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Research on AI-RPA-based Enterprise Empowerment and Cost Decision System

——Taking the Xiaomi Group as an Example

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Abstract: Since its establishment in 2010, Xiaomi Technology Co., Ltd. has been a global mobile Internet enterprise and innovative technology enterprise focusing on the research and development of intelligent hardware and electronic products, smartphones, smart electric vehicles, Internet TV, and smart home ecological chain construction. However, with the increasing industry competition, we should effectively use our own resources in internal management to occupy a larger market share. Therefore, from Xiaomi Technology Liability Co., LTD.'s perspective, it is particularly important to improve the cost decision and find a scientific cost decision to achieve a better strategic goal. Based on its existing cost decision analysis and operation, this paper puts forward the combination of "RPA + AI" technology in the cost decision structure. The first part of the paper determines the research background, significance, method, and background. The second part details the relevant concepts: cost decision, artificial intelligence, and "RPA + AI", the theoretical basis. In the third part, Xiaomi Technology Liability Co., Ltd. is taken as a case to analyze the specific application of the cost composition and cost decision of "RPA + AI", including technical advantages and specific applications. In the fourth part, based on the analysis of the third part, "RPA + AI" is optimized and integrated in Xiaomi Group, the current situation of cost management is compared, analyzed, and finally put forward the problems and challenges faced. The fifth part summarizes the research in this paper and summarizes them systematically.

Keywords: RPA, cost decision structure, artificial intelligence, robotics

1. Introduction

In recent years, China has focused on promoting the effective integration of the Internet, big data, artificial intelligence, and the real economy, in which artificial intelligence (AI), big data, and robotic process automation (RPA) occupy a very important place in the information technology of the digital economy [1]. As new technologies such as AI, cloud computing, and big data mature and are widely

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used in practice, they have brought far-reaching changes to social life. In the environment of constant use of new technologies, traditional finance also urgently needs improvement and innovation due to the impact of AI technology. The introduction of the New Artificial Intelligence Development Plan has further pointed out the direction for the development of artificial intelligence and clarified the strategy for developing China's current artificial intelligence industry [2]. For enterprises, integrating these new technologies with business management can better promote the strategic development of enterprises, help enterprises to achieve cost management improvement, use RPA and AI to provide strong support for costs and promote the overall strategic objectives of enterprises [3].

This paper analyzes Xiaomi Technology Co., Ltd.'s existing cost decision-making model in light of its actual situation and grasps the basic path and method of constructing its cost decision-making system based on RPA and AI technology based on theories and practices related to RPA and AI technology. This study will provide a reference for enterprises in China that have not yet been implemented but are ready to implement cost decision-making enhancement based on RPA and AI technology and also provide a reference value for future related research [4].

To sum up, the research in this paper is to explore the use of RPA, AI, and other technologies, based on the analysis of their existing cost decisions, using the case study method, taking Xiaomi as an example, to help enterprises improve their cost decisions, effectively prevent financial risks, to a certain extent. Hence, the overall costs of the enterprise continue to reduce and ultimately promote the continuous reduction of costs to strongly support the stable development of the company's overall business.

2. Relevant Concepts and Theoretical Foundations

2.1. Basic Concept of Cost Decision-making

The capital cost decision has different connotations in the narrow and broad sense. The narrow sense mainly refers to the expenses enterprises need to bear to raise the necessary funds for operation and obtain long-term development funds. In the financial concept, long-term funds are also called the capital of enterprise development. Therefore, the concept of capital cost includes the financing and financing process carried out by enterprises in order to raise operating funds. For modern enterprises, the cost of capital is the core of financial management in the operation of modern enterprises. First, the cost of capital is affected by the rate of return on benefits proposed by corporate investors in the investment process. Secondly, the specific content of the cost of capital also includes the cost that the financing enterprise needs to spend when participating in various investment projects. The basic concept of the cost of capital is often widely applied to all aspects of enterprise financial management. For the financing of enterprises, the cost of capital is the basis for enterprises to choose financing parties and establish financing schemes. Enterprises can choose the lowest cost financing measures based on the analysis of cost capital. From a broad perspective, the entire process of financing enterprises raising development funds and using this part of funds to carry out business activities belongs to the scope of consideration of the cost of capital. Based on the analysis of the investment activities of financing enterprises, it can be seen that the cost of capital is the decisive factor for financing enterprises to carry out business activities. When financing enterprises evaluate the feasibility of projects that need investment, they must take the cost of capital as the basic standard and core basis. At the same time, the operating results of the enterprise also need to rely on the cost of capital to measure only by comparing the operating profit margin and the cost of capital of the financing enterprise and determining that the operating profit margin is much greater than the cost of capital, can it be said that the enterprise has obtained economic profits and performed well.

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2.2. Basic Concepts of Artificial Intelligence

According to the description of NetEncyclopedia, it is a new technology science that researches and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. Artificial intelligence is a branch of computer science that attempts to understand the essence of intelligence and produce a new intelligent machine that can respond in a manner similar to human intelligence. Research in this area includes robotics, language recognition, image recognition, natural language processing, and expert systems. Since the birth of artificial intelligence, theory, and technology have become increasingly mature, and the application fields have expanded. It can be imagined that the technological products brought by artificial intelligence in the future will be the "container" of human wisdom. Artificial intelligence can simulate the information process of human consciousness and thinking. Artificial intelligence is not human intelligence; it can think like humans and may exceed human intelligence.

Artificial intelligence is a very challenging science. People engaged in this work must understand computer knowledge, psychology, and philosophy. Artificial intelligence is a broad science consisting of different fields, such as machine learning, computer vision, etc. In general, a major goal of artificial intelligence research is to enable machines to perform complex tasks that usually require human intelligence. But different times and people understand this "complex work" differently.In December 2017, artificial intelligence was selected as one of the "2017 Top Ten Buzzwords in Chinese Media". On September 25, 2021, the "New Generation of Artificial Intelligence Ethics" was released to promote the healthy development of artificial intelligence. In layman's terms, artificial intelligence, as the name implies, artificial is manufactured, and intelligence is smart. Compared with previous technologies, artificial intelligence technology will better understand the needs and preferences of users. Although AI technology has been hot in recent years, it is not a new technology. As early as the mid to late 1990s, this concept was proposed in the computer field. Due to the weak computer performance at that time, Internet technology was on the ascendant, and artificial intelligence required a huge and terrifying amount of calculation. Hence, the trend of AI became popular in the civilian field and then died out. However, the forward-looking nature of AI determines that in the era when computer and Internet technologies are mature, developed, and fully applied, AI will surely return to civilian use and profoundly affect everyone's lives. It turns out that today, we are experiencing all of this. Twenty years after the rapid development of hardware technology, the constraints of objective factors have been cleared, and artificial intelligence will profoundly affect our lives.

2.3. Basic Concepts of Financial Robotics (RPA)

2.3.1. Technical Definition and Characteristics of RPA

Robotic Process Automation (RPA) is a software tool for automating user interface (UI) technology with a computer scripting language based on software robotics and artificial intelligence concepts. The RPA is versatile and cross-application, freeing up manual work for routine and repetitive operations, increasing productivity, and connecting internal and external systems for data collection, making it easier and faster to access data [5].

RPA is therefore also characterised by the following features and advantages: firstly, it is a substitute for repetitive manual operations in the financial process, based on clear rules, eliminating the human factor as much as possible without differentiation and helping to free up the company's human resources for higher value work; secondly, it is a continuous feature, working 24/7 and greatly improving the efficiency of financial management; thirdly, it is non-intrusive. RPA is a relatively independent system that does not change the company's existing architecture, and the model does not

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affect the original IT infrastructure; the fourth monitorable feature, each step, can be monitored and recorded, facilitating the optimisation and improvement of the company's processes.

2.3.2. Definition and Functional Features of Financial Robotics

The financial robot is an advanced intelligent device derived from cloud computing, big data, and automation technology in the artificial intelligence era. It belongs to a kind of financial process automation, an intelligent product designed and developed for financial work in the accounting industry. As such, a financial robot is a virtual accountant, able to work autonomously on some repetitive operational processes [6].

Robotic Process Automation (RPA) in the finance field is a relatively mature technology for digital finance application. The finance-related input-processing-decision-making-output process is analysed and dismantled. The robot software is used to simulate human operations so that actions such as filling out, reporting, executing commands, menu clicking, and outputting reports, which would otherwise be done by many human beings on various software platforms - including accounting software, ERP software, reporting software, and even CRM software and tax software - are left to robots.

3. Case Analysis—Xiaomi Group

3.1. Necessity of Financial Application of "AI+RPA" in Xiaomi

3.1.1. Extensive Traditional Management Decision-making Model and Modern Enterprise Financial Development Mismatch

For traditional cost management decision-making, the enterprise reduces the direct production cost in the production process to the lowest possible level to achieve a good cost decision-making effect. For technology-based manufacturing companies represented by Xiaomi, the diversification of its business sectors, from R&D to sales, is the key consideration for the company's financial department to make cost decisions. To take high-cost performance as a competitive advantage, Xiaomi Group needs to reduce manual financial cost decision-making and optimize cost management in operation. "AI+RPA" can better improve the level of competition.

3.1.2. Cost-oriented Overall Strategic Needs

In April 2018, Lei Jun announced at the Xiaomi press conference that the comprehensive net interest rate of Xiaomi hardware would not exceed five percentage points. This move clarifies Xiaomi's positioning of its extremely cost-effective products and also reflects that Xiaomi is a cost-oriented technology company. The extremely low net interest rate brings pressure on cost decision management. Xiaomi needs a comprehensive financial cost management system to improve economic efficiency. In terms of Xiaomi's product business structure, mobile phones still account for the highest proportion, while the development of Internet products with high-profit margins is relatively slow.

All in all, Xiaomi's overall cost-oriented financial goals, and traditional manual finance has been unable to meet the needs of cost decision-making, so the conversion of the cost decision-making model, the implementation of more scientific and efficient "AI + RPA" combined with financial, in order to meet the needs of enterprise positioning.

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3.1.3. Realization of Various Types of Cost Data Collection

In the operation of an enterprise, the source of cost data is very complicated, and different channels will form different data information, which often leads to great differences in data formats. Using "AI+RPA" can realize the format conversion and deeper classification of cost information from different sources, and finally upload it to the cost decision-making system, and store it accordingly, which greatly helps the company to provide real-time and effective data mining and analysis in cost decision-making [7].

3.2. The Operation Mechanism of AI+RPA in Xiaomi's Finance

3.2.1. System Structure

The function of the data layer is data-related collection, analysis, storage, and transmission [8]. With the help of "RPA+AI" technology, the automatic data processing can be realized. The internal decision-making cost information, such as useful information, supplier information, and credit information, can be stored in the local database. Government policy, market, and legal information can be published on the Internet. In-depth analysis and extraction of these diversified data can form information that can meet the needs of cost decision-making and store it in the data warehouse. Based on these data, it is transmitted and submitted to the analysis and interaction layers to meet the needs of cost decision-making and make the cost decision-making more scientific and reasonable.

The analysis layer is responsible for cost analysis, forecasting, and decision-making activities. "RPA+AI technology analyzes and extracts the data in the data warehouse formed by the data layer to provide data sources for analysis for the three management systems. The system automatically retrieves the required knowledge, methods, and models according to algorithmic instructions. The artificial intelligence analysis system fully integrates a variety of different algorithms. In the actual use process, the knowledge, methods, and models that match it can be selected according to the needs of cost decision-making. At the same time, it can also realize the generation of portraits and cost decisions simultaneously [9]. A portrait is a description formed by processing a certain thing expressed by numbers with the help of a specific reasoning algorithm. For example, based on the data warehouse, the relevant data can be reasoned and analyzed, the description results of the corresponding enterprise can be obtained, and objective conditions such as cost performance and cost risk level can be analyzed in real-time so as to obtain an objective and accurate corporate portrait. At the same time, by analyzing the external environmental information faced by the enterprise, an external portrait can also be generated. In order to make the portrait more accurate, it is necessary to increase the amount of data collected. At the same time, it is also necessary to pay attention to the deep learning algorithm so that the description is more realistic and can better meet the needs of cost prediction so that cost analysis results can be integrated and the final cost decision can be made. In the whole process of cost decision-making, for the parts with high repeatability, logical certainty, and relatively low stability requirements, RPA technology can achieve cost decision-making faster. It can predict possible future decision-making goals based on previous analysis, forecasting, and decision-making needs, and perform related analysis during time periods when the cost decision support needs are low, such as the off-duty time of the enterprise, and improve the efficiency of the analysis. According to the portrait and the goal, the decision is optimized under the calculation of the deep learning algorithm.

The interaction layer is the decision maker that will cost decision objectives to the human-computer interaction system and human-computer interaction system after identification and transformation. The RPA + technology combined with the relevant data, system analysis, and the

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analysis of the decision results and then submitted to the human-computer interaction system to generate a decision report for decision makers to choose and use [10].

3.2.2. Working Principle of the System

The operation of a cost decision-making system is based on cost information but also needs the support of other decision-making information, and then according to a specific method or model, to complete the decision. Hence, the principle of its system operation also includes four points, one is useful information for decision-making, the second is a special decision-making method, the third is a special decision-making model, and the fourth is decision-making.

Decision-making useful information refers to the cost of decision-making. The information industry decision-making needs to use a variety of information, so the cost of the decision-making system does not filter the information collected to use more comprehensive information in decision-making. But the cost decision system will process this data information so some information related to decision-making can be better used. Use certain techniques to process unstructured data, extract information from it, and find key information. Through data mining, combined with the cleaned, structured data, the system can obtain high-quality useful information for decision-making, including the complex relationship between the data and the data.

The establishment of specialized decision-making methods is to obtain useful information for decision-making, but also through certain methods and models to be able to make cost decisions. Therefore, the bridge between information and decision-making is the method and model, which reflects the relationship between the two. Suppose someone wants to have an information record useful for decision-making. In that case, it will enter the information useful for decision-making into the system. The system will automatically make a decision. If the decision is correct, the neural network weight can be increased. Otherwise, it needs to be reduced. This is a process of systematic training. Through continuous training, the system will form its own decision-making method and make decisions through the model. The cost decision-making model is not fixed; relatively more complex and more powerful, and in continuous training, these methods and models will become more and more complex. Of course, the function will be more abundant, and the quality of decision-making will be improved.

The system starts the decision support program when it receives the decision target. The cost decision-making system will combine the decision-making goals by itself and choose the appropriate method and model obtained in training to make the decision. And after calculation and analysis, a decision is finally made.

3.3. Specific Model Design of Cost Decision System Based on “RPA+AI”

According to the business process of Xiaomi Company, based on the operation mechanism of the cost decision system based on "RPA+AI" proposed above, the system modules are set up into four parts: recommendation system and data mining module, intelligent decision prediction module, data collection interaction module, information supervision, and feedback module. The rule base here refers to analyzing cost decision cases and designing models. It is mainly used to solve cost risk prediction problems and deal with cost risks. The number of rule bases comes from, first of all, professional knowledge, setting up indicators, and clarifying the scope of data. The second is the experience in dealing with cost risks, and these experiences and methods are established into models. Finally, it summarizes the handling rules through the operation process and the case of the heavy company's cost risk. The recommendation system and data mining module are mainly based on collecting cases, establishing a rule base, and using it as the standard for cost decision-making. The intelligent decision prediction module judges the legitimacy and compliance of cost decision-making

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based on the rule base and reminds irregular items. The data collection interaction module publicizes the business processing results. The rule base is transparent so that company personnel can understand the business processing information in advance and make data preparations. The information supervision and feedback module analyzes the process and summarizes and updates the rule base information.

4. AI+RPA-based Technology Status and Optimisation

4.1. Current Status and Problems with the Deployment of the Xiaomi Group's Traditional Model

4.1.1. Current State of Deployment

RPA can effectively empower finance, something that Xiaomi understands. In 2017, Xiaomi examined RPA technology, launched RPA selection in 2018, landed RPA applications in 2019, and explored RPA+AI in 2020. in just four years, Xiaomi has completed the application of RPA from shallow to deep.

It should be stressed that the gradual improvement of the company's financial information technology is responsible for the rapid success of Xiaomi's RPA exploration. Previously, Xiaomi spent seven years completing the construction of a 5+2 financial informatization framework, including five professional systems: an accounting and reporting system, capital management system, tax management system, budget management system, and risk management system, as well as two platforms: digital operation platform and shared operation platform.

Although Xiaomi is a latecomer in RPA exploration, Xiaomi has been thinking about how to do RPA well and how to take the lead later. Specifically, firstly, Xiaomi wanted to complete RPA deployment quickly, and finding a good partner was key, so Xiaomi chose UiPath; secondly, Xiaomi wanted to develop its own RPA capabilities and integrate its strong AI capabilities into it, so that many subsequent business deployments could be led by itself. The results of RPA's deployment have been significant in optimizing finances and the company as a whole.

Xiaomi has seen a 15-fold improvement in overall financial efficiency after deploying RPA, involving 12 monthly closing processes and completing the deployment of 20 projects.

4.1.2. Existence of Problems

As the Xiaomi Group has many entities and a large business volume, the amount of uncleared item data of customers in just one month is in the millions. In addition, the Group's business involves different businesses such as finance, Internet, hardware, etc. Different businesses under different subjects have different rules for using voucher line item fields, and the clearing configuration rules can only be unified across the Group. This is not flexible enough, and lacks functions such as correlation and fuzzy summary matching, all issues that need to be addressed.

4.2. Technical Optimisation and Improvement

Traditional technology and RPA cannot fully automate the clearing of accounts, so Xiaomi has created the "RPA + AI" intelligent clearing robot after three months of testing and deployment with its own AI technology. With this combination, Xiaomi has now cleared accounts for over 1,000 suppliers and customers. Not only has it freed up manpower, but it has also delivered significant results, with an 82% success rate of data matching and a 100% accuracy rate.

The process includes processing cumulative emails and performing performed SAP clearing operations. It also is relevant parties of clearing results, performing SAP uncleared accounts

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downloading operations, data processing AI analysis, and business receiving matching result emails in six major parts, all completed by RPA in collaboration with AI. It can be said that with such an intelligent and automated combination of RPA + AI, Xiaomi has accomplished tasks that the traditional model could not accomplish.

The intelligent account-clearing robot is an innovative move in Xiaomi's history, which not only achieves cost reduction and efficiency and provides new ideas and thinking for Xiaomi's internal innovation. Looking to the future, Xiaomi will start the first year of smart finance, using the combination of RPA + AI to create a digital workforce belonging to Xiaomi, to promote the smart transformation of finance, to achieve cost reduction and efficiency, and to commit to transforming this internal capability into a new service model to add to the digital transformation of customers.

5. Conclusions

5.1. Research Findings

Based on the actual situation of Xiaomi Technology Company and the practical research on cost decision-making, artificial intelligence, and robotics, the basic cost decision-making of Xiaomi Company was built using "AI+RPA" technology, and the following conclusions were reached after the preliminary design.

"AI+RPA can positively impact Xiaomi's costs, making cost analysis more comprehensive and specific, highlighting useful cost information, and improving the effectiveness and timeliness of cost decisions. At the same time, it provides decision-makers with effective information. It makes decisions more accurate and objective, thus enabling higher quality decisions and more positive development guided by the decisions. And while robots make decisions, they can also better vet-makers and have a leadership role in decision-making. "AI+RPA is a better leader of cost decisions, not a replacement.

The new system has three main components: the data, analysis, and interaction layers. In the new system, the data collected in each database is sorted and mined. The portraits are stored in the general database and matched to the purpose of the decision so that the decision is scientifically derived and the decision maker is constantly refining the decision in the robotic decision. Different paths are taken for different problems, with complex decisions made by human-robot interaction, while for less complex problems, the machine system makes its own decisions.

5.2. Research Direction

For technology companies with a high turnover rate, it is imperative to establish a cost and financial decision system that gives "AI+RPA". "AI+RPA" analyses the information gathered and makes decisions, and the results can be tracked and predicted. This helps to improve daily work efficiency.

In addition, there is little research on this "AI+RPA" technology at home and abroad, and it is highly specialised, so we are still at the learning stage.

References

[1] *Yuan, Q., Li, Y. F. Research on the Application of RPA Financial Robot in Financial Shared Service Center.Modern Commercial Industry,2023,44(01):141-143.DOI:10.19311/j.cnki.1672-3198.2023.01.043.*

[2] *Cheng, P., Deng, X. U. RPA Financial Data Analysis Robot: Theoretical Framework and R&D Strategy. Friends of Accounting, 2022, No. 685(13):148-155.*

[3] *Ge, W., Hang, C. Application practice of RPA technology in the digital transformation of financial management of power grid enterprises. Management Accounting Research,2020,3(05):76-85+88.*

[4] *Du, H. X., Liu, Y. X., Chen, L., Li, N., Wu, X. J. Application Practice of Gome RPA in Financial Scenarios. Finance and Accounting, 2021, No. 633(09):28-32.*

[5] *The World Of Finance. The financial RPA market is in turmoil, from entry to breakthrough, see how Siku Cube plays with black technology.May 24,2022.Retrieved on March 4, 2023.Retrieved from:https://baijiahao.baidu.com/s?id=1733687010124979568&wfr=spider&for=pc*

[6] *Easy Pie. What are the main functions of a financial robot.April 22,2022.Retrieved on March 4, 2023.Retrieved from:https://www.easypie.com/news/content/MTU=*

[7] *Wang, S. Research on Enterprise Cost Decision System Based on "RPA+AI". Chongqing University of Technology, 2021. DOI:10.27753/d.cnki.gcqgx.2021.000373.*

[8] *Yang, C. H. Research on the application of RPA robots in the financial field. China Management Informationization, 2023, 26(01):57-60.*

[9] *Song, T. A Preliminary Study on the Application of RPA in the Intelligent Transformation of Enterprise Finance. Volkswagen Investment Guide, 2022, No. 414(22):107-109.*

[10] *Ji, Z. H., Shen, J. L., Wu, X. H. Research on the application of RPA in the digital transformation of corporate finance. Financial Management Research, 2022, No. 37(10):73-78.*