

Research on Accurate Pricing Strategy of Insurance Industry under the Background of Big Data Era

Xiaonan Li*

Central University of Finance and Economics, Beijing, China

lxn_cufejs@126.com

**Corresponding author*

Keywords: Big data, insurance, accurate pricing, pricing strategy

Abstract: Under the era of big data, big data technology has been widely used in all aspects of insurance precision marketing, product design, risk control, internal operation and so on, which effectively solves the practical problems faced by insurance companies in the transformation and upgrading of insurance companies in the big data era, and it is conducive to promoting the high-quality development of the insurance industry. The new generation of information technology represented by big data technology has promoted the progress of insurance science and technology, infiltrating into all aspects of insurance marketing, products, pricing, service and management. On the basis of a brief description of the application of big data in the insurance industry, and taking the insurance pricing research as the starting point, this paper analyzes the positive and negative effects of big data's technology application on the insurance industry. Finally, it focuses on the specific research on the accurate pricing strategy of the insurance industry under the background of big data era from three aspects: establishing big data actuarial thinking, establishing accurate pricing model and insisting on customer-centered.

1. Introduction

Under the background of the wide application of the Internet, technologies such as big data, artificial intelligence and blockchain have not only become the driving force to promote insurance scientific and technological innovation, but also become an important technical support for the digital transformation and upgrading of the insurance industry. At present, China's insurance industry is in a window of transformation. It is of great significance to promote the high-quality development of the insurance industry to enable the insurance industry to change and promote the digital transformation of the insurance industry with science and technology. In the 14th five-year Development Plan of Insurance Science and Technology issued by China Insurance Industry Association in December 2021, it is clearly proposed that the application of big data should be strengthened in the process of strengthening the value empowerment of insurance science and technology. Meanwhile, fully release the core value of big data as a basic strategic resource. Insurance pricing is an important part of the insurance business process. When insurance companies apply big data technology in insurance pricing, they can achieve more accurate pricing and more comprehensive risk assessment, and then provide insurance products and premium rates that are more in line with users' expectations for the

insurance market.^[1] In the era of big data, giving full play to big data's technology to assist insurance companies in accurate pricing is of great significance to the business operation and sustainable development of insurance companies.

2. A brief Analysis of big data's Application in Insurance Industry in the era of big data

With the continuous progress and maturity of big data technology, big data technology has been effectively promoted and applied in all fields and industries of society, and human society has entered the era of big data. Taking big data's technology as the driving factor to promote a new round of transformation and upgrading of the insurance industry has been widely recognized by the major insurance companies^[2]. In order to give full play to the due role of big data technology, we must accurately grasp the application scene of big data technology in the insurance industry, so as to truly promote the transformation and upgrading of the insurance industry with new technologies and new ideas. The application of big data technology in the insurance industry broadens the development space of the industry, strengthens the risk management ability of the industry, and improves the ability to use insurance funds.

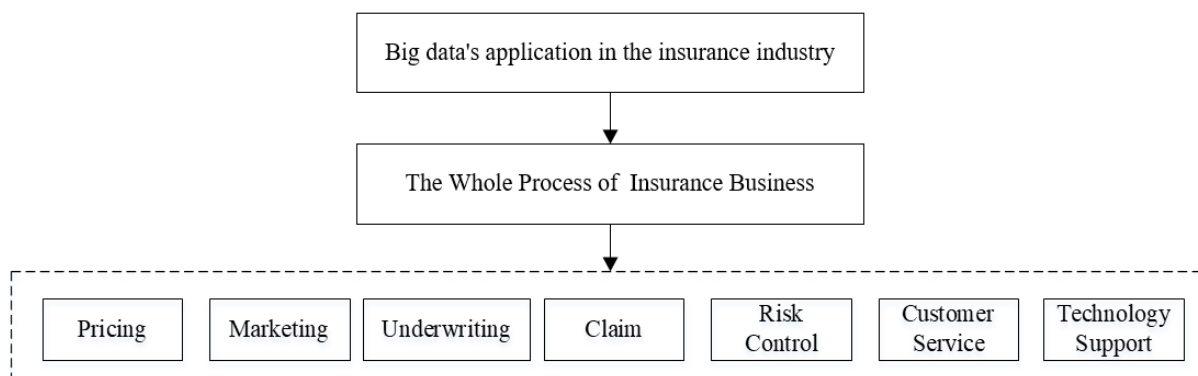


Figure 1: The Application of big data in Insurance Industry

As shown in figure 1, the application of big data technology in the insurance industry has gradually expanded from a certain field to the whole process of insurance business, covering all aspects of pricing, marketing, underwriting, claims, risk control, customer service and technology support. For example, innovate insurance products, optimize product pricing, depict customer portraits and carry out accurate marketing, intelligent underwriting and claims settlement, establish a new customer service system and accurate recommendation products, multi-dimensional risk identification and effective risk control mechanism.

In a word, with the rapid development of the Internet, the integration of the financial industry, the collectivization of insurance, and the diversification of insurance products and service channels have become the main features of the development of the financial and insurance industry^[3]. With it comes the massive accumulation of insurance data and the in-depth application of insurance technology. The application of big data technology improves the ability of insurance companies to analyze customer behavior, potential demand, product preference and risk factors. It provides a new driving force for the realization of accurate insurance pricing, efficient marketing, high-quality customer service and reducing the risk prevention and control of claims fraud.

3. The influence of big data's Technology Application on Insurance pricing of Insurance companies

Before clarifying the internal relationship between big data and insurance pricing, we should have

a clear grasp of their respective definitions. Big data is a data collection that acquires, stores, manages and analyzes massive data and realizes data "value-added" through data "processing". The insurance pricing is the cost determination of the premium^[4]. In the process of insurance pricing, insurance companies improve and optimize the formation mechanism of marketization of premium rates with the help of big data's technology^[5]. By using big data technology, we can capture the rules behind the data with the help of behavioral data and correlation analysis, such as customer transaction and search, and then divide the customer groups effectively and optimize the actuarial pricing model of insurance companies. Finally, a scientific and effective pricing strategy and premium rate floating mechanism can be formed. For example, in German Pay-How-You-Drive car insurance, mobile sensor devices and remote information devices are used to collect speed and acceleration parameters, based on these data to evaluate driving behavior, thus individualized insurance pricing^[6].

The relationship between big data and insurance pricing can be sorted out from the following aspects:

3.1. The positive effect of big data's technology application on insurance pricing of insurance companies

Through the in-depth analysis of big data in the market with the help of big data technology, we can ensure the accuracy of insurance pricing, flexibly adapt to the changes of the market and make reasonable pricing, which fully reflects the price advantage. It can significantly reduce the risk probability in the process of actuarial pricing of insurance products. At the same time, with big data technology as the technical support, form a professional, comprehensive, detailed data analysis system, effectively tap potential customers, improve the business system, on the basis of constantly improving the rationalization of insurance product pricing, to maximize economic benefits. In addition, with the help of big data analysis technology to achieve in-depth analysis of insurance pricing data, with the help of cloud computing analysis to improve work efficiency, to complete the pricing of insurance products in a more efficient and rapid way.

3.2. The negative effect of big data's technology application on insurance pricing of insurance companies

The advantage of big data's application in insurance pricing is obvious, but it also has some negative effects. It is mainly reflected in two aspects: first, the application of big data technology needs to collect huge amounts of data to ensure the pricing efficiency of insurance products and the work efficiency of insurance practitioners. However, as the mode of data resource sharing becomes mainstream day by day, the number is bound to increase exponentially. In this case, according to the original manpower and material resources can not effectively improve work efficiency, it will lead to untimely data processing, which will affect the accuracy and timeliness of insurance pricing to a certain extent. Secondly, it is easy to fall into the misunderstanding of over-reliance on big data's technology. Insurance pricing needs to comprehensively consider a variety of factors and analyze from different dimensions, and big data analysis mainly plays an auxiliary role rather than a decisive role in this process^[7]. Therefore, in insurance pricing, big data technology should be properly applied, but we should not rely too much on big data technology in order to give full play to big data's important value to insurance pricing.

4. The specific strategy of accurate pricing of the insurance industry in the era of big data

In his book *The Era of Big Data: Great Changes in Life, Work and Thinking*, Viktor Mayer-Schönberger mentioned: "big data has initiated a major transformation of the times." In the era of big

data, making rational use of the advantages of big data's technology and giving full play to big data's advantages in assisting insurance companies in insurance pricing is of great significance for realizing reasonable and accurate insurance pricing^[8]. Through the application of big data technology and full data analysis, insurance companies can obtain more accurate pricing than the traditional pricing methods, which can be started from the following aspects.

4.1. Set up big data's actuarial thinking to improve the accuracy of insurance pricing

The main value of actuarial calculus is the assessment of risk. Traditional actuarial use a relatively single dimension to quantify risk. In the era of big data, data is rich and multidimensional. In this case, the traditional highly actuarial method cannot meet the complex risk assessment needs of today. Therefore, actuaries of insurance companies should establish big data actuarial thinking and integrate big data thinking into all aspects of actuarial work, specifically:

4.1.1. Correctly understand the important value of big data

In the era of big data, relying on the advantages of big data technology in data collection, we can obtain internal and external data closely related to insurance business in real time, which can fully meet the data needs of insurance pricing. At the same time, big data technology makes it possible to obtain full data, and it can also maintain real-time monitoring of insurance-related data. Obviously, this is more accurate than the traditional prediction by relying on the analysis and judgment of historical data, and it is also conducive to portraying the research object with richer dimensions.

4.1.2. Cultivate big data actuarial thinking

The establishment of big data's actuarial thinking is an important prerequisite for the application of big data's technology to the actuarial field. When training and absorbing external talents internally, insurance companies should not only pay attention to the traditional thinking of similarities and differences, average thinking, dynamic thinking and relevance thinking, but also emphasize big data thinking. Strengthen big data's thinking to cope with the complexity and diversity of actuarial data in the big data era, with the help of big data technology to mine and analyze the huge data, and then get a more powerful prediction to serve the insurance industry and the society.

4.1.3. Correctly understand the relationship between big data and the law of large numbers

At present, there are some views in academic circles that big data's application subverts the law of large numbers. In fact, it is not, the mechanism of the two in insurance pricing is different. The law of large numbers is the mathematical basis of the operation and management of the insurance industry, which is based on statistics and is the core of actuarial theory. In the insurance industry, big data mainly plays an auxiliary role. There are differences between the two, but they do not conflict. Through the application of big data, we can further optimize the market-oriented formation mechanism of insurance premium rates, enhance the risk management ability of insurance companies, and provide technical support for risk measurement and assessment of insurance companies.

In short, the actuarial link is one of the key links in the whole process of insurance business. In traditional actuarial science, insurance companies analyze and calculate past experience, and then evaluate the possible risks in the future. Insurance companies can effectively predict underwriting risks by using actuarial technology. Actuarial science is derived from the law of large numbers, and the actuarial process needs to be based on data science, extract and analyze the data, and then predict and solve problems. In the era of big data, the integration of big data's thinking and technology into the insurance actuarial link can subvert the traditional actuarial theory and technology, and with the

help of big data's advantage of extracting valuable information from massive data, the accuracy of prediction and actuarial can be improved.

4.2. Establish an accurate pricing model to assist insurance companies in personalized and accurate pricing

The application of big data technology in the pricing of insurance products can achieve personalized product recommendations that meet the characteristics of users, and facilitate users to accurately select insurance products and services that meet their needs in a way that is easy to understand. Users can get a good experience through the digital risk assessment function provided by big data technology. Insurance companies with big data technology enable insurance, can use accurate underwriting model for risk identification and identification, can improve underwriting efficiency, enhance user experience, but also can effectively identify high-risk groups. Specifically:

4.2.1. Improve the accuracy of insurance pricing with the support of massive data

Through the way of big data technology combined with artificial intelligence, insurance companies analyze and model big data based on user massive data, present user portraits, and provide personalized, accurate and scene-oriented insurance service products around user needs and individual conditions. At the same time, insurance companies make differential pricing according to the situation of different users. With the improvement of the predictive ability of machine learning, multi-functional remote communication devices and smartphones can provide more dimensional data, and insurance is becoming personalized^[9]. For example, take the return insurance provided by Zhongan Insurance for Taobao platform as an example. Return insurance uses big data, cloud computing, artificial intelligence and other technologies to form dynamic personalized pricing products. When the user places an order, the model will calculate the corresponding premium according to the information of the user and the store, and then display it in the user payment interface. Another example is the "Intelligent Flash Compensation" insurance launched by PingAn Insurance, which is supported by massive business data and automatically determines the loss of pictures with the help of the deep learning algorithm of convolution neural network, which ensures the accuracy and speed of calculation and can efficiently complete a large number of loss-fixing operations. With the help of the combination of picture recognition technology and risk penetration rule model, the product is applied to the settlement of vehicle claims, realizing one-second loss determination, high-precision picture recognition, automatic accurate pricing and intelligent risk control.

4.2.2. Optimize and improve the data analysis model

In order to achieve the purpose of accurate insurance pricing, insurance companies need to combine internal data and external data, combine the existing model and import multi-dimensional data and comprehensive data into the model to optimize and improve the model. When constructing the model, it is required to reasonably reduce the noise of the data in the process of data collection and analysis, reduce and eliminate the useless data, and bring the true and reliable data into the database, which can improve the accuracy of data analysis. lay a reliable foundation for the use of data. Prediction model is a popular analysis method in the era of big data, which gives full play to big data's advantages in analyzing massive data and complex data, and has a good effect in dealing with discrete variables and continuous variables. Take flight delay insurance as an example, this is a kind of economic loss caused by time delay, which can not be estimated by specific material loss, so the insurance pricing of flight delay insurance has also become a difficult problem. Through the application of big data technology combined with AI in-depth learning, through the flight delay prediction model and user profile, a multi-dimensional flight delay prediction model is constructed

to effectively solve the pricing problem of this insurance.

4.3. Insist on customer-centered and improve the accuracy of insurance pricing

The arrival of big data era has pushed insurance pricing into a new stage of development. In insurance pricing, insurance companies should adhere to customer-centered, pay attention to mining users' habits, preferences and behavior patterns from big data, establish a user-centered multi-dimensional pricing model, and pay attention to collecting and studying customer feedback. Through this process, on the basis of determining the segmentation of customers, we can achieve product customization, pricing differentiation and precision based on customer needs. Specifically: First, insurance companies should conduct in-depth analysis of customer information and behavior, predict customer demand as much as possible, and provide them with personalized insurance product information and accurate pricing in line with their needs. Second, make use of big data's advantages in data mining and data analysis to reveal the potential rules behind a series of data such as user transactions and user search, and then subdivide the customer group and optimize the actuarial pricing model. develop a scientific and reasonable pricing mechanism with differences. For example, in the pricing of car insurance, it is necessary to match the appropriate price according to the situation of different users, improve the risk pricing ability, and form insurance products and premium rates that meet the needs of the market, meet the expectations of users and actual situation. It can really realize "thousand price for thousand people" of car insurance premium.

5. Conclusion

In a word, the new generation of information technology represented by big data technology and AI technology has promoted the progress of insurance science and technology, and provided an important means and support for the transformation and upgrading of the insurance industry under the Internet environment from many aspects, such as improving efficiency, reducing costs and improving experience. The advantage of big data's technology lies in data analysis, data processing and data mining, which provides strong support for optimizing all aspects of insurance and promoting the high-quality development of the insurance industry. Therefore, insurance companies should correctly understand the important auxiliary role of big data in realizing accurate insurance pricing, strengthen the scientific and technological ability of insurance pricing with big data technology, and improve the efficiency and quality of insurance pricing work. Determine the reasonableness and accuracy of insurance pricing, and then provide the insurance market with insurance products and premium rates that are more in line with customer expectations.

References

- [1] Zhou Yanli.(2019) *Insurance Pricing and Big Data Management (in Chinese)*. *Tsinghua Financial Review*, 10, 95-98.
- [2] Luo Xingwen.(2018) *Insurance Pricing Strategy under the Background of Big Data(in Chinese)*. *Finance & Economy*, 06, 118-119.
- [3] Liu Dan, Hao Xuejing, Chen Yuhong.(2021) *A review and comparative analysis of domestic and foreign research on big data pricing methods(in Chinese)*. *Big Data Research*, 7(06), 89-102.
- [4] Yang Junjun, Xie Zhishan. (2021) *Analysis on the Impact of Big Data on Insurance Pricing -- Taking Life Insurance as an Example(in Chinese)*. *China Circulation Economy*, 24, 154-156.
- [5] Guo Ji. (2022) *Exploration on the construction of UBI auto insurance pricing model in the insurance industry under the big data environment (in Chinese)*. *Prices Monthly*, 10, 45-51.
- [6] Weidner Wiltrud, Fabian W. G. Transchel, and Robert Weidner. (2017) *Telematic driving profile classification in car insurance pricing*. *Annals of Actuarial Science* 11: 213–36.
- [7] Wei Yulin. (2022) *Research on The Application of BIG DATA Technology in the Field of Internet Insurance(in*

Chinese). *Jilin University of Finance and Economics*, 2022.

[8] Han Ying. (2021) *Analysis on the Role of Big Data Analysis in Risk Management of Insurance Industry*(in Chinese). *China Internet Week*, 09, 59-61.

[9] Barry Laurence. (2019) *Insurance, big data and changing conceptions of fairness*. *European Journal of Sociology/ Archives Européennes de Sociologie*, 1–26.