Research on Agricultural Development Based on SWOT Analysis-Taking Ping An Agricultural Insurance Digital Map as an Example

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Abstract. Contemporarily, with technological progress and accelerated digitization, some traditional agricultural insurance has also started digital conversion, such as Ping An's digital map of agricultural insurance using DRS Hawk-Eye technology and data platforms. However, considering the level of awareness and production methods of rural agricultural farmers in China, this new form of agricultural insurance combined with big data suffers from a low level of trust as well as insufficient on-the-ground coverage. This report analyzes the strengths, weaknesses, opportunities and challenges of digital agricultural insurance in Ping An's case using SWOT analysis. The results of the study show that the digital agricultural insurance map promotes the development of agricultural insurance in terms of risk reduction and fast claims settlement, but the acceptance of this type of digital agricultural insurance still needs to be improved. This study seeks to provide a number of strategic recommendations to promote the high-quality development of digitized agricultural insurance and expects to provide a marginal contribution to the deep integration of digital technology and the insurance industry.

Keywords: Digital agricultural insurance; agricultural development; SWOT analysis; Ping An's digital map.

1. Introduction

Agricultural insurance is an important factor in promoting agricultural progress, and its importance has increased with technological progress and agricultural innovation [1]. Agricultural insurance plays a pivotal role in enhancing the resilience of agriculture, rural areas and farmers, and protecting the rights and interests of farmers. From the development of digital agricultural insurance insurance, its development, after-sales, underwriting and claims are inextricably linked to the history and authenticity of traditional data. Digital technology plays an "enabler" role in the transformation of agricultural insurance insurance digital intelligence [2]. Many existing researches focus on exploring the role of digital agricultural insurance in reducing agricultural risks, improving information communication, and promoting green sustainable development and other technical aspects, however, the academic research on the acceptance of digital agricultural insurance in rural areas and comparative research on traditional insurance is still insufficient. Particularly, the problem of insurance distribution due to the specificities of agricultural insurance and rural producers, such as the low education level of agricultural producers, has not been given sufficient attention in the context of China's specific national conditions. In this study, SWOT analysis will be used to explore the scientific and rationalized realization path of digital agricultural insurance in the promotion process in China.

2. Case Descriptions

The application of digital insurance science and technology is helpful to promote insurance companies to develop agricultural insurance products that are compatible with the market equilibrium, which in turn promotes the market to converge to a state of equilibrium, and effectively solves the problem of market failure in agricultural insurance [3]. Ping An Company uses digital map technology (Eagle Eye DRS system) to combine with agricultural insurance, demonstrating the

application of science and technology in agricultural insurance. Using Ping An's agricultural insurance digital map project as a case study, this study explores the mechanisms and challenges faced by digital agricultural insurance for agricultural development.

At the level of technology application, Ping An relies on an integrated monitoring system of "air and sky", integrating satellite remote sensing, drone surveys and IoT sensors to achieve an accurate assessment of the area planted with crops, their growth and the scope of disasters. For example, through cooperation with DJI drones, centimeter-level image acquisition of 200 acres of farmland can be completed within 10 minutes, significantly improving the efficiency of underwriting losses. Meanwhile, the introduction of AI and big data risk control technology enables the intelligent underwriting model to dynamically adjust premiums and coverage, while the application of blockchain technology ensures the non-tamperability of policy and survey records, effectively alleviating the problem of information asymmetry. The automated claims system further shortens the payout cycle and reduces operating costs through image recognition and weather index triggering mechanisms. Data shows that the disaster loss rate in the pilot areas of digitized agricultural insurance will be reduced by an average of 2.3 percentage points in 2020-2022, verifying the positive effect of technology on risk reduction.

In summary, through the integration of intelligent and digital technologies, a precise underwriting model has been constructed, which can accurately associate "people (insurance holders)", "land (including plot coordinates, area, and floor plan)", "things (insurance subject matter)", and "rights (e.g., land contract management right information, etc.) " [4]. It promotes the development and exhibition of digitalized agricultural insurance.

3. SWOT Analysis

The SWOT analysis adopted in this study is a systematic analytical tool designed to provide clients with a multi-dimensional evaluation framework by identifying the project's internal strengths and weaknesses, as well as the opportunities and threats in the external environment.SWOT analysis integrates internal and external factors to reveal the path of optimal resource allocation and potential risks, and thus supports the formulation and adjustment of objectives. Its core value lies in balancing subjective judgment and objective data in a structured way, providing relevant scientific theoretical basis for projects to dynamically adapt to the complex external environment.

3.1. Strengths

Based on the data analysis of Ping An Insurance Company of China's DRS Hawkeye project and related literature, this study reveals that the core advantages of Ping An Insurance Company of China's digital agricultural insurance are mainly reflected in two dimensions: the advantages of technology integration and innovation, and the advantages of risk assessment and pricing.

Ping An Insurance (Group) Company of China, Ltd.'s "finance + technology" double-wheel drive strategy established in 2017 has laid a pioneering position in the digital transformation of various types of insurance [5]. First, in terms of technology integration, Ping An Insurance Company of China has constructed an integrated monitoring system of "air and sky", which realizes the accurate assessment of crop planting area, growth conditions and the scope of disaster impact through the integration of satellite remote sensing technology, drone survey and IoT sensors. For example, through in-depth cooperation with DJI's drone technology, it is able to complete high-precision image acquisition of large areas of farmland in a relatively short period of time. The establishment of this system has significantly improved the risk assessment efficiency of agricultural insurance through the integration of multiple technologies.

Secondly, in terms of risk assessment and pricing, Ping An introduced artificial intelligence and big data risk control technology, enabling the intelligent underwriting model to dynamically adjust premiums and coverage based on real-time data. Relying on massive data resources and advanced algorithms, the model is able to more accurately assess agricultural risks, thereby enabling

personalized and differentiated pricing of insurance products. This strategy not only ensures the sustainable development of insurance companies, but also provides farmers with more reasonable and scientific insurance protection solutions.

At the same time, Ping An Group's resources can also be used to expand product sales channels. For example, it can make use of product purchasing meetings organized by the Group in the field, display and sales meetings, internal purchases by the headquarters and its subsidiaries, live webcast sales, as well as publicity and promotion through Ping An's good car owner, One Wallet, Good Life and other e-commerce platforms, so as to enhance the comprehensive competitiveness and exhibition capacity of the new digital agricultural insurance [6].

3.2. Weakness

The weakness of Ping An's digital agricultural insurance map described in this paper include both the product design side of Ping An and the insured side, i.e., the majority of agricultural producers.

First of all, as a financial and technological giant, Ping An has relatively little experience in the agricultural insurance industry, which is a very policy-oriented and special industry, which has led to the deviation between its agricultural insurance product design and the actual demand, for example, some farmers in Zhoukou, Henan Province are skeptical about the accuracy of satellite remote sensing loss determination, which illustrates the conflict between the technology and the traditional cognition, and also shows that the company needs to strengthen the localization and adaptability of the agricultural insurance business. This also indicates that the Company's efforts in localization and adaptability of agricultural insurance business need to be strengthened. Weak rural digital infrastructure is also an important constraint due to objective material conditions. In some remote areas, such as the Luoyang mountainous region, low network coverage and insufficient smartphone penetration have led to farmers' high reliance on offline services, and the promotion of digital tools has been hindered, affecting the popularity of digital agricultural insurance services and user experience. Finally, in terms of premiums, in terms of pricing strategies, as noted by Zhao Qianhe, some insurance products failed to adequately meet public demand in terms of pricing strategies and claims terms, which led to unattractive products and low market acceptance. As a result, coverage is limited while prices continue to remain high [7]. For Ping An, which is relatively inexperienced in the field of agricultural insurance, its ability to set the right price range needs to be improved, and therefore premium setting constitutes a weakness.

On the insured side, farmers' awareness and acceptance can increase the gap between perceived costs and policy objectives. The research shows that despite the relatively high level of premium subsidies provided by the government, some smallholder farmers still find the premiums burdensome. Moreover, the low penetration rate of agricultural insurance is due to the fact that some farmers do not want to believe in insurance, or even have a resistance and aversion to insurance because of some erroneous marketing at the early stage of the introduction of insurance, as well as the fact that some farmers do not understand the regulations of the insurance, which makes the penetration rate of agricultural insurance relatively low. This phenomenon can also be explained through the perspective of behavioral economics by the irrationality of farmers' decision-making, who tend to believe that they do not need to be protected and that they are not the ones who can afford to digitize their agricultural insurance premiums.

3.3. Opportunities

In the current period of digital economy and technology iteration, a new round of technological revolution led by emerging technologies such as cloud computing, big data, artificial intelligence, Internet of Things, blockchain, virtual reality, and gene technology is sweeping across the world, and this technological innovation is expected to promote the upgrading of global industries, including the insurance industry [8]. The digital transformation of agricultural insurance is accelerating under this megatrend, which also provides an opportunity for the innovative development of Ping An's digital agricultural insurance. With the advantage of digital technology, Ping An relies on satellite remote

sensing, drones, Internet of Things (IoT), artificial intelligence, big data, blockchain and other technologies to build an integrated monitoring system of "air and sky" and an intelligent underwriting model to further optimize agricultural insurance services, enhance market competitiveness, and satisfy the growing insurance needs of farmers.

Agricultural insurance has significant policy characteristics, and from the perspective of policy support, the government has explicitly encouraged insurance companies to improve the quality and efficiency of the insurance supply system through scientific and technological innovation, and to enhance the innovation and service capacity of the insurance industry [9]. Under the dual impetus of the government's policy support and market demand, Ping An digital agricultural insurance can demonstrate its unique competitiveness. The government attaches increasing importance to agricultural insurance, and it provides a solid backing for the promotion and popularization of agricultural insurance by providing high premium subsidies and other forms of policy support. At the same time, as the process of agricultural modernization continues to advance, farmers' demand for agricultural insurance continues to grow, and market expectations are high. Against this backdrop, Ping An has the opportunity to capitalize on this market opportunity and further increase its share of the market by expanding the scale of its business and improving the quality of its services.

3.4. Threats

For the threats faced by Ping An Digital Agricultural Insurance Map, this paper will take traditional agricultural insurance as the subject, and reflect the threats of traditional agricultural insurance to Ping An Digital Agricultural Insurance Map by comparing the advantages of Ping An Digital Agricultural Insurance Map and traditional agricultural insurance.

Policy-based agricultural insurance plays a vital and realistic role in avoiding agricultural production risks, enhancing the disaster prevention and resistance ability of farmers, promoting the development of modern agriculture, and increasing farmers' income [10]. As researcher Long Wenjun said, China has established a product system that matches the risk protection needs of farmers. The three main grains, soybean cost insurance has been popularized [11]. And traditional agricultural insurance has a long history of development in the country of China, and has formed a broader base of farmers. For example, the traditional policy agricultural insurance has the characteristics of "low protection, wide coverage", which can make up for the loss of agricultural income caused by the loss of production, and farmers are more familiar with its model. It will take some time and process for farmers to accept the new digital agricultural insurance, and the promotion of Ping An's digital agricultural insurance map may be hindered by this traditional trust and habit. That is to say, traditional agricultural insurance has a high market awareness, while digital agricultural insurance, as an emerging thing, has limited understanding by farmers. Some farmers are skeptical of the new technology, for example, some farmers in Zhoukou, Henan Province are skeptical of the accuracy of satellite remote sensing loss determination, believing that "photos taken in the sky are not as reliable as the human eye", which reflects the conflict between traditional cognition and the new technology, which in turn affects the promotion of Ping An's Digital Agricultural Insurance Map.

In terms of infrastructure and material level analysis, traditional agricultural insurance relies on relatively low infrastructure, while the implementation of Ping An digital agricultural insurance map requires good digital infrastructure support. However, there is an uneven digital infrastructure construction in rural areas of China, and some remote areas have low network coverage and insufficient smartphone penetration, which makes the promotion of Ping An Digital Farming Insurance Map in these areas limited, while traditional agricultural insurance can still conduct business normally under this infrastructure environment.

4. Suggestions

Agricultural insurance is an important part of the rural financial service system and an indispensable and effective tool in the agricultural support and protection system [12]. In the field of

agricultural insurance, how to effectively promote insurance products and enhance the willingness of farmers to insure constitutes an urgent challenge. This study will propose strategies to promote the development of peaceful digital agricultural insurance based on the results framework derived from the SWOT analysis method.

Insurance agencies need to perform efficient and in-depth analysis of the information data collected in order to provide customized risk assessment services to potential insurance buyers. For agricultural producers, risk avoidance strategies with early warning mechanisms and personalized advice will significantly increase their willingness to purchase insurance products [7]. Therefore, this study focuses on strengthening risk visualization and dynamic early warning i.e. strengthening the accurate reach capability of maps, i.e. allowing potential customers to see potential risks, and constructing a regional risk stratification model relying on the geographic information integration function of digital maps. Based on historical disaster data (e.g., frequency of floods and droughts) and real-time meteorological data, the risk level of different regions is dynamically displayed in the form of heat maps, and the average annual potential loss amount of uninsured farmers (e.g., 5,000 yuan/mu) is directly labeled on the map interface. At the same time, it develops a disaster warning pop-up window function to push warning information (e.g., “80% probability of heavy rainfall in the next 48 hours, uninsured farmers may lose 3,000 RMB”) through the pop-up window of the map when it is detected that the farmer's area reaches the risk threshold, so as to strengthen the perception of risk.

Further, by combining historical disaster data with case studies and visually presenting actual loss cases in uninsured areas, farmers' perception of risk can be further strengthened. Utilizing digital tools (e.g., APP push) to disseminate this information can make insurance publicity more vivid and intuitive, thus enhancing the publicity effect.

The above strategy deeply integrates the spatial analysis, real-time interaction and data penetration capabilities of Ping An Farmers Insurance's digital map, and transforms the theoretical model into a floor-to-ceiling digital solution through the design of quantifiable risks.

5. Conclusion

In this study, through the structure of SWOT analysis, in the agricultural insurance digitalization strategy implemented by Ping An, innovations such as digital maps (Eagle Eye DRS) have significantly contributed to the improvement of agricultural production efficiency and risk reduction. However, in China, farmers are constrained by irrational thinking patterns and the limitations of their education level, resulting in low insurance participation and serious information asymmetry in the whole process of insurance coverage. To a certain extent, this problem restricts the high-quality development of China's agricultural insurance market, and it is urgent to take effective measures to solve it. As for the solution, as suggested, Ping An can further promote data visualization, so that the majority of farmers can see the risks and buy agricultural insurance, only in this way can agricultural insurance really benefit the majority of agricultural producers.

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