



Reflections on the Application of RPA in the Digital Transformation of Enterprise Finance

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Abstract: With the coming of the era of intelligence, the process of the digital transformation of enterprise finance is also accelerating. Robot process automation(RPA) is gradually becoming a key tool to improve the quality and efficiency of enterprise financial process. This paper mainly discusses the application of RPA in the digital transformation of enterprise finance as its influence and limitations. Firstly, the RPA technology and the digital transformation of enterprise finance are introduced. Secondly, this paper studies the places where we can use RPA in the digital transformation of enterprise finance from four aspects which are financial process automation, financial data analysis and reporting, financial risk management and compliance management, enterprise financial efficiency and value creation. The result shows that the application of RPA technology significantly raises the automation level of enterprise finance process reduces the operation costs of the enterprises and improves the efficiency, quality and safety of data processing. In addition, this paper also discusses the limitations of RPA application, which provides a reference for the enterprises to use RPA technology. All in all, RPA has important practical value and broad application prospects in the digital transformation of enterprise finance.

Keywords: RPA, financial digital transformation, enterprise development, automation

1 INTRODUCTION

Nowadays, the development of digital technology continues to advance and the demand for digital transformation of enterprises is increasing. These elements have promoted the application of RPA technology. As a new-type digital labor force, RPA can help the enterprises realize the automatic operation of many kinds of financial work, improve the work efficiency and quality, and reduce the operation cost of the enterprises. So, it is practical significant to study the application of RPA in the digital transformation of enterprise finance.

Combining relevant literature and cases, this paper deeply analyzes the application of RPA in the digital transformation of enterprise finance, discusses the advantages and challenges of using the RPA technology, and makes a summary so as to provide

theoretical support and practical guidance for the digital transformation of enterprise finance. The research is helpful to improve the digital level of enterprise finance work and promote the financial work to be operated efficiently, accurately and intelligently. At the same time, it also helps enterprises to better cope with the opportunities and challenges brought by the digital era, and provides some experience and lessons for the digital transformation of global finance.

2 OVERVIEW OF RPA TECHNOLOGY

2.1 The Connotation and Development Process of RPA

Robot process automation (RPA) is a kind of software system, which can copy human operations on computers, perform repetitive tasks according to specific rules, and replace humans to complete these tasks. At the same time, it is also vividly called digital labor. By copying and enhancing the interaction process between human and computer, it can perform or assist in performing tasks that only humans can perform before. It can also become a labor supplement for high-intensity work. ^[1]

The development of RPA has gone through four stages:

(1) Prehistoric period (1913-1990). During this period, automation technology began to be applied to the production process, such as Ford's automobile manufacturing.

(2) Auxiliary RPA (1990s-early 2000). At this stage, RPA technology began to appear, but its functions are very limited. It is difficult to achieve end-to-end automation in many business scenarios, so it cannot be deployed on a large scale. It is mainly used in batch scripts and triggers, as well as VBA macro programming and business process management.

(3) Non-auxiliary RPA (2000-2015). At this stage, RPA technology began to mature, able to achieve end-to-end business automation, and began to be applied on a large scale in the enterprise. It is mainly deployed on VMS virtual machines and can also centrally manage RPA robots, but it still needs to work together manually.

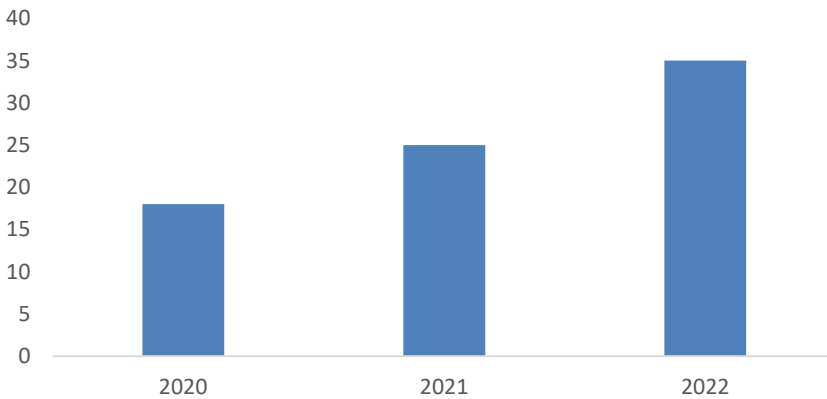
(4) Autonomous RPA (2015-present). At this stage, RPA technology is further developed to handle more complex tasks and achieve large-scale deployment. At the same time, RPA began to combine with artificial intelligence technology, which improved the flexibility and intelligence level of automation process.

In recent years, with the maturity of the RPA industry and the change of customer needs, RPA suppliers have begun to pay attention to technology integration and innovation. The combination of RPA and other technologies such as artificial intelligence, cognitive ability, machine learning, etc. has become a development trend. The integration of these technologies gives RPA stronger cognitive and decision-making power, enabling it to deal with more complex tasks and situations. At the same time, it continuously improves product functions and provides more industry application scenarios and customized services.

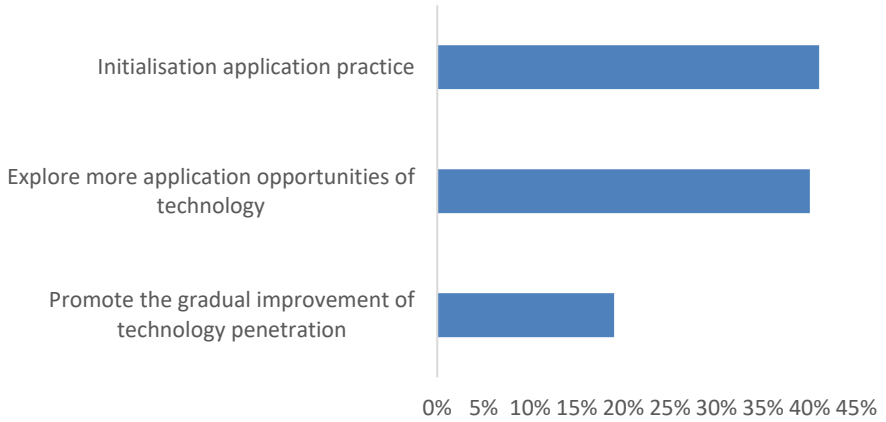
In these years, with the continuous penetration of RPA in various fields and the continuous maturity of RPA application practice, the market scale of the RPA industry has continued to grow. Take China as an example. According to the survey, from

the application of RPA in 2022, at present, banking, insurance, securities, e-commerce and retail, government affairs and other fields are the main force of RPA commercial practice. 40% of customers are exploring more application opportunities of technology, and 41% of customers are still in the initial application practice stage. Paragraph. Judging from the willingness of RPA industry customers to be completed and existing customers to invest in RPA in 2023, the types of customers who increase the investment budget of the two types of customers account for the main part. Among the customers to be completed, the proportion of customers who invest/increase the budget accounts for about 75%; among the existing customers, the proportion of customers who are willing to increase investment in RPA accounts for about 43%, and the proportion of customers who are willing to maintain the same level of investment accounts for about 31%. Compared with the failure or failure to deliver some projects on time in the early stage, in the past two years, with the gradual deepening of the application practice of process automation on the customer side and the continuous improvement of the supplier's product and service capabilities, the practical results of RPA projects have gradually improved. In 2021-2022, the proportion of customers who did not recognize the effectiveness of RPA practice decreased from 29% to 15%, and the proportion of customers who did not recognize the effectiveness of RPA practice increased from 11% to 13%. In 2022, China's RPA market will reach 3.53 billion yuan. It is expected that the market size of the RPA industry will reach 43% in the next five years, and the market size of China's RPA industry may reach 30.2 billion yuan by 2028.

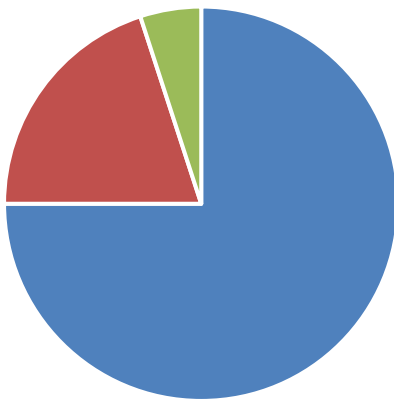
2020-2022 Robots Process Automation(RPA) Market Size



The Propotion of RPA Practice Application Stage in 2022

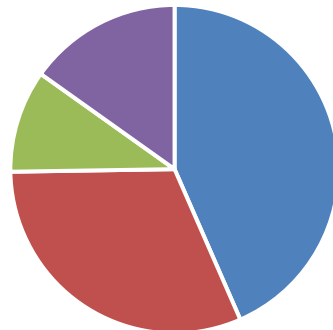


Willingness of Customers to be Traded in the RPA Industry in 2022



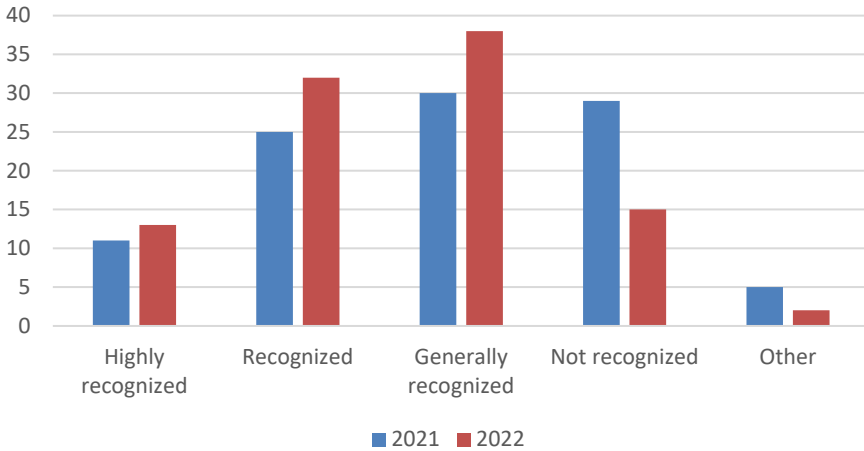
- Invest/Increase budget
- Don't invest
- Not sure

Investment Planning for Existing Customers in the RPA Industry in 2022



- Increase investment
- Maintain the same level of investment
- Decrease investment
- Not sure

2021-2022 RPA Practice Effectiveness Survey



2.2 Functions and Features of RPA

As a software system that simulates human manual operation, RPA is very suitable for dealing with a large number of repetitive tasks. At present, it has many functions, mainly as follows:

(1) Data capture: RPA can simulate the process of human manual crawler to capture data based on human-written programs, obtain data from web pages, clients, etc., and integrate them into local files.

(2) Document recognition and processing: RPA can use Optical Character Recognition (OCR) technology to convert the content of the scanned image into text data, and then perform text processing to convert text data into structured data, preparing for data processing. [2]

(3) Data processing and migration: RPA can integrate, compare, calculate, filter, classify, analyze and process data from various sources, automatically verify data information, analyze and identify errors in data. At the same time, it can also automatically process cross-system structured data for data migration.

(4) Batch operation: RPA can perform multiple identical operations at one time, so as to realize continuous and batch processing of repetitive tasks, improve work efficiency, and greatly reduce the possibility of human error.

(5) Information monitoring: RPA can be 7*24 on duty, uninterrupted monitoring and response.

Compared with traditional software programs, RPA is easier to develop and more popular, which is mainly due to its following characteristics:

(1) Non-invasive: RPA is mainly based on the UI system, operating in the user interface, and will not destroy the original IT structure of the enterprise. [3]

(2) Flexibility: RPA can flexibly change the program design of RPA according to the needs of different industries and enterprises, and automate various complex business processes.

(3) High efficiency: RPA can work continuously for a long time, with fast speed and high precision, and the comprehensive operation rate is 5 times that of manual operation, which greatly improves the production efficiency and reduces the cost of enterprises.

(4) Security: RPA robot can protect and encrypt the important data of the enterprise to ensure the information security of the enterprise.

(5) Reliability: RPA robots can perform the same tasks repeatedly, reduce human errors, and improve the reliability and stability of the business.

3 OVERVIEW OF ENTERPRISE FINANCIAL DIGITAL TRANSFORMATION

The digital transformation of enterprise finance, as the term suggests, refers to enterprises combine the external environment with the need of integration of internal business and finance, and use various digital technologies to upgrade the financial management system, so as to achieve more efficient and fine-tune financial management. Its core is to use digital technologies such as big data, artificial intelligence, cloud computing, and blockchain to optimize financial processes, improve financial work, reduce the costs, and thus improve corporate competitiveness.^[4]

At present, with the advent and continuous development of the intelligent era, the financial digital transformation of enterprises mainly has the following four driving forces:

(1) Technology-driven: the continuous innovation, development and popularization of digital technology provide technical support and possibility for financial digital transformation.

(2) Policy-driven: The government attaches importance to digital development and introduces a series of policies and plans to provide policy support and convenience for the digital transformation of corporate finance.

(3) Market demand: In the fiercely competitive market environment, enterprises need to change their business models through their financial digital transformation to improve work quality and efficiency, reduce costs, and thus improve their market competitiveness.

(4) Enterprise internal drive: In order to achieve the established strategic objectives, enterprises need to continuously optimize internal management. Nowadays, only by promoting digital transformation, we can make our own internal control develop in leaps and bounds. As an integral part of an enterprise, financial digital transformation has become an inevitable choice for enterprise development.

To sum up, the financial digital transformation of enterprises has become the general trend of enterprise development. Enterprises should grasp the development trend according to their own actual situation, clarify the direction of transformation, formulate transformation plans, learn applicable transformation methods, and realize the

networking, digitization and intelligence of financial management, so as to improve their competitiveness and better cope with the complicated changes in the external environment. In the future, the digital transformation of enterprise finance will continue to be deepened and open up a broader path for enterprise development.

4 THE APPLICATION PLACES OF RPA IN THE DIGITAL TRANSFORMATION OF ENTERPRISE FINANCE

4.1 The Application of RPA in Financial Process Automation

In recent years, with the continuous development of social economic, the development of enterprises has change from passively accepting the market environment to actively looking for opportunities of the times, which requires enterprises to promote their own intelligent development. The automation of financial process conforms to this demand. The application of RPA is the most extensive and basic in the financial field. The role of RPA is mainly as follows:

(1) Financial accounting: RPA can automatically perform all kinds of financial accounting work, including report generation, financial analysis and so on. It not only completes fast, but also has a great improvement in accuracy compared with manual work.

(2) Payment and settlement: Rapid processing of a large number of payment and settlement business is also an important role of RPA. RPA can reduce the error rate of settlement payment amount accounting, and can also improve efficiency and increase the speed of capital flow.

(3) Invoice processing: RPA can automatically identify, analyze and process invoice information, effectively review the legitimacy and content correctness of invoices, improve the efficiency of invoice processing and management, and reduce tax errors.

(4) Financial approval: The financial department can use RPA to automatically approve financial applications from other departments, shorten the approval cycle, accelerate financial circulation, improve work efficiency, and better adapt to the current rapidly changing market environment.

Applying RPA to financial process automation can effectively improve work efficiency, reduce costs, achieve standardized operations, and reduce work errors. At the same time, in some cases, it can also carry out flexible intelligent operation according to business needs. For example, a large enterprise will use RPA technology to automate financial processes when faced with tedious tasks such as report preparation and financial approval. By deploying Cyclone RPA intelligent assistant, the enterprise has realized the automatic generation of financial statements and the automatic processing of reimbursement approval, which greatly improves the quality and efficiency of work. [5]

4.2 The Application of RPA in Financial Data Analysis and Reporting

Financial data is a key factor for an enterprise to carry out daily management and make major business decisions, and the ability of RPA in this field can not be ignored. Through automated financial data collection, collation and analysis, RPA can help companies better understand their financial situation, thus providing strong support for business management decisions. The following are the main roles of RPA in this area:

(1) Data collection and integration: In the process of financial data analysis, good data collection is undoubtedly a prerequisite for everything. RPA can automatically collect the information needed by enterprises from multiple data sources such as financial statements, bank traffic and invoices, and integrate them into a unified data platform. This helps to improve the efficiency of data collection and the integrity and accuracy of data, and lays a good foundation for subsequent data analysis.

(2) Calculation and analysis of financial indicators: RPA can automatically calculate various financial indicators such as operating income, net profit, gross profit margin and so on according to the preset financial model, avoid calculation errors, and carry out enterprise financial analysis according to the results. In addition, RPA can also perform dynamic data analysis, real-time monitoring of financial status, and provide data basis for daily management and decision-making of enterprises.

(3) Early warning and control of risk: By using RPA to analyze financial data in real time, enterprises can find potential risks including shortage of funds and excessive investment timely. RPA sends out early warning signals according to the preset risk threshold, so that management can take corresponding measures to reduce risks in time, which can effectively avoid enterprises from falling into a major business crisis.

(4) Report preparation: RPA can extract the required financial data from the enterprise database according to the preset report template, and then perform certain analysis and calculation to automatically generate financial statements. At the same time, companies can also use RPA to collect other financial information which reports require. It's helpful to reduce the workload of finance staff, improve the efficiency of report preparation, and improve the accuracy of reports.^[6]

(5) Report checking and approval: RPA can send the report to the relevant personnel for checking after the report is finished. If it is passed, it can be submitted automatically, which ensures the timeliness of the report.

(6) Publishing and archiving of reports: RPA can publish approved financial reports to designated platforms such as enterprise intranets and external websites in a timely manner according to the preset publishing process. At the same time, RPA can also automatically archive the report, which greatly facilitates subsequent query and management.

In short, RPA can effectively improve the accuracy, integrity and security of data, help companies to manage and make decisions, and promote the sustainable development of enterprises.

4.3 The Application of RPA in Financial Risk Management and Compliance Management

The development of the society has brought many opportunities for enterprises, however, it has also made them have to face more and more risks and challenges. In this case, it has become an inevitable demand for enterprises to seek steady development that using advanced technology to make financial risk management and compliance management. RPA is applied in this field, and its role is mainly reflected in:

(1) Improve the accuracy of financial statements: RPA can automatically perform a large number of repetitive financial operations, reduce errors caused by fatigue work, improve the accuracy of financial statements, and further reduce the possibility of financial risks.

(2) Improving audit efficiency: RPA can help auditors quickly complete the review of statements, spot checks and other documents, and can assist in filling in the audit work papers and notes to accounting statements to improve audit efficiency.^[7]

(4) Reduce compliance risk: RPA can operate in accordance with the preset compliance rules when automatically performing financial work, and can automatically perform tax calculation, payment, declaration and other compliance processes to ensure that the company's behavior in the financial processing process can meet the relevant laws and regulations. In addition, RPA can also monitor the financial data of companies in real time and find potential compliance risks, and through the early warning mechanism, timely remind enterprises to take measures in advance to prevent and reduce compliance risks.

(5) Improve the efficiency of compliance review: RPA can help compliance staffs to quickly complete the compliance review of rules and regulations, business processes, business contracts and transaction documents, statements and advertisements, submission materials, etc., and improve the efficiency of the review.

In short, the application of RPA technology in financial risk management and compliance has significant advantages. Through the use of RPA, companies can effectively control and prevent financial risks, improve compliance levels, consciously assume social responsibility, and improve corporate reputation and competitiveness.

4.4 The Application of RPA in Improving the Efficiency of Enterprise Financial Work and Promoting Value Creation

Nowadays, the complexity of business of the companies is increasing, so does the pressure on financial management. Robotic process automation (RPA), as an emerging technology, is playing an important role in this field:

(1) Improving the business processing efficiency: RPA can automatically perform a large number of regular financial operation tasks to reduce the workload of finance staffs and improve the speed and accuracy of business processing.

(2) Optimizing the business process: RPA can perform the financial process according to the preset procedures to ensure the standardization and consistency of financial operations, thereby optimizing the entire financial management process.

(3) Reducing the error rate: RPA is not affected by human psychological and phys-

iological factors, which can effectively avoid mistakes in financial operations, reduce the error rate, and thus reduce financial risks.

(4) Improving the ability to support decision-making: RPA can collect and analyze financial data in real time. It provides more accurate and comprehensive financial information for management, and then help companies make more informed decisions.^[8]

(5) Strengthening internal control: RPA can ensure the accuracy and integrity of financial data, thus prevent financial fraud effectively and improve the level of internal control.^[9]

(6) Promoting the integration of business and finance: RPA can make the financial system seamlessly connect with other business systems of the companies, realize the real-time sharing of financial and business data, promote the integration of business and finance, and create more value for the enterprise.

For example, a large manufacturing enterprise has realized automatic generation of financial statements and financial analysis by introducing RPA, which improves the accuracy and timeliness of financial reports and reduces the working pressure of finance staffs. Financial companies use RPA technology to process and analyze customer information automatically, which improves their risk control capability, and reduce non-performing loan rate. In short, the application of RPA technology in enterprise financial management has significant advantages, which is expected to further improve the financial efficiency of enterprises and create more value for them.

5 THE LIMITATIONS OF THE APPLICATION OF RPA IN THE DIGITAL TRANSFORMATION OF ENTERPRISE FINANCE

The advantages of RPA technology in the application of in the digital transformation of enterprise finance are very prominent, and it has been widely recognized by all sectors of society. However, we must clearly recognize that RPA technology also has certain limitations in practical application. The following seven limitations require particular attention:

(1) Technical threshold: Although RPA technology is very easy to use, it also requires enterprises to have certain technical capabilities. When programming and using RPA, enterprises need to invest a lot of resources in the technical field and personnel training, otherwise it may be difficult to achieve the desired good results. In addition, when designing the operation rules of RPA, enterprises need to have a deep understanding of their own business processes, and also need to have a certain understanding of enterprises in the same industry, as well as upstream and downstream enterprises in the market, so as to formulate the most suitable rules for their own needs.^[10]

(2) Inadequate process adaptability: RPA technology has a strong advantage in dealing with repetitive, standardized business, but for more complex, highly variable business, its processing capacity is relatively poor. In addition, RPA technology may have certain challenges when faced with cross-system and cross-departmental data interaction. Therefore, enterprises need to standardize business processes before im-

plementing RPA projects in order to improve the application effect of RPA technology.

(3) Difficulties in integration: Enterprises need to integrate with existing business systems when applying RPA. However, problems such as different interfaces and data formats between different systems may increase the difficulty of integration and affect the implementation of RPA technology. In order to solve this problem, enterprises need to work closely with RPA solution providers to ensure the smooth implementation of system integration.^[11]

(4) Data security and privacy protection: With the application of RPA technology in enterprises becoming wilder, there are a large number of sensitive data streams in the process of automation. How to ensure data security and privacy protection has become a major problem for enterprises to use RPA technology. Before implementing the RPA project, enterprises need to establish and improve data security protection measures to ensure data security.

(5) Investment return period: Although the return on investment of RPA technology is high, enterprises still need to bear a certain number of costs in the using process. For SMEs, it may take a long time to see a significant return on investment. Therefore, when choosing RPA solutions, companies need to fully consider the cost factors to ensure that the investment return period is controllable.

(6) Legal restrictions: With the application of RPA technology in various fields, laws and regulations on artificial intelligence and robot substitution for manual work need to be improved. Enterprises need to pay more attention to the changes in laws and regulations when using RPA technology to ensure compliance. In addition, enterprises should also strengthen the training about laws and regulations for employees and enhance their awareness.

(7) Human resources adjustment: The application of RPA technology may lead to the reduction of some jobs. In the process of transformation, enterprises need to deal with the problem of employee placement in order to avoid the impact of brain drain on the stable development of enterprises. Enterprises can help employees adapt to the new business environment through internal training and job adjustment to ensure the smooth realization of digital transformation.^[12]

All in all, when applying RPA technology for digital transformation, enterprises should deeply learn its limitations and formulate appropriate plans according to their own actual conditions. By overcoming its limitations, enterprises can give full play to the advantages of RPA technology and achieve digital transformation. At the same time, enterprises also need to pay attention to the development trend of RPA technology, and constantly optimize and improve existing solutions to adapt to the changing market environment. On the road of digital transformation to the future, RPA technology will bring more opportunities and challenges to enterprises.

6 AI+RPA

AI+RPA, also known as IPA (Intelligent Process Automation).

RPA has strong execution ability, retrieval ability, judgment ability and automatic

processing ability, which can replace human beings to perform repetitive and regular tasks, improve work efficiency, reduce labor costs, reduce errors caused by human factors, and improve the accuracy and reliability of work. AI has cognitive, learning and reasoning capabilities, and can identify and process complex structures and information. Through the combination of AI and RPA, it can make up for the shortcomings of RPA, make process robots more "smart", be able to handle more complex business scenarios and system operations, and complete more complex system operations and data acquisition tasks. This combination is like the relationship between the human brain and the limbs. AI builds the human brain and gives RPA a strong cognitive ability; RPA simulates human behavior and gives AI strong execution.

The combination of AI and RPA is widely used in many fields. For example, in the field of customer service, intelligent customer service automation processing can be realized to improve customer satisfaction and service efficiency; in the field of data analysis, data analysis results can be automatically sorted out, generate reports, and improve the accuracy and efficiency of decision-making; in the field of supply chain management, the intelligence of supply chain can be realized. Manage and automate processes to improve operational efficiency and reduce costs; in the field of risk control, risks can be identified and predicted through intelligent algorithms and models, and the routine audit work in risk control can be automated.^[13]

With the development of generative AI, the boundary between RPA and AI is gradually blurred. In the future, RPA may integrate more AI elements, and robots may become human work partners to meet challenges together. RPA empowered and enhanced by AI has become a new trend of enterprise automation, meeting the urgent needs of various industries for automation and intelligence.

In general, AI+RPA brings more efficient and intelligent workflow and decision-making support to enterprises, and promotes the digital transformation and intelligent upgrading of enterprises.

7 SUMMARY

To sum up, in the process of digital transformation of enterprise finance, the importance of robot process automation (RPA) is increasing. RPA not only improves the quality and efficiency of financial work through the automatic processing of repetitive and regular business in enterprises, but also provides strong support for enterprises to make financial decisions through the capture, analysis and prediction of data. However, like any other technology, RPA also faces some challenges in the application process. In the promotion of RPA, we must fully consider data security, system integration, staff training and other issues. Therefore, when applying RPA, enterprises should formulate detailed and applicable strategic planning to ensure its normal and smooth operation. Looking forward to the future, with the continuous progress of technology and the continuous expansion of application scenarios, RPA will inevitably play a more critical role in the digital transformation of corporate finance. More and more companies will use RPA technology to achieve intelligent, high-quality and efficient financial management, and the overall digital transformation process of en-

terprises will continue to be rapidly promoted. In short, the application of RPA in the digital transformation of corporate finance has great vitality and unlimited potential, and the prospect is very broad.

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