4.2 Problems of Big Data Analytics in Corporate Marketing in General

4.2.1 Violation of consumer privacy and information security

Big data is a double-edged sword; on the one hand, the use of big data analysis can bring rich profits to enterprises; but on the other hand, big data collects various network records of consumers, which to a certain extent violates the privacy and information security of consumers. Moreover, especially in recent years, the phenomenon of big data "killing familiarity" has emerged in society. For example, some businesses use their user data to present different prices for new and returning customers in the same commodity or service and to adopt differentiated price marketing tactics for different customers. Thus, consumers reject big data analyses of enterprises because of their "killing familiarity" habit, which affects the development of enterprises.

4.2.2 SEO and SEM are difficult to combine organically

SEO stands for Search Engine Optimization, which improves the natural ranking of keywords in search engines to get more traffic, while SEM stands for Search Engine Marketing, which is paid promotion. Companies can use the two data analysis results, with the two keywords complementing

one another, to efficiently select keywords and accurately cover the demand user base. However, if search engine marketing and optimization do not work well together, there will be evident duplication of overlapping phenomena in keywords, resulting in unjustified optimization loss [5].

4.2.3 Lack of big data analysis professionals

Big data analysis is a highly specialized field that necessitates not just excellent data analysis and organization skills but also a thorough understanding of consumer psychology so as to predict market product development trends and cater to consumer preferences. Nowadays, big data analysis expertise with comprehensive quality is in short supply and unable to meet the market demand. Practitioners with poor analysis skills or unfamiliar with consumer psychology often form conclusions inconsistent with user purchase characteristics, resulting in a lack of precision in personalized enterprise suggestions.

5. The application strategy of big data analysis in enterprise marketing

We can observe that the influence of big data analytics on enterprise marketing has more advantages than negatives. Thus, to make big data analytics more useful, we must take the problem as the guide and apply practical application strategies.

5.1 Adhere to the "user-centered" Internet thinking

Big data is the data gathered from the consumer's consumption behavior; thus, consumers themselves are the central focus of marketing. We must keep the consumer at the center of the 4P marketing strategy (Product, Price, Promotion, and Place). Always uphold the original objective of "give consumers superior products and services" in big data analysis, accurate understanding of consumer psychology, product design, research and development, pricing, and selection of promotional models and sales channels. This is the ideal approach to meet customers' needs, capture their attention, and let them feel the respect and sincerity of the enterprise.

The marketing strategy of wine brand Jiang Xiaobai, for example, is an improvement of the traditional 4P theory. It spent 40% of its time on consumer research before launching the "expression bottle," which allowed customers to draw their preferred patterns on the bottle to express their personalized thoughts. This strategy has successfully fostered contact between enterprises and consumers, making one-way advertising more interactive and satisfying consumers' inner needs for self-expression [6], and is deeply loved by young consumers. This innovative and low-cost initiative of Jiang Xiaobai helped it break into the market quickly and spread widely, allowing it to stand out among the strong competition from most distilleries.

Another example is Jingdong Mall, which uses big data analysis to discover that the number of female users among online shoppers is quickly increasing, so it focuses more on the shopping habits of the female party and develops a series of marketing strategies for this particular group.

5.2 Protect user privacy and information security

Companies must ensure that consumer privacy is protected while employing big data marketing. To begin, companies should avoid infringing on consumers' privacy when gathering consumer information. Second, the government should enhance user privacy laws and regulations and firmly prohibit the use of big data "swindle familiarity" behavior to protect users' personal privacy and rights.

The "swindle familiarity" causes consumers to lose money and damages the company's reputation. According to research, when customers discover that they have been "swindled

familiarity" by the platform, they forsake more than 60% of their consumption and transfer to another brand. It is clear that "swindle familiarity," while providing a temporary benefit, will result in customer loss and must be eradicated to defend consumers' fundamental rights.

5.3 Establish real-time feedback and communication channels

The market is constantly changing, and consumers' needs are also changing. Enterprises can develop real-time feedback and timely communication channels with consumers using big data analysis, allowing them to receive timely and effective input from the consumer market and consumers. This method enables enterprises to understand consumer psychology better, allowing them to adjust marketing strategies based on a large amount of marketing data, better cater to customer demand, eliminate customer discontent, and achieve marketing goals.

For example, after a new product is launched, Jingdong Mall will use big data technology to analyze a variety of information data on the website, such as the number of views, clicks, purchase rates, and comments of users, to predict consumers' attitudes and behaviors toward the new product so as to discover its benefits and drawbacks. Jingdong Mall then decides whether or not to continue promoting the new product [7]. Thanks to this marketing strategy, Jingdong Mall's transaction volume has expanded dramatically in the last five years. Therefore, it can be seen that, based on the feedback of big data analysis results, timely adjustments to corporate marketing strategy would provide considerable benefits to the company, allowing it to avoid excessive losses.

5.4 Strengthen the professional level of the team

The two aspects of enterprise professional marketing management are: First, we should continuously enhance the internal operating mechanism, offer adequate institutional protection, establish a data-sharing platform, and implement information resource sharing at different levels. Jingdong, for example, shared data with its upstream suppliers, which not only benefited its development but also built a high-quality value chain, maximizing the impact of big data.

Second, the company should strengthen the development of a marketing team based on big data analysis. For example, improve team members' professional ability in data analysis and mining, and encourage them to study consumer psychology and behaviors in-depth. Besides, improve the team's data processing and integration ability and consumer psychology research level, forming an excellent data analysis and marketing team. Enterprises focus on the two criteria mentioned above to make the most of big data and maintain their market competitiveness.

6. Conclusion

Big data will be an inevitable trend in future technological progress and majorly influences enterprise competitiveness. Enterprises can acquire a more precise understanding of consumer market trends and requirements through big data research, resulting in significant economic benefits. However, because big data is a double-edged sword, enterprises must employ the appropriate strategy to improve the rationalization and standardization of big data utilization.

This paper proposes that enterprises adopt a "user-centered" Internet mindset, fully respect users' needs and protect their privacy, and provide real-time feedback and communication channels for customers to adapt to market changes. At the same time, enterprises need to strengthen the team's professional construction and management, constantly improve the enterprise big data analysis in marketing, enhance the competitiveness of enterprises, and provide consumers with more comprehensive and personalized high-quality services.

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