

Research on the Application Practice of Financial Robots Based on RPA Technology in Tianjin Medical University

Xinyao Wang^a

School of Accounting, Shandong University of Management, 250300, Jinan, Guyunhu Street, China

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Abstract: In today's rapidly developing digital and intelligent era, intelligent financial robot technology (RPA) is widely used in major enterprises and universities, promoting innovation and development in the financial field. This article explores the application practice of RPA technology at Tianjin Medical University and deeply analyzes its application background. By sorting out the principles of RPA technology and the characteristics of financial management in universities, the necessity of applying RPA technology in the school is explained. By collecting financial data from the university, the implementation process and significant effects of RPA technology at Tianjin Medical University were revealed. The research results indicate that this technology has provided convenience for Tianjin Medical University in the field of financial management, solved problems such as personnel cost shortage, and greatly promoted the transformation of financial intelligence in universities. At the same time, this article points out and proposes suggestions for certain specific issues, which can provide certain reference value for the future development of universities.

1 INTRODUCTION

With the widespread popularization and rapid development of education, the number and scale of universities are constantly expanding. In its development process, the financial business will also continue to increase, and relatively speaking, repetitive work accounts for a large proportion. Traditional accounting personnel often make mistakes and have low efficiency when completing these large amounts of repetitive work. At the same time, traditional financial management methods also increase personnel costs, which to some extent hinder the rapid and efficient development of schools. In the field of higher education, the digital transformation of financial management is leading a profound transformation (Chen, 2024).

Among universities, Tianjin Medical University, as a national "world-class discipline construction university" and a key construction university of the "211 Project", actively explores intelligent transformation in the field of finance. It is one of the first many universities to implement RPA in practice and has had a great impact in the field of financial management. Therefore, this article will use Tianjin

Medical University as a representative case for research.

Tianjin Medical University actively promoted the automation of financial robot processes in March 2022. By identifying and sorting out RPA as a substitute for manual workflows, standardizing the setting of subject attributes and project types, and developing application scenario programs, the university began to officially apply financial robot RPA in May of the same year, with good results. Six application scenarios, including self-service printing of labor appointment documents on web pages, integrated budget management system for financial fund payment, bank reconciliation, project reconciliation, sorting of scientific research completion templates, and sorting of accounts receivable and payable, have achieved the automation of financial robots replacing manual processes. This provides stable and efficient financial service guarantees for improving work efficiency, standardizing work standards, improving the construction of intelligent financial systems, deepening the digital transformation of intelligent financial systems, and promoting the development of the Double First Class cause.

^a <https://orcid.org/0009-0004-8327-3975>

This article is based on the traditional financial field of Tianjin Medical University, where the efficiency and accuracy of personnel work are not high, and information transmission is not timely. RPA technology is used to implement a budget management integrated system for financial fund payment in financial management; Self printing of labor appointment documents in OA office system; Bank self-reconciliation and project self-reconciliation; Fill in the scientific research completion template; The practice of sorting out accounts receivable and payable has provided optimization solutions for the financial management mode of universities. On this basis, the problems and shortcomings arising from the practical process were explored and targeted solutions were provided, providing ideas and directions for the future practical exploration of RPA technology in universities.

2 OVERVIEW AND ADVANTAGES OF RPA FINANCIAL ROBOT THEORY

RPA technology is an emerging digital intelligent tool that simulates human thinking and behavior patterns, simulates human operations on computers, automatically executes rule-based repetitive tasks, and achieves automated processing of business processes. As shown in Figure 1, this technology has the characteristics of high efficiency, clear rules, and completing repetitive work. In China, rapid advances in information technology and investment in the field of artificial intelligence have made the role of RPA increasingly important, and various organizations have begun to use RPA to improve efficiency and decision-making levels (Wang, 2024).

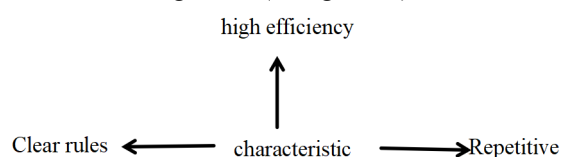


Figure 1: Introduction to the basic characteristics of financial robots.

The application of RPA financial robot technology in universities is mainly reflected in the following advantages (Hu and Gao, 2024): Firstly, it can improve the efficiency and accuracy of financial data processing; RPA financial robots can work continuously for 24 hours a day, greatly saving time and labor costs. At the same time, it can also improve work efficiency to a certain extent, reduce human

errors, and enhance the accuracy of data processing. Secondly, through this technology, financial management in universities can break down barriers to paper-based information transmission; RPA technology has high flexibility and scalability, and can quickly adjust according to changes in business needs, supporting continuous optimization and innovation of business processes. Finally, RPA financial robot technology can promote the digital transformation and upgrading of finance; The application of RPA financial robots in universities can promote the digital and intelligent transformation of financial management and improve financial processing methods (Zhao, 2024).

3 THE CURRENT SITUATION AND PROBLEMS OF FINANCIAL MANAGEMENT AT TIANJIN MEDICAL UNIVERSITY

3.1 University Background

Tianjin Medical University, formerly known as Tianjin Medical College, was established in 1951 as a higher medical institution approved by the former State Council after the founding of the People's Republic of China. Professor Zhu Xianyi, a renowned endocrinologist and medical educator, was appointed as the first president. In June 1994, Tianjin Medical College and Tianjin Second Medical College were officially established to form Tianjin Medical University. In December 1996, it became the only national "211 Project" key construction municipal university in Tianjin. In October 2015, it became a jointly built university by the Tianjin Municipal People's Government, the National Health Commission, and the Ministry of Education. In September 2017, it was selected as a national "world-class discipline" construction university. In February 2022, it became the second round of "Double First Class" construction universities.

3.2 The Specific Situation and Existing Problems of Traditional Financial Management

3.2.1 Specific Situation

Basic information of financial personnel: There are a total of 20 people in the finance department. In terms

of personnel structure: two directors; There are seven personnel in the accounting department, one for project and report management, one for review, one for cashier, and four for document preparation; There are eleven people in the management department, including salary management, asset management, party and union management, internal control and budget management, scientific research fund management, fee management, etc. The matching degree between the number of financial personnel and the increasing demand for financial management is gradually decreasing. In 2021 and 2022, the per capita number of document making exceeded 500 per month, and even reached a peak of 1100 per month, which brought great pressure to accounting personnel (Chen, 2024).

3.2.2 Eproblems

The traditional financial management model still has significant deficiencies in the financial field of Tianjin Medical University (Hu and Gao, 2024). This is mainly reflected in the following three aspects: Firstly, there are many financial and non-financial projects in universities, and the work efficiency of relying solely on manual mode is low. A series of repetitive tasks consume a lot of manpower and financial resources; Secondly, accuracy is difficult to guarantee. Traditional financial management work is complex and labor-intensive, and accounting

personnel are prone to errors in the face of a large workload; Thirdly, the cost is relatively high, and financial work requires a significant investment of manpower to complete; The fourth issue is that information transmission is not timely, and the processing and feedback speed of financial information is slow, which affects the decision-making efficiency of the school (Yang and Chen, 2024).

4 APPLICATION PRACTICE AND EFFECT OF RPA FINANCIAL ROBOT IN TIANJIN MEDICAL UNIVERSITY

4.1 Application Practice

As shown in Figure 2, the application practice of RPA financial robots in Tianjin Medical University mainly includes: budget management integrated system for financial fund payment; Self printing of labor appointment documents in OA office system; Bank self-reconciliation and project self-reconciliation; Fill in the scientific research completion template; Sorting of accounts receivable and payable (Tianjin Accounting Society, 2024).

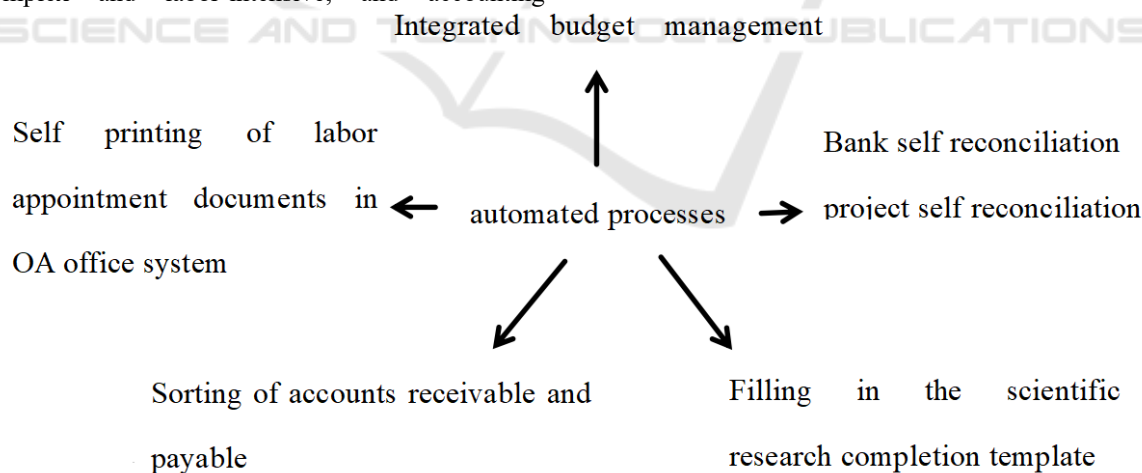


Figure 2: Overall plan and implementation of RPA financial robot at Tianjin Medical University.

4.1.1 Integrated Budget Management System for Financial Fund Payment

According to Table 1, under the traditional financial model, the budget integration system of Tianjin Medical University can be divided into two methods

for financial fund payment: Method 1 requires cashiers to select corresponding payment indicators and fully grasp the project types and fund types of university, resulting in significant payment pressure. Method 2: Although the voucher maker replaces the cashier in selecting the corresponding payment

indicators, due to the large number and lack of regularity in the coding of financial budget project codes, the pressure is transferred to the voucher maker, and the overall pressure and workload have not decreased.

After applying the financial robot, the document maker does not need to enter the financial budget project code. After completing the document creation, the payment information is exported from the financial system, named as a file, and placed in a designated folder. Click the financial robot run button, and the financial robot will automatically match the corresponding payment indicators based on

the project information and the pre-matching comparison table, and automatically generate a payment information template table. Rename it according to the established rules and place it in the designated folder. The cashier only needs to import the payment information template table into the budget management integrated system with one click. The subsequent review and final review processes are consistent with the above methods. Financial robots replace financial personnel in selecting payment indicators and entering unit payment information, alleviating payment pressure for financial personnel.

Table 1: The budget Integration system and financial fund payment process of Tianjin Medical University under traditional financial model.

	Method 1	Method 2	Method 3
Financial staff	Review financial documents		
	Financial voucher preparation (without entering financial budget item code)	Financial voucher preparation (enter financial budget item code)	Financial voucher preparation (without entering financial budget item code)
	Review financial documents		
Cashier	Verify bank payment information		Financial robots organize financial templates
	Choose integrated system payment indicators	After confirming the operation of the bank school interconnection system, push it to the integrated system	
	Enter payment information		Import payment template into integrated system
	Subsequent review and payment process		

4.1.2 Self Printing of Labor Appointment Documents in OA Office System

As shown in Figure 3, in both traditional manual processes and current robot processes, there are three stages in the labor declaration system: application, uploading documents, and completing the review and signing process; Next, the next step in the manual process is to deliver the paper version of the materials

to the finance department, while the next step in the robot process requires the finance department to download the labor documents; The following process is the same (financial review and voucher preparation, cashier payment), and it is precisely from delivery to direct download that the change greatly improves the efficiency of appointment documents and saves time.

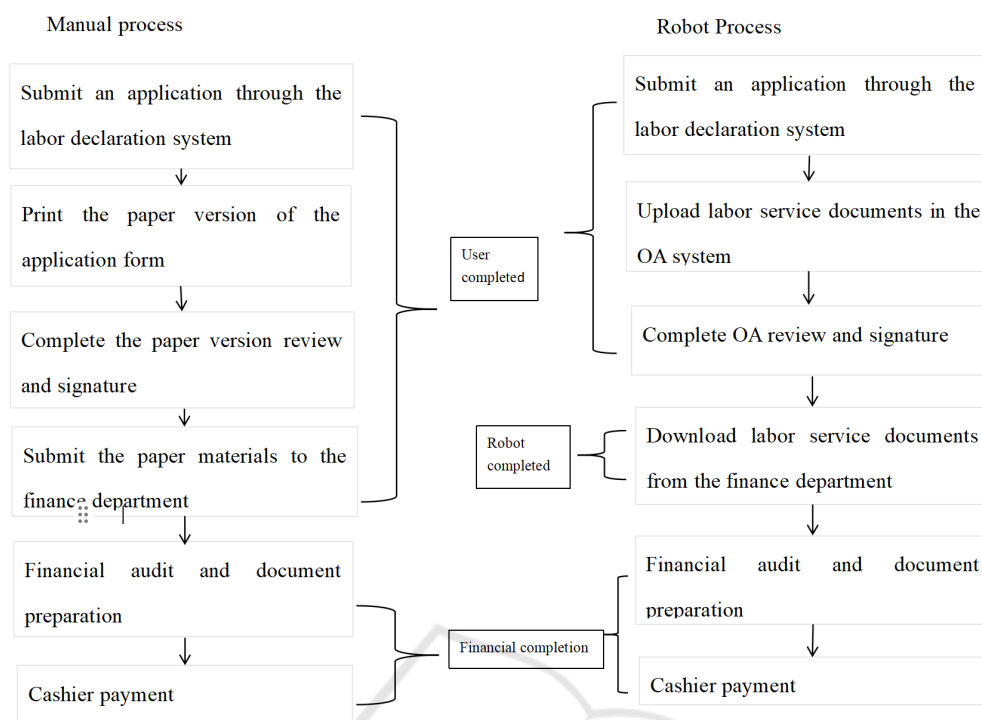


Figure 3: Comparison of manual and robot processes for self-service document printing in OA office systems.

4.1.3 Bank and Project Self Reconciliation

The working principle of bank reconciliation is simple, but it is time-consuming and laborious. After applying the financial robot, the financial personnel put the bank journal and unit journal into the designated folder, click the financial robot run button, and after completing the self-service reconciliation, mark the bank statements that have not been successfully reconciled, such as bank received but not received by the unit, unit paid but not paid by the bank, etc. Record the bank statements that have not been successfully reconciled in the bank deposit balance adjustment table, and record the entire bank reconciliation process in the designated folder for later query work needs.

Tianjin Medical University has a large amount of research funds, and the sources of research funds and types of research projects are complex. On the basis of bank reconciliation, project funds need to be checked against project balances, especially for projects supported by financial funds, which need to be checked against corresponding indicators in the budget management integration system to avoid project mismatches. Manual verification of project accounts is time-consuming and inefficient. After applying the financial robot, the financial personnel will place the project balance table exported from the

accounting system and the financial fund statement exported from the budget management integration system into the designated folder, click the financial robot run button, and according to the corresponding relationship in the pre-set comparison table, the financial robot will replace manual self-service to check whether the project balance is correct and generate reconciliation results. Financial personnel only need to check whether there are differences in the reconciliation results. If there are differences, they can perform fund detail reconciliation according to the bank statement reconciliation mode.

4.1.4 Filling in the Scientific Research Completion Template

Every year, it is necessary to fill out a standardized scientific research completion form. Financial personnel need to export the income and expenditure details of each project from the accounting system and fill in them one by one according to the prescribed content of the scientific research completion template. Batch completion results in a large number of projects and low work efficiency.

After applying the financial robot, as shown in Figure 4, financial personnel only need to export the income and expenditure detailed accounts of each project from the accounting system, place them in the

designated folder, click the financial robot run button, and according to the pre-set comparison table and rules, the financial robot automatically classifies the content of the income and expenditure detailed accounts. The classified content is self-filled into the

scientific research conclusion template and renamed, completely replacing manual filling of the scientific research conclusion template (Tianjin Accounting Society, 2024).

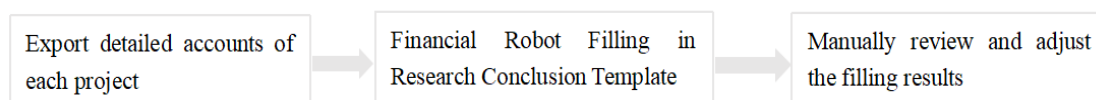


Figure 4: Workflow after applying financial robots.

4.1.5 Sorting of Accounts Receivable and Payable

The process of sorting out accounts receivable and payable: Financial personnel can query all accounts receivable and payable through the temporary payment port of the accounting system, classify and analyze them according to accounting subjects, project numbers, account contents, and project leaders. For temporary payments that are about to expire or have already expired, they should be promptly reminded one by one, and payment reminder notices should be printed. Generally, SMS or phone communication is used, and the overall process efficiency is relatively low (see Figure 5).

After the application of RPA financial robots at Tianjin Medical University, the complexity of the process for sorting accounts receivable and payable has been greatly reduced. Just need the financial personnel to export the incoming and outgoing funds from the financial system with one click, place them in the designated folder, click the run button, and the financial robot will replace the manual analysis process. According to the pre-set rules, the analysis results will be filled in the designated list, and the financial personnel can directly view the analysis results. After verification, the financial robot will send information in batches to each project leader.

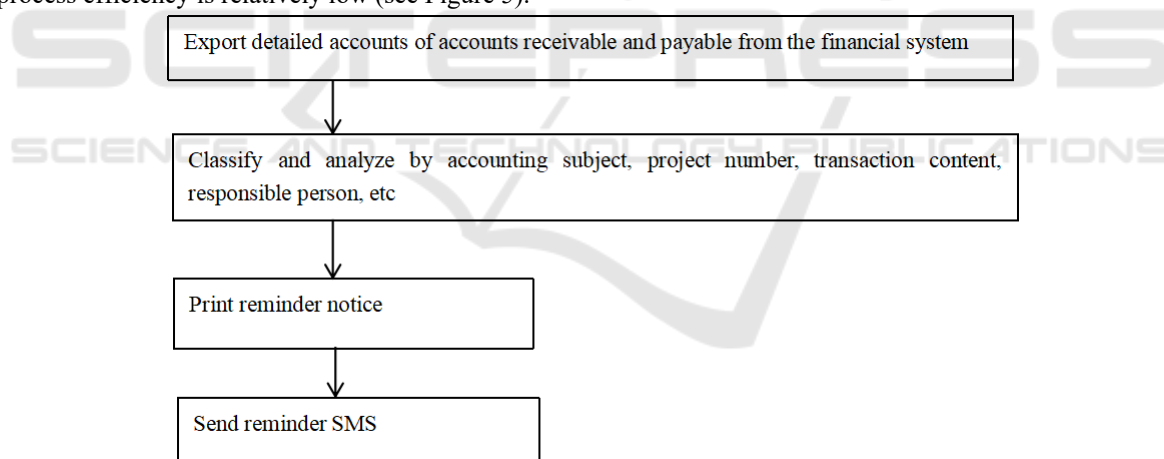


Figure 5: Workflow for sorting accounts receivable and payable after applying financial robots.

4.2 Application Effect

After the application of RPA financial robot technology at Tianjin Medical University, work efficiency has significantly improved: with the help of RPA financial robots, a large amount of tedious manual operations by financial personnel have been replaced, greatly improving the speed of business processing in universities, alleviating the work pressure of financial personnel, and enabling financial personnel responsible for completing these

computationally repetitive tasks to engage in other creative work, thereby effectively improving work results (Xing and Ma, 2024);

At the same time, the accuracy of financial work in universities has been greatly improved: through the participation of RPA financial robots in university financial management, many cases of careless or erroneous data filling by financial personnel in the past no longer exist. The digital financial management model enables it to calculate data according to fixed calculation methods and formats,

thereby significantly improving the accuracy of these tasks;

In addition, the focus of financial work in universities has shifted: as RPA financial robots can complete most of the work in the finance department, the focus of financial personnel's work will shift from financial accounting to research work in financial management. This transformation will provide data support and formal judgment for the decision-making of school management, helping to reduce the losses caused by adopting different strategies and minimize the possibility of risks;

Finally, this measure enhances the work value of financial personnel in universities: freeing a large number of financial personnel from tedious and complex work, allowing them to devote more energy to more valuable tasks such as financial management, and improving the work value and career development space of financial personnel (Gao and Hu, 2024).

5 PROBLEMS AND SUGGESTIONS IN THE APPLICATION PROCESS OF RPA FINANCIAL ROBOTS

5.1 Existing Issues

The first issue that needs to be faced is technical problems. While technology keeps pace with the times, there may still be some technical errors in the financial field. In the financial work of universities, RPA robots may also encounter system failures or data input errors, which can have a negative impact on the normal operation of the financial system (Zhang and Liu, 2025).

Secondly, there are adaptation issues for university financial personnel after changes in business processes. With the continuous updating and development of university financial management models, there will be some changes and adjustments in the workflow of RPA financial robots. If the RPA financial robot does not adjust or update the corresponding steps in a timely manner, it may not be able to adapt to new work requirements (Yu, 2024).

Then, security issues need to be taken extremely seriously: RPA financial robots pose a risk of data leakage during application, and there is a large amount of sensitive data in university financial data. Once the system is hacked or poisoned, its private data may be stolen or maliciously tampered with. At the same time, if there are system equipment failures

that are not promptly addressed during information storage, it can lead to data loss (Yu, 2024).

Finally, there is the issue of acceptance: some financial personnel may have concerns about the development and application of RPA technology leading to their own unemployment, which may cause a certain resistance to RPA financial robots and have a negative impact on their work attitude and promotion (Zhang, 2025).

5.2 Suggestion

Firstly, in terms of technology; Universities can increase investment in technology to reduce the frequency of erroneous programs and accelerate updates, making it easy to implement various forms of financial processing using RPA financial robots (Li et al., 2024).

Secondly, in terms of personnel; Although RPA financial robot technology brings great convenience to financial personnel, universities also need to advocate for deep attention to the operation of financial robots, as well as pay attention to changes in various financial indicators and the handling of special businesses, in order to prevent the inability to handle emergencies in a timely and effective manner; Moreover, through the collaborative operation of manual operation and RPA technology, the acceptance of intelligent financial robots by financial personnel can be effectively improved, enabling interaction and cooperation between humans and intelligent technology, and harmonious coexistence (Gao and Hu, 2024).

Thirdly, in terms of safety management; For confidential data and programs that have not been automated by financial robots, their application may lead to internal code and financial data leakage, with high financial risks. Universities should spend additional manpower, material resources, and financial resources to solve the problem of financial data leakage and maintain financial information security (Zhao, 2024).

6 CONCLUSIONS

The high efficiency, clear rules, and repetitive work characteristics of RPA technology have made it widely used in the financial management model of Tianjin Medical University. With the rapid development of digitalization in China, intelligence and automation are inevitable trends in the future financial informationization construction. RPA financial robots are a part of financial

informationization work and an important development direction. Through the widespread application of RPA technology, there will be a qualitative leap in the financial work of universities.

There are still certain shortcomings and limitations in the research process of this article. This study conducted a specific analysis of various financial indicators and operational results of Tianjin Medical University to infer the implementation of RPA technology in major universities. However, each university has its unique financial situation, and relying solely on Tianjin Medical University as a representative for analysis does not have certain persuasiveness and reliability. In the future, the author can include more universities with different types of financial situations as research objects in the research process, and expand on the original research direction and methods of this article. For example, survey questionnaires and field research can be used to further understand the actual financial situation of universities.

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