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Design of financial robot based on industry finance integration——Taking farmers' professional cooperatives as an example

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Abstract: *In the process of digital empowerment and rural revitalization, it is of great practical and policy significance to design financial robot with RPA technology and apply it to farmers' professional cooperatives. This paper analyses the necessity of applying financial robot in farmers' professional cooperatives from three aspects: the development status of farmers' professional cooperative finance, the needs of fiscal and tax system reform and the guidance and supervision of farmers' professional cooperatives, and then discusses our assumption from three aspects: function design, platform design, installation & service. The platform design includes 8 modules: business input, business review, supply chain management, contract management, asset management, village nostalgia, third-party application and learning commune.*

Keywords: *RPA; Digital empowerment; Financial robot; Rural professional cooperatives*

1. Introduction

The rapid progress of intelligent technology affects the development and transformation of economy and society. *Several opinions of the State Council on promoting the high-quality development of national high-tech industrial development zones* was issued by the State Council of China on July 13, 2020. The Ministry of science and technology will further strengthen the research and development of cutting-edge technologies including artificial intelligence and key core technologies. Using RPA open source technology to develop a financial robot of "industry finance integration", provide information support for the healthy development of economic entities, and realize the automatic processing of repetitive businesses such as voucher making, bookkeeping, statements and tax declaration, will contribute to the healthy and efficient development of economic entities.

The report of the 19th National Congress of the Communist Party of China pointed out that the problem of agricultural and rural farmers is a fundamental problem related to the national economy and the people's livelihood. We must always take solving the "three rural" problems as the top priority of the whole Party's work. In July 2020, the Ministry of agriculture and rural affairs and the Ministry of Finance issued *the key policies for strengthening agriculture and benefiting agriculture in 2020*. Article 12 of the policies emphasizes the socialized services of agricultural production and supports service subjects such as supply and marketing cooperatives, rural collective economic organizations, service-oriented farmers' cooperatives and family farms. In 2021, the No. 1 central document of the Central Committee pointed out that we should promote the construction of a modern agricultural management system, focus on two types of business entities: family farms and farmers' cooperatives, and encourage the development of diversified forms of moderate scale operation. With the increasing participation of farmers' cooperatives in the economic market, the demand for financial management also increases. Helping to improve the financial system and business process of cooperatives is of great significance to improve the transaction norms of cooperatives in the market. In 2022, the No. 1 central document stressed the need to vigorously promote the construction of digital village, promote the development of intelligent agriculture, extend the coverage of digital technology empowerment to the countryside, focus on solving practical problems, and expand the application scenarios of big data in agriculture and rural areas.

The research and development of a financial robot integrating industry and finance for farmers' professional cooperatives will contribute to rural revitalization and have prominent policy significance.

Financial robots were applicated in various fields at present. For example, the applications of financial

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robots in oilfield enterprise[1], electric power enterprise[2], power grid industry[3] and telecommunications industry[4] have brought obvious economic benefits to enterprises, showing the important position and bright prospects of financial robots developed with RPA technology.

However, in agriculture, at present, it is mainly focused on the reform and innovation of agricultural product technology based on artificial intelligence. There are few cases of applying artificial intelligence to the collective financial management of rural collective economy organization. There is no relevant article on the assumption of applying financial robot to farmers' professional cooperatives.

2. The necessity of applying financial robot in farmers' professional cooperatives

A financial robot is designed in line with the business characteristics of farmers' professional cooperatives using RPA technology, which can quickly integrates business and fiance data, and then promote modern farmers' professional cooperatives development in the structuration, large-scale and digital aspects. Therefore, it is necessary to apply the financial robot to farmers' professional cooperatives.

2.1. The development of farmers' professional cooperative finance needs financial robot

The number of farmers' cooperatives registered in accordance with the law had reached 2,259,000[5] by the end of April 2021. Although China's farmers' professional cooperatives have developed to a certain scale, there are still the following problems in financial management:

2.1.1. Insufficient accounting personnel of the entity

Some farmers' professional cooperation cannot attract young accountants due to geographical location, financial resources of cooperatives and other reasons. Often, the former village committee accountants or the retired accountants of nearby enterprises play the roles the financial personnel in the cooperatives, and the aging problem of accountants is obvious.

2.1.2. The financial management system is not standardized

Due to the lack of professional accountants, farmers' professional cooperatives are prone to the phenomenon of non-standard financial management system, which is manifested in the following: accounting accounts are chaotic, account statements are non-standard, bookkeeping is wrong, boundary of fixed assets is fuzzy, the transaction records or incomplete transaction data are absent, contracts management is confused, destination of funds is unclear, a separate account role for each member is not set up, return proportion of distributable surplus is definied unclearly, and so on.

2.1.3. Internal control is not in place

The financial accounting system of farmers' professional cooperatives emphasizes that cooperatives must establish and improve internal control systems such as monetary capital internal control system and sales business internal control system. However, in the actual situation, the implementation of the system is not in place, and some bissneses are out of control, which result in phenomena of artificial tampered financial data. It is everywhere that financial process are insufficient, procedures are imperfect, cash flows are unclear, accounts and facts are inconsistent, and vouchers are falsified [6].

2.2. The reform of fiscal and taxation system needs financial robot

The Ministry of Finance issued *the outline of the 14th five year plan for accounting reform and development* (hereinafter referred to as *the outline*) (CAI Kuai [2021] No. 27) on November 24, 2021. *The outline* mentioned digitization 19 times, emphasized "promoting the digitization and paperless of the whole process of issuing, receiving, recording and archiving electronic accounting vouchers", and required "embedding internal control systems and processes into the information system".

On March 24, 2021, the general office of the CPC Central Committee and the general office of the State Council issued *the opinions on further deepening the reform of tax collection and management*, requiring "making full use of modern information technologies such as big data, cloud computing, artificial intelligence and mobile internet, striving to promote the convergence and connection of internal and external tax related data, online and offline organic connection to drive tax law enforcement, service, regulatory system innovation and business reform", realizing the transformation from "managing tax by ticket" to " governing tax by number".

The popularization and application of electronic invoice provides a broad prospect for the application

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of financial robot. On the basis of widely implementing the electronic ordinary invoice of value-added tax, the electronic special invoice of value-added tax was implemented among new taxpayers in 11 regions such as Tianjin from December 21, 2020, and was implemented among new taxpayers in other regions on January 21, 2021. The tax authorities provide taxpayers with services such as to write, delivery and check electronic invoice 24 hours online freely on the national-unified electronic invoice service platform, which can realize the electronization of all fields, all segments and all elements of invoices[7].

2.3. The guidance and supervision of farmers' professional cooperatives need financial robots

For cooperatives in modern economic society, there are generally some problems, such as weak foundation, small number of social members, low professional level of cooperatives, imperfect financial management system and so on. In the context of rural revitalization, farmers' professional cooperatives are increasingly involved in a wide range of businesses, rich output content and increasing economic exchanges, which poses new challenges to the guidance and supervision of farmers' professional cooperatives.

Article 45 of *the Farmers' professional cooperatives law of the People's Republic of China (2017)* requires the executive supervisor or the board of supervisors to be responsible for the internal audit of the financial affairs of the cooperative and report to the general assembly. And the general assembly also has right to invite intermediaries to audit the financial affairs of the cooperative.

On December 27 of 2018, nine departments of government in Qingdao including Municipal Agricultural Committee and Municipal Bureau of Finance jointly issued *the opinions on further guiding and standardizing the development of farmers' professional cooperatives* to strengthen the guidance and supervision of farmers' professional cooperatives, which focused on the problems of small operation scale, weak service capacity, poor demonstration drive, imperfect organization, non-standard internal management and unscientific benefit distribution of farmers' professional cooperatives.

In the era of financial process digitization, financial robots use their relevant advantages to supervise the relevant financial work data in real time and supervise the financial work process of cooperatives. At the same time, the financial robot can combine big data with artificial intelligence to analyze the market transaction trend, issue relevant reports in combination with relevant laws and policies, and provide auxiliary suggestions for the next development direction of cooperatives.

3. Design of financial robot for rural professional cooperatives

3.1. Functional design of financial robot for farmers' professional cooperatives

The application of financial robot in farmers' professional cooperatives will bring great convenience to the financial work of farmers' professional cooperatives. It can be embodied in the following scenarios:

Invoicing. With the promotion of the state's electronic ordinary invoice and electronic special invoice for value-added tax, when farmers' professional cooperatives have a transaction with a third party, a financial robot will automatically issue an invoice according to the entered business information and automatically push it to the invoice receiving end of the third party.

Voucher verification and identification. For the external invoices accepted by farmers' professional cooperatives, the financial robot can automatically push them to the invoice comparison platform of the tax system for voucher comparison to identify the authenticity of invoices.

Automatic bookkeeping and updating of financial statements.

Automatic tax declaration. At present, the online tax bureau of the tax system accepts taxpayers' online tax declaration. The financial robot can automatically update the tax declaration according to the automatic accounting book and tax-accouting differences (which may need to be adjusted manually under the audit function), thus automatically realize online tax declaration to improve the efficiency of tax declaration.

3.2. Design of financial robot platform for farmers' professional cooperatives

The financial robot for farmers' professional cooperatives should have the following eight modules.

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3.2.1 Business input

"Business input" belongs to the business personnel input module, which specifically includes sales business, purchase business, production business (including planting, breeding, etc.), loan and reimbursement business, investment business and financing business. After each business is entered, set button on whether to review or not. For businesses that do not need to be reviewed, the financial robot will automatically process invoices, accounts and taxes.

3.2.2 Business review

"Business review" corresponds to "business input". For the business to be reviewed, it will be automatically pushed to the relevant review department according to the requirements of the internal control of farmers' professional cooperatives. In particular, according to Article 43 of *the Farmers' professional cooperatives law of the people's Republic of China*, farmers' professional cooperatives record the transaction volume (amount) between their members and their cooperatives. If the distributable surplus is returned in proportion to the transaction volume (amount) between the member and the cooperative, the total amount returned shall not be less than 60% of the distributable surplus; For the remaining part after return, in order to reduce disputes, the transactions between members and the cooperatives need to be approved by a certain proportion of other members. After the approval is completed, the financial robot will automatically issue invoices, automatically keep accounts, and automatically update the financial statements and tax returns.

The two modules of "business input" and "business review" are the most basic modules of the financial robot, and also reflect the main requirements of industry finance integration.

3.2.3 Supply chain management

Agricultural products supply chain is a network system composed of farmers, traders, processors, retailers, logistics distributors and consumers, from field to table, involving upstream and downstream enterprises.

The "FCH" platform (the farmers' cooperatives helper, the name of the financial robot in this study) connects the daily business of rural professional cooperatives and provides the function of supply chain management. Specifically, two sub modules can be set, the existed supply chain and the potential supply chain. The "existed supply chain" rearranges of the information formed in the process of "business input", which reflects: the expected production varieties and quantities in the production process in detail; purchase volume, payment speed and collection process in the sales process; delivery speed and quality in the procurement process (including seeds, chemical fertilizers, pesticides, livestock seedlings, fish fry, etc.); quality, speed and other information of processing outsourcing process, and so on. "Potential supply chain" provides information about potential customers and suppliers, which provides a platform for advertising and reduces the cost of obtaining relevant resources.

If a large number of farmers' professional cooperatives use financial robots, they can provide the total amount of expected production, so as to enhance the predictability of agricultural production, reduce the ups and downs of agricultural product supply and protect the interests of farmers.

3.2.4. Contract management

The financial robot will have a complete set of contract templates and management specifications for storing contracts. There are many kinds of products produced or operated by rural professional cooperatives, and many data need to be refined. The formulation and preservation of paper-based contracts need certain management norms. However, due to the particularity of paper materials, they are easy to be lost and damaged in preservation. Financial robots can store scanned copies of paper contracts or electronic contracts in the cloud. While ensuring the authenticity, continuity and integrity of data, electronic contracts can be stored, numbered and digitally managed. When the user needs to call out the contract related to a transaction, he can directly send instructions to the robot, and the robot will extract the relevant contract information from the database. At the same time, the reminder of contract performance can be set to realize the two-way integration of information and reduce the operation risk of cooperatives.

3.2.5. Asset management

There are many items in the assets of rural professional cooperatives, which are the common assets of members of economic organizations. The assets of rural collective economy include resource assets, operational assets and non operational assets. As the rural reform has not yet falled into a pattern, there is a certain lack of management and supervision in the management and liquidation of assets by rural

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collective economic organizations. Some human factors may lead the assets to be recognized and measured unreliably when purchasing agricultural assets such as poultry. The transaction procedures of fixed assets may also cause inconsistency between accounts and facts, which can cause the loss of assets. The financial robot can assist the rural professional cooperatives to calculate and classify relevant assets, automatically connect to the accounting processing system, inventory the assets, realize the paperless management of assets, make every asset in the collective economy information-based, realize the one click query at the fingertips, and effectively reduce the loss of fixed assets.

3.2.6. Village nostalgia

"Village nostalgia" is planned to publicize rural civilization, folk dishes with local characteristics and characteristic rural tourism. It can focus on the characteristics of the cooperative to play a role in publicity, providing an advertising platform for characteristic professional cooperatives. At the same time, this module can use pictures and words to display old rural articles, compare the past with the present in rural areas to make the progress of rural society to be feeled. The "folk dishes" sub-module is similar to Tiktok, which can solve the problem that the southerner don't know how to cook the Northeast's wild mushrooms, and the winter bamboos and ferns in the South can not be cooked their due taste in other places, and the purpose is to promote the wider circulation of agricultural specialties.

3.2.7. Third party applications

"Third party application" provides convenience for the federation of farmers' professional cooperatives (Article 59 of *the Farmers' professional cooperatives law*) to look up the operation and development of various professional cooperatives under the federation; The executive supervisor or the board of supervisors shall conduct internal audit on the financial affairs of the cooperative (Article 45 of *the Farmers' professional cooperatives law*), providing convenience for online audit; The process of construction projects that the State supports the development of agriculture and rural economy may be entrusted to farmers' professional cooperatives (Article 64 of *the Farmers' professional cooperatives law*), which will help relevant state departments to inquire relevant information; It provides a platform for the relevant departments of the governments at or above the county level to supervise and manage farmers' professional cooperatives (paragraph 2, Article 65 of *the Farmers' professional cooperatives law*), and also provides support for the design of litigation involving farmers' professional cooperatives. Of course, different authorities need to be set for different subjects in this process. If these functions can be realized, they will help the construction of China under the rule of law and produce good social benefits.

3.2.8. Learning commune

The "learning commune" module plans to push the housekeeper and local policy documents on promoting the development of farmers' professional cooperatives, promote planting and breeding technology, and launch two modes of text reading and audio reading by using the machine reading function.

3.3. Installation and service of financial robot for farmers' professional cooperatives

The financial robot for farmers' professional cooperatives plans to launch two ways: network platform and app software. SaaS and PaaS service modes are adopted. The "village nostalgia" module and "learning commune" module, "potential supply chain"under the "supply chain management" module are downloaded and installed and activated freely. But the activation of other modules requires the farmers' professional cooperatives to upload the business license and other materials reqired by Article 12 of *the Farmers' professional cooperatives law*, such as the list of members, legal articles of association, description of organization, residence, and capital contribution of members in line with the provisions of the articles of association, which can be used after being reviewed by the platform.

4. Conclusion

The entry of financial robots into the market will certainly promote the digital and intelligent reform of accounting specialty, liberate the hands of accounting personnel and cultivate more accounting talents at the management level. The introduction of financial robots into rural cooperatives is bound to solve the problem of lack of management and accounting personnel of rural cooperatives, which can promote the development of farmers' professional cooperatives, drive the development of rural economy and move towards common prosperity. The application of financial robot platform to machine learning and RPA technology is bound to trigger the thinking of artificial intelligence and data science professionals

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on professional and practical scene applications, and promote the transformation and development of social digitization and intelligence.

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