

Application of RPA Financial Robots in Banking: A Case Study of the Bank of China

Zoufeng Hu^{*}, Dongwei Shi

College of Management, Sichuan University of Science & Engineering, Yibin, China

^{*}Corresponding Author: 2405401894@qq.com

ABSTRACT

With the rapid development of the economy, we have entered an era of significant technological advancement. Technology has brought many benefits, one of which is the emergence of RPA financial robots as a product of this technological era. The application of financial robots is quite extensive, and they have been widely applied and valued in both enterprises and governments. This paper mainly discusses the concept of financial robots, their application in the Bank of China, the impact they have made, and the implications for their application, and finally, it estimates the future prospects based on the current development.

KEYWORDS

Financial Robots; Bank of China; Application Development

1. THE CONCEPT OF RPA FINANCIAL ROBOTS

1.1. Concept

Financial robots are an advanced technological solution specifically designed for various business processes in corporate financial workflows [1]. They refer to software programs or systems that utilize artificial intelligence and automation technology to perform financial and accounting tasks. These robots can handle tasks such as data entry, account processing, financial reporting, and risk management analysis, thereby reducing the need for manual operations and improving work efficiency and accuracy. Financial robots can typically simulate human financial decision-making and execution capabilities, complete various financial tasks according to preset rules and algorithms, and also learn and improve their performance. These robots can play an important role in corporate finance departments, the banking industry, the insurance industry, and other fields, saving costs for organizations and providing more reliable financial services.

1.2. Benefits of Developing RPA

- (1) **Improve Efficiency:** Robots can automatically complete a series of repetitive operations according to specified processes and procedures, such as data entry and account checking [2].
- (2) **Reduce Errors:** Compared to manual operations, financial robots are more accurate and can greatly reduce the risk of errors, helping to ensure the accuracy of financial data.
- (3) **Reduce Costs:** Automating financial processes can reduce the demand for human resources, thereby reducing the operating costs of enterprises.

(4) **Enhance Data Analysis Capability:** Financial robots can quickly process large amounts of data and generate reports, helping enterprises to better understand their financial situation and make wiser decisions.

(5) **Improve Risk Management:** Financial robots can monitor data in real time, identify potential risks, and take timely measures, helping to improve the risk management capabilities of enterprises.

1.3. Applicable Situations for RPA

(1) **A large amount of data.** RPA technology is a product of today's intelligent technology; it can automate the extraction and processing of data and perform tasks across systems, achieving data uniformity through cross-validation.

(2) **Business processes with repetitive operations.** Financial robots are also a type of robot designed to facilitate the work of accountants, improve work efficiency, and reduce costs. If a task does not require repetitive completion and only needs to be handled occasionally or at fixed times by the staff, then there is no need to use financial robots. On the contrary, using financial robots may increase costs and efficiency may not be much higher than manual processing.

(3) **Business operations with standardized rules.** Processes suitable for RPA must have certain rules. If a process is irregular and dispersed, and requires subjective judgment by people, it will not be suitable for RPA, as current robots are still unable to make subjective judgments[3]. RPA financial robots follow existing security and data standards, access current systems in a manner that simulates humans, automatically complete repetitive processes according to relevant rules, and can be completed by simply clicking the corresponding buttons or performing some mechanical operations without causing any damage to the existing system rules.

2. THE APPLICATION AND DEVELOPMENT OF RPA FINANCIAL ROBOTS IN BANKING

2.1. Customer Service

Financial institutions often need to deal with a variety of query demands in their daily operations, including fraud detection, account status checks, and loan information retrieval, among other aspects. These complex and diverse tasks often put great pressure on the customer service department, making it difficult to respond quickly and comprehensively. Fortunately, the introduction of RPA financial assistants has become an effective strategy, specifically optimizing the processing of non-urgent or low-priority query tasks, thereby releasing customer service team resources to focus more on solving urgent and critical issues. In addition, the deployment of RPA technology has also significantly optimized the customer data verification process across systems and internal platforms, greatly reducing the time required for this tedious process. This not only accelerates the service response speed and reduces the waiting time for customers but also provides the bank with a more agile remedial action execution capability, further consolidating the trust between the bank and customers, and promoting the overall improvement of service quality and customer satisfaction.

2.2. Accounts Payable

Processing accounts payable used to be a tedious and monotonous task, which required the use of Optical Character Recognition (OCR) technology to convert paper invoices from suppliers into digital formats, then accurately extract information from every detail field of the invoice, go through a strict verification process, and finally complete the processing. Fortunately, the introduction of RPA (Robotic Process Automation) technology has completely changed this situation, enabling seamless automation of the entire processing process: from digital recognition of invoices to accurate extraction

and verification of information, to the final automatic recording of error-free payment operations to the supplier's account, greatly improving efficiency and reducing human errors.

2.3. Credit Card Processing

In the past, banks often took several weeks to process credit card applications, focusing on customer verification and approval, which led many customers to think the waiting period was too long, thus canceling their credit card applications. Now, the emergence of financial robots has largely solved this problem; financial robot software can efficiently gather customer documents within a few hours, complete credit assessment and background review processes, and quickly assess whether customers meet the qualifications for credit card applications.

2.4. Mortgage Loan Processing

There are differences in the speed of loan issuance among banks. Under normal circumstances, completing a mortgage loan from application to disbursement takes at least a cycle of 15 to 30 working days. For customers in urgent need of funds, this waiting period is undoubtedly very painful, as the entire process is accompanied by multiple review and inspection links, including credit assessment, each of which is crucial. If there is a slight oversight by the customer or the bank during this process, it can become a cause for extending this period and even causing unnecessary delays. To alleviate this situation, banks have now adopted RPA technology, which accelerates the loan approval process through preset rules and algorithms, effectively addressing and alleviating the process delays caused by human errors or low efficiency, thereby improving overall service efficiency and customer satisfaction.

2.5. Account Closure Process

Banks receive a certain number of account closure applications every month, some of which do not include account operation vouchers, but this does not hinder the progress of the account closure process. Given the large amount of monthly data processing by banks and the need to strictly follow a series of regulations and checklists, the risk of human errors also increases. After introducing financial robots, banks, with the help of RPA, can automatically send warm reminders to customers, requesting supplementary necessary account operation proof. RPA robots, with their efficiency and accuracy, can handle the queue of accounts to be closed according to preset rules in a very short time, significantly improving the efficiency and accuracy of processing.

2.6. Compliance

As banks need to comply with many rules, this is a daunting task for employees. However, the emergence of RPA has made it easier for banks to comply with rules. Based on an in-depth survey implemented by Accenture in 2016, as high as 73% of compliance management experts interviewed anticipated that RPA technology would be the core driving force in the development of the compliance field in the next three years. The introduction of RPA technology can achieve uninterrupted operation, effectively reducing the demand for full-time equivalent (FTE) manpower, thereby enhancing the overall efficiency and quality of compliance operations. In addition, the technology, by automating tedious and repetitive tasks, not only frees up human resources but also encourages employees to engage in more strategic, innovative, and imaginative projects, significantly enhancing job satisfaction and indirectly promoting a leap in organizational productivity.

2.7. Fraud Detection

With the wave of technological progress, the fraud threats faced by the banking industry are becoming increasingly severe. Faced with a large amount of transaction data, it is extremely challenging for

manual checks to identify fraud patterns one by one. RPA, with its unique "if-then" logic, effectively solves this problem, capable of automatically detecting potential fraudulent activities and issuing timely warnings to relevant departments. Specifically, RPA can keenly capture abnormal behavior patterns such as high-frequency transactions in a short period of time and quickly mark the relevant accounts as potential risk objects. This measure greatly promotes the bank's in-depth review of suspicious accounts and timely investigation of fraudulent activities, adding an intelligent solid defense to the bank's security line.

2.8. General Ledger

In the operation of banks, it is necessary to ensure that the core financial record - the general ledger, can reflect all key information such as financial statements, asset changes, liability status, sources of income, and details of expenditures in real time and accurately. This information is not only the basis for preparing the bank's financial reports but also an important basis for the public, media, and stakeholders to assess the operating conditions of the bank. In view of the need to integrate complex data from multiple independent systems when preparing financial reports, maintaining the accuracy of the general ledger is particularly important. Therefore, adopting the RPA solution has become an innovative strategy, which can automatically collect data across systems, implement strict verification processes, and update accurately and error-free into the system, effectively reducing the risk of errors that may be brought by manual operations.

2.9. Report Automation

In the bank's compliance system, preparing and submitting detailed process reports to the board of directors and the majority of stakeholders is a key link to demonstrate the bank's operational effectiveness and performance. Given that such reports are directly related to the bank's reputation and trust, ensuring the accuracy of the report content is particularly critical. Therefore, RPA technology stands out with its powerful information processing capabilities. It can independently gather information from multiple data sources, perform strict data verification, and organize and present it in a clear and understandable format, providing strong support for the bank to prepare accurate and error-free reports.

3. OVERVIEW OF THE BANK OF CHINA

3.1. Background and History

The Bank of China (BOC) is one of China's state-owned commercial banks with a long history and significant international influence. The Bank of China has always adhered to a corporate culture of "excellent service, prudent innovation, open inclusiveness, and collaborative win-win," and a core business philosophy of "innovation, openness, collaboration, and win-win," serving the local economy, taking on social responsibilities, and achieving leapfrog development in service capabilities and profitability [4].

3.2. Business Scope and Internationalization

The Bank of China is known for its extensive business map, with business extending to commercial banking services, investment banking operations, fund management, insurance business, and aviation leasing, among other dimensions, demonstrating a comprehensive financial service capability. As the only bank in China with a century-spanning history of over a hundred years, the Bank of China has not only stood the test of time but has also become an outstanding representative of the internationalization and diversification of China's banking industry with its highly international perspective and diversified business structure. Its branches are spread throughout mainland China and

extend to 64 countries and regions around the world, building a widely covered, closely connected financial service network. With more than 10,000 domestic institutions and over 600 overseas institutions, it provides global financial services to customers.

3.3. Unique Position and Honors

The Bank of China is one of the note-issuing banks in the Hong Kong and Macao regions, holding an extremely high financial status and influence. In addition, the Bank of China is also the only "Double Olympic Bank" in China, providing financial services for both the 2008 Beijing Olympic Games and the 2022 Beijing Winter Olympic Games. In the global financial system, the Bank of China also occupies an important position, has been selected for the list of Global Systemically Important Banks for many years, and has been ranked at the forefront of global banks for many consecutive years.

3.4. Financial Status and Performance

In recent years, the financial status of the Bank of China has remained robust, and its performance has continued to grow. According to the latest financial reports, the total assets and liabilities of the Bank of China have both achieved steady growth, and the net amount of customer deposits and loans has also increased significantly. In terms of profitability, the Bank of China has achieved continuous growth in operating income and net profit by optimizing business structure and improving service quality. At the same time, the Bank of China also focuses on risk management, with a continuous decline in the non-performing loan ratio and an increasing provision coverage ratio, laying a solid foundation for future stable development.

3.5. Social Responsibility and Brand Building

The Bank of China has also made active contributions to fulfilling social responsibilities. The bank actively participates in public welfare and charitable activities, giving back to society through donations, volunteer services, and other forms. At the same time, the Bank of China also focuses on brand building and corporate culture cultivation, striving to enhance brand image and employee cohesion. Through years of effort, the Bank of China has become one of the well-known brands in China's financial industry and has won widespread social recognition and praise.

4. APPLICATION OF FINANCIAL ROBOTS IN THE BANK OF CHINA

With the popularization of artificial intelligence, more and more industries have begun to use artificial intelligence to assist their work. Artificial intelligence can not only reduce a large part of the workload but also save a lot of costs for enterprises or governments. Therefore, it is also necessary to introduce artificial intelligence into the banking industry, among which financial robots, as one of the products of artificial intelligence, are very necessary to be introduced into banking enterprises. The application of financial robots in the Bank of China is an important embodiment of the development of financial technology, which has significantly improved the efficiency and accuracy of the bank's financial work.

4.1. Automation of a Large Number of Repetitive Tasks

Financial robots can simulate human operations, perform tasks such as copying, pasting, clicking, and data entry, effectively undertaking workflow processes that are highly standardized, significantly repetitive, and relatively low in added value. It is estimated that by introducing financial robots, the Bank of China has achieved about 25%-30% automation of financial processes, greatly reducing the workload of financial personnel. For example, cashier robots can automatically log in to online

banking, inquire about account balances and transaction details, a process that is not only fast and accurate but also reduces the possibility of human errors.

4.2. Enhancing Data Processing and Analysis Capability

Data analysis robots have a certain process order when performing work, as shown in Figure 1. According to internal data from the Bank of China, after adopting financial robots, the efficiency and accuracy of data analysis have both increased by more than 30%. This not only helps the Bank of China to grasp the financial situation more quickly but also provides more accurate data support for decision-making.

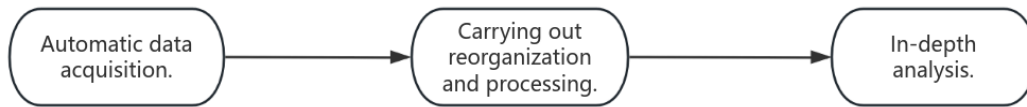


Figure 1. Workflow of the Data Analysis Robot

4.3. Optimizing the Reconciliation Process

The financial reconciliation robot is capable of automatically downloading corporate bank statements and performing reconciliation operations with the corporate ledger, greatly simplifying the reconciliation process, as shown in Figure 2. According to statistics, after the introduction of the financial reconciliation robot, the Bank of China has reduced the reconciliation time by more than 50%, while also enhancing the accuracy and timeliness of the reconciliation.

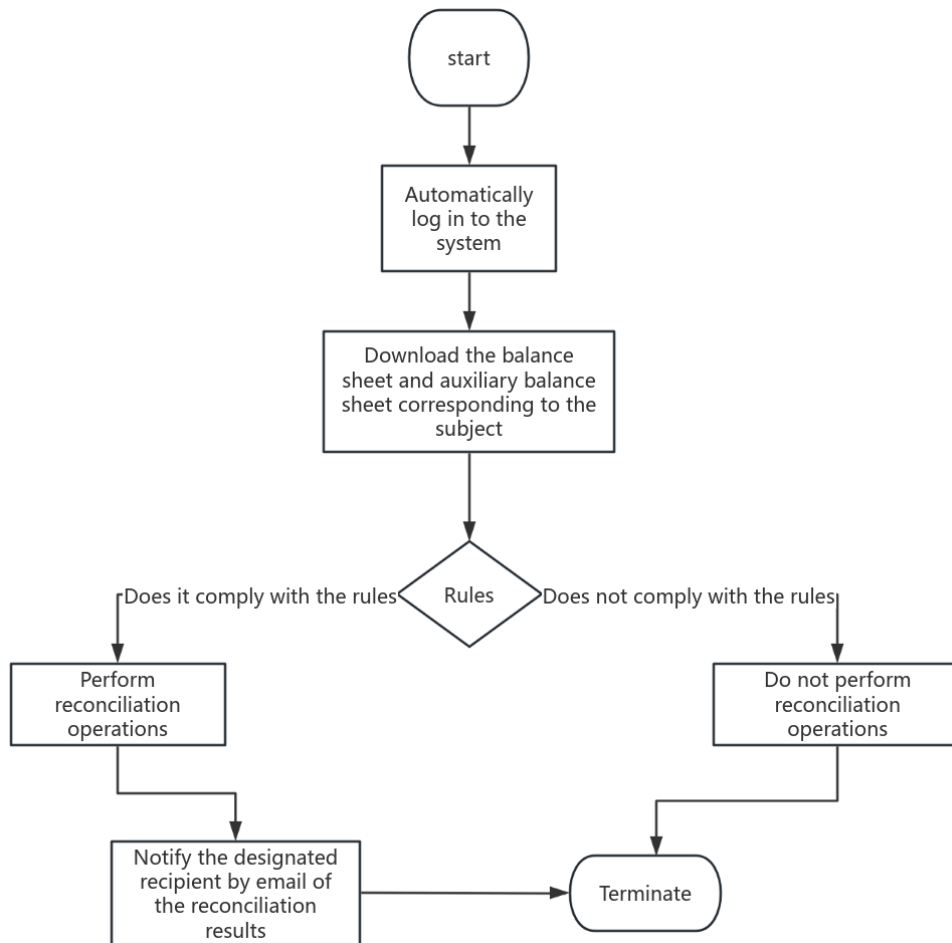


Figure 2. Financial Reconciliation Robot Workflow

4.4. Intelligent Business Collaboration

The business collaboration robot is capable of handling complex and procedural tasks, as shown in Figure 3. This not only improves the efficiency of business processing but also reduces errors caused by human intervention. By applying such robots, the Bank of China has shortened the processing time for business processes such as expense reimbursement by approximately 40%, significantly enhancing employee satisfaction.



Figure 3. Business Collaboration Robot Workflow

4.5. Unleashing Human Resources

The introduction of RPA (Robotic Process Automation) technology has enabled the Bank of China to free up a significant amount of financial management human resources. It is estimated that by automating highly repetitive tasks, the bank has saved approximately 70% of its financial labor costs. These freed-up human resources can be redirected to more valuable and meaningful work, such as innovating business models and improving service quality.

4.6. Automatic Handling of Business Data Across Systems and Platforms

The financial automation assistant has demonstrated excellent adaptability and seamless integration capabilities, being able to cross the boundaries of different systems and platforms to independently perform business data processing tasks, achieving efficient and non-intrusive operational optimization. This feature allows the Bank of China to respond more quickly to market changes, optimize business processes, and enhance overall operational efficiency. For example, in loan qualification review work, the RPA financial robot can automatically extract the loan qualification data from scanned documents, form structured electronic data, and conduct automatic review according to preset rules, greatly reducing the review time and improving the accuracy of the review, as shown in Figure 4.

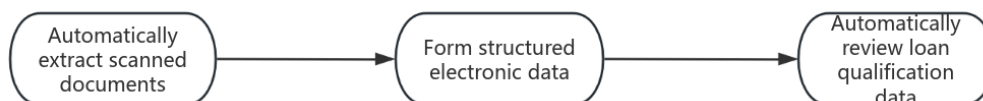


Figure 4. Financial Robot Workflow

In summary, the application of financial robots in the Bank of China has not only improved the efficiency and accuracy of financial work but also freed up a significant amount of human resources, providing strong support for the bank's digital transformation and high-quality development. With the continuous advancement of technology and the ongoing expansion of application scenarios, the prospects for the application of financial robots in the Bank of China will be even broader.

5. THE APPLICATION EFFECTS AND ENLIGHTENMENT OF FINANCIAL ROBOTS IN THE BANK OF CHINA

5.1. Application Effects

5.1.1. Improvement of Efficiency

Financial robots can automate a large amount of repetitive work, such as bill entry, bill review, settlement, and report generation, significantly improving processing efficiency. Tasks that originally

required manual completion can now be quickly and accurately accomplished by robots, thereby freeing up human resources and allowing employees to focus on more valuable work. In addition, financial robots can operate across systems to achieve automatic data collection, processing, and analysis. For example, in the credit card approval process, financial robots can automatically complete cross-system data collection, obtain customer credit information, and automatically filter high-quality customers from the whitelist, greatly improving the approval efficiency.

5.1.2. Cost Reduction

Financial robots mainly implement automated processing for the Bank of China through intelligent operations, which can reduce the workload of financial staff to a certain extent. For instance, workflow processes that require repetitive operations and have little value can be handled by financial robots. This not only allows financial staff to have more time for more valuable work but also avoids the waste of staff scheduling. To some extent, this has reduced the costs of the Bank of China. In addition, RPA robots are non-intrusive to systems, enabling data sharing and information integration between different systems and departments, effectively solving problems such as cumbersome manual operations and difficulties in real-time data updates [5].

5.1.3. Enhancement of Customer Experience

According to relevant data, before the introduction of financial robots to the Bank of China, some services that took 15 minutes to complete manually now only require 3 minutes with the robots. Therefore, services that originally required customers to wait for 15 minutes can now be processed in just 3 minutes. This not only shortens the business processing time for bank staff and reduces their workload but also saves time for customers and provides a better experience. Moreover, financial robots can work continuously 24 hours a day, so if customers can handle their business at a self-service machine at any time, it greatly improves the efficiency and flexibility of their time management.

5.2. Enlightenment of Application

Nowadays, as technology becomes more advanced and intelligent products become more abundant, RPA financial robots, as one of the intelligent products, have undoubtedly brought significant changes and impacts to various industries, especially playing a major role in the financial systems of enterprises and governments. They not only reflect their influence by improving efficiency and reducing costs but are also indispensable in finance and accounting, making enterprises and staff "indispensable" to them. The application effect of RPA in the banking industry is remarkable, and improving work efficiency, information decision-making, and customer service through RPA will become a new trend. Banks that take the lead in applying RPA will promote RPA business to more business lines in the bank, continuing to explore business opportunities [3].

6. CONCLUSION

In the wave of the banking industry's increasing move towards intelligent and digital transformation, the application of financial robots has undoubtedly injected strong momentum into this process. With their efficient, accurate, and tireless working characteristics, they have redefined the boundaries of bank back-office operations, greatly improving the speed and quality of financial processing, reducing the risk of human errors, and also freeing up more time for employees to focus on high-value work such as customer service and value creation. With the continuous maturation and popularization of artificial intelligence technology, the application of financial robots in banks will be more extensive and in-depth. They will not only be limited to basic accounting processing, report generation, and compliance checks but will also penetrate into more complex fields such as risk management, financial analysis, and investment decision-making, becoming an important force in the intelligent transformation of banks. Through deep learning and continuous optimization, financial

robots will be able to more intelligently identify customer needs, predict market trends, and provide more accurate strategic support and business insights for banks.

In addition, the widespread application of financial robots will also promote further optimization and restructuring of internal processes in the banking industry, promoting the development of bank organizational structures towards a more flat and flexible direction. This transformation will not only enhance the operational efficiency and market competitiveness of banks but also bring more convenient and personalized financial service experiences to customers.

In summary, the application of financial robots in banks is an inevitable trend in the digital transformation of the banking industry and is also key to improving the quality and efficiency of financial services. We have reason to believe that in the future, with the continuous advancement of technology and the ongoing expansion of application scenarios, financial robots will play a more important role in the banking industry, contributing new strength to the prosperity and development of the banking industry.

Sichuan University of Science & Engineering"Research on the Construction of First-class Accounting Major in Local Science and Technology Colleges under the Background of New Liberal Arts" (JG-24009)

REFERENCES

- [1] Jun Pang. Application of Financial Robot RPA in Financial Shared Service Centers [J]. China Science and Technology Journal Database (Full Text Edition), Economic Management, 2023(4): 109-111.
- [2] Min Ding. A Preliminary Discussion on the Impact of Financial Robots on Hospital Accounting Work and Countermeasures [J]. Financial Accounting Learning, 2024, (01): 92-94.
- [3] Zhitang Li, Xiaoshuo Hu. Application of Financial Robots in the Banking Sector: A Case Study of Xiamen International Bank [J]. Research on Financial Management, 2020, (09): 43-47.
- [4] Yanping Yang. A Study on the Marketing Strategy of Mobile Banking at the TZ Branch of Bank of China [D]. Shandong University of Finance and Economics, 2024. DOI: 10.27274/d.cnki.gsdjc.2024.000166.
- [5] Zhulan Luo. Evaluation and Optimization Research on the Application Effect of RPA Robots in Financial Shared Service Centers [J]. Heilongjiang Science, 2023, 14(24): 125-127.