Research on Export Tax Refund Declaration Robot Based on RPA

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Abstract: In recent years, with the export tax refund comprehensive service companies and higher vocational colleges to deepen the cooperation, “First-year students do not learn the theory of export tax refunds, it is difficult to quickly qualified for the job; second-year students have heavy schoolwork, it is difficult to guarantee enough working hours; third-year students after just getting used to the work will face leaving the school ,” and other issues are increasingly prominent. This paper proposes to make a RPA-based export tax refund declaration robot to try to solve the above problems. This method achieves satisfactory results in practice, and compares it with the python-based export tax refund declaration robot, which shows the advantages of choosing RPA technology.

Keywords: RPA, Export Tax Refund Declaration, Robot.

1 INTRODUCTION

Both the impact of the “Belt and Road” policy and the opportunity of the "Post-epidemic era" have contributed to the rapid development of our export trade, at the same time also makes the export tax refund agent declaration demand rapid growth. The export tax refund comprehensive service companies began to cooperate with higher vocational colleges, and students completed the export tax refund agent declaration for companies every month. In the course of cooperation, the following problems appeared: first-year students do not learn the theory of export tax refunds, it is difficult to quickly qualified for the job; second-year students have heavy homework, it is difficult to guarantee enough working hours; third-year students after just getting used to the work will face leaving the school. The results of the collaborative process are not ideal.

Robotic Process Automation (RPA) is to simulate, enhance and extend the interaction process between users and computer systems according to ore-set business processing rules and operation behavior by using and understanding the enterprise's existing applications through user interface, automatic completion of a series of specific workflow and expected tasks, effective implementation of people, business and information systems integration of intelligent software [1]. If RPA can be applied to export tax refund agent declaration, to complete repetitive, applicable and regular tasks, teachers and students can focus on more valuable work,

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it can also increase the speed while ensuring the quality of work and laying the foundation for long-term school-enterprise partnership.

The research of RPA technology has been abundant in the field of finance and economics, but the research in the field of finance and economics is obviously more than that in the field of tax, and none of them involves the declaration of export tax refund. Based on various practical problems encountered in the agent declaration of export tax refund for enterprises in the cooperation between schools and enterprises, the design framework of RPA-based export tax refund declaration robot is proposed for the first time, the other parts of the article are as follows: the second part combs the workflow of export tax refund agent declaration and business “Pain Point” ; The third part introduces the implementation process of the system; the fourth part shows the effect of the system in practice, and compares it with the robot based on python to explain the reason of choosing RPA; the fifth part is the conclusion.

2 DESIGN AND ANALYSIS OF RPA-BASED EXPORT TAX REFUND DECLARATION ROBOT

The export tax refund declaration is divided into two types: the export tax refund declaration of the manufacturing enterprise and the export tax refund declaration of the foreign trade enterprise, but the agent declaration is mainly for the foreign trade enterprise, therefore, RPA-based export tax refund declaration robot mainly based on foreign trade enterprise export tax refund declaration process to conduct a comprehensive analysis, identify the most complete business flow, lay the foundation for automated process design. The business process of export tax refund declaration of foreign trade enterprise after reconfiguration mainly includes: system login, data collection, tax refund declaration, system reinstallation.

2.1 System Login

The export tax refund agent declaration work of the foreign trade enterprise is completed by the robot automatically, but because of the design limitation of the export tax refund declaration software of the foreign trade enterprise, the business “Pain Point” of this process is: the agent declaration is divided into the first declaration and the others, the two types of declaration workflow is different, the first declaration needs to fill in the enterprise's basic information, then you can enter the business data filing, and the others can enter the business data filing directly. The enterprise's basic information filing page is shown in Figure1 below. Therefore, when designing the RPA-based export tax refund declaration robot, after each declaration, the software will be unloaded and reloaded directly, and the first declaration workflow will be adopted at the beginning of the declaration.

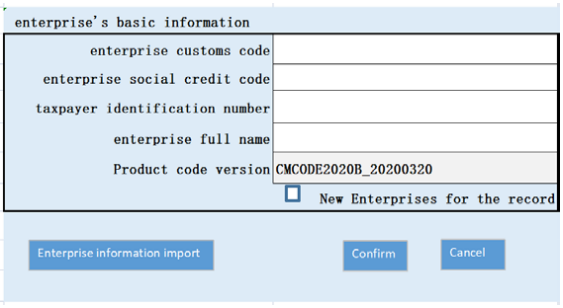

Figure 1. The enterprise's basic information filling page.

2.2 Data Collection

This part of the work first needs to be carried out by the export enterprises in accordance with the requirements of the export tax refund comprehensive service companies, provide the following information: enterprise basic information, customs declaration form, export agent certificate, purchase invoice, export invoice and so on. The export tax refund comprehensive service companies according to foreign trade enterprises export tax refund declaration needs, relevant data collection. It is necessary to collect a great deal of business data for export tax refund agent to declare, and the order and content of data collection are different because of the difference between enterprises and business, so the work is both tedious and time-consuming, has been considered the biggest ”Pain point”. But because data collection is the starting point of all agent declaration work, its accuracy often determines the accuracy of the whole agent declaration work, the staff's financial knowledge, business familiarity, work sense of responsibility are higher, therefore, according to the content and sequence of tax refunds to produce data collection forms, RPA-based export tax refund declaration robot is able to efficiently complete the work of the necessary foundation, as follows Table 1.

TABLE I. DATA COLLECTION TABLE OF RPA-BASED EXPORT TAX REFUND DECLARATION ROBOT

The enterprise's basic information			
Enterprise Customs Code		Social Credit Code	
Enterprise full name		Declaration period	
Export information			
Serial number		Export Declaration number	
Agency reference number		Export Invoice number	
Export date		Export Commodity Code	
Export quantity		FOB USD	
Purchase information			
Correlation number		VAT special invoice number	
Date of purchase invoice		Supplier's tax code	
amount purchased			

Where the declaration period in accordance with the export tax refund declaration requirements for collection, collection principles are: If the export date is this year, then the collection of export date; if the export date is not this year, then the collection of export date is last December.

2.3 Tax Refund Declaration

This step can be completed automatically by the RPA-based export tax refund declaration robot, after which manual review is required, it mainly compares the export tax refund amount formed by the export tax refund software with the input tax amount in the input invoice, determines whether the tax refund is complete, and considers the difference between the input tax rate and the refund rate, if you find any problems, you can check the data collection form and the declaration form generated by the system. The checking formula is as follows:

$$\text{Purchase amount} \times \text{tax refund rate} = \text{tax refund amount} \tag{1}$$

The declaration form is as follows: Figure 2, Figure 3.

Export detail declaration form for Foreign Trade Enterprises													
enterprise social credit					declaration period				Batch				
Full name of enterprise													
Tax Refund													
Value Added Tax				Consumption tax					Unit of value:yuan				
Serial number	Correlation number	Export Invoice number	Export Declaration number	Agency reference number	Export date	Export Commodity Code	Name of export commodity	Unit of measurement	Export quantity	FOB USD	Declare the commodity code	Types of tax refund and exemption business	Notes
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Subtotal													
Total													
Signature of the taxpayer:											year	month	day

Figure 2. Export detail declaration form.

Import detail declaration form for Foreign Trade Enterprises															
enterprise social				declaration period					Batch						
Full name of enterprise															
Tax Refund															
Value Added Tax				Consumption tax					Unit of value:yuan						
Serial number	Correlation number	Taxes	Type of voucher	No. Of purchase voucher	Taxpayer identification number	Date of purchase invoice	Export Commodity Code	Name of export commodity	Unit of measurement	Quantity	Amount of tax payable	Tax rate	Tax Refund rate	Tax Refund	Notes
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Subtotal															
Total															
Signature of the taxpayer:													year	month	day

Figure 3. Purchase detail declaration form.

2.4 System reinstallation

Foreign trade enterprises export tax refund after the installation of the declaration software can only be declared for one enterprise, if the second enterprise to declare the need to unload

reinstalled, which will not only extend the work cycle, it will also reduce work efficiency, but as mentioned earlier, the RPA-based export tax refund declaration robot will automatically install the software after each declaration, and the robot can work on its own for 7 x 24 hours, therefore, compared with manual declaration, RPA-based export tax refund declaration robot can better solve this problem.

3 THE DEVELOPMENT AND REALIZATION OF RPA-BASED EXPORT TAX REFUND DECLARATION ROBOT

3.1 System Login

Before the formal declaration, it mainly includes three steps: Login system, enterprise information collection and declaration period. The RPA design functions used mainly include: mouse click, excel cell reading, simulated keys, the detailed flow is shown in Figure 4 below. In this process, we need to set four variables: ckrq_1.ckrq_2.ckrq_3.ckrq_4.

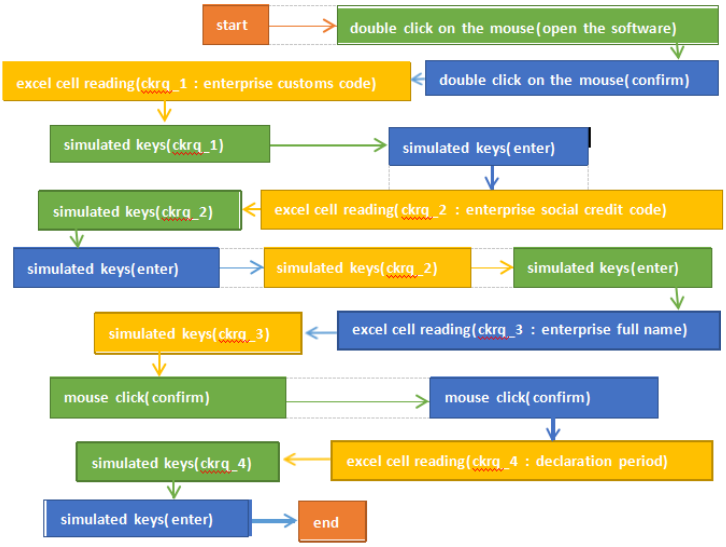

Figure 4. RPA-based export tax refund declaration robot login design flow chart.

3.2 Data Collection

There are two kinds of data collection for export tax refund declaration of foreign trade enterprises: export detail data collection and purchase detail data collection. The RPA design functions used in export detail data collection mainly include: mouse click, excel cell read, simulated keys, trajectory moving, set variable, the number of worksheet rows, while loop, add and subtract, the detailed flow is shown in Figure 5 below. In this process, we need to set eight variables: hs_1.lv_1.ck_1.ck_2.ck_3.ck_4.ck_5.ck_6.

Figure 5. RPA-based export tax refund declaration robot export detail data collection design flow chart.

The RPA design functions used in purchase detail data collection mainly include: mouse click, excel cell read, simulated keys, trajectory moving, set variable, the number of worksheet rows, while loop, add and subtract, the detailed flow is shown in Figure 6 below. In this process, we need to set seven variables: hs_2.lv_2.jh_1.jh_2.jh_3.jh_4.jh_5.

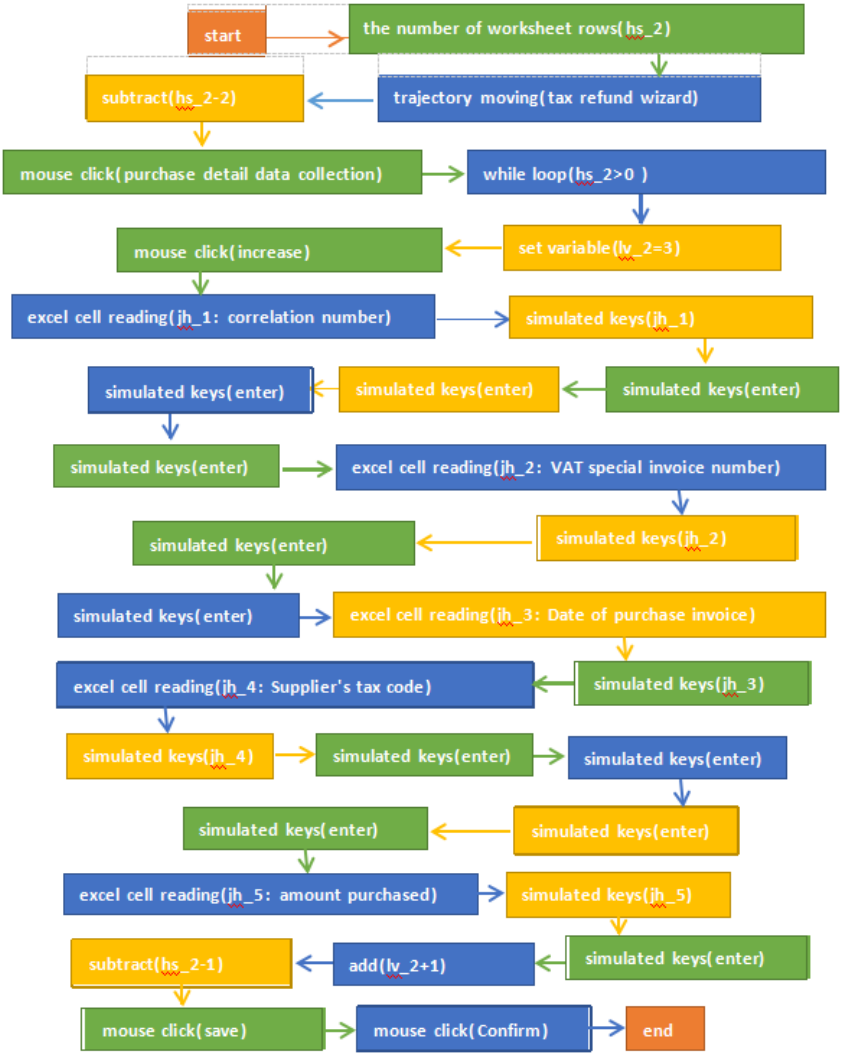

Figure 6. RPA-based export tax refund declaration robot purchase detail data collection design flow chart.

3.3 Tax Refund Declaration

After the information is collected, we can do tax refund declaration. The RPA design functions used in tax refund declaration include: trajectory moving and mouse click, the detailed flow is shown in Figure 7 below.

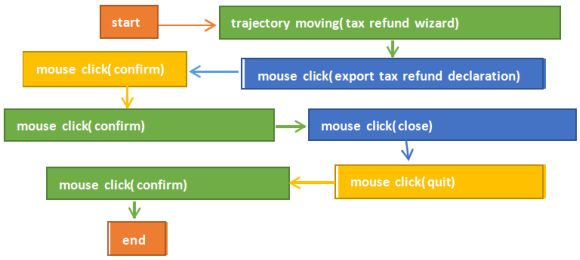

Figure 7. RPA-based export tax refund declaration robot export tax refund declaration design flow chart.

3.4 System Reinstallation

After export tax refund declaration, we can do system reinstallation. The RPA design functions used in system reinstallation include: trajectory moving, mouse click, simulated keys and mouse scrolling, the detailed flow is shown in Figure 8 below.

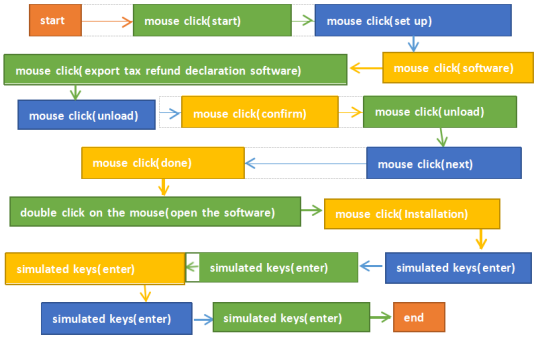

Figure 8. RPA-based export tax refund declaration robot system reinstallation design flow chart.

4 APPLICATION EFFECT OF RPA-BASED EXPORT TAX REFUND DECLARATION ROBOT

4.1 Shorten the Cycle of Agent Declaration

Through the introduction of RPA technology, re-export tax refund agent declaration process, business restructuring before and after the comparison of the following figure 9.

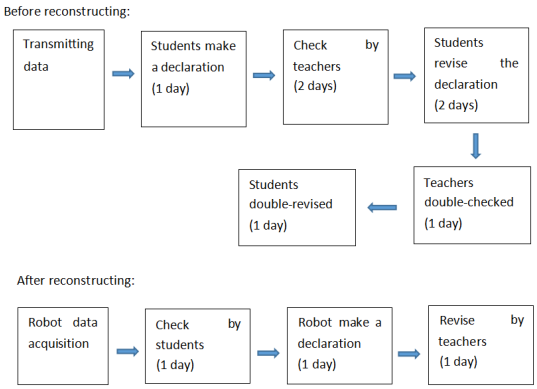

Figure 9. The workflow after RPA reconstructing.

Before using the RPA-based export tax refund declaration robot, the export tax refund agent declaration process is as follows: the original data is transmitted between the school and the enterprise; the students use the export tax refund software to declare for the first time, this process takes 1 day; teachers to review the results of declaration, because of the limited number of teachers, declaration data need to be manually compared with the original data, this process takes 2 days; according to the results of the review of students to apply for revision, because the software modification process is more complex, the process also needs 2 days; teachers to double-check, the process takes 1 day; students to double-revise, this process takes 1 day; the whole process takes 7 days. After using the RPA-based export tax refund declaration robot, the export tax refund agent declaration process is as follows: the school and the enterprise use excel to transfer declaration data; the student carries on the declaration data review, this process takes 1 day; the robot automatically declare, this process takes 1 day; the teacher reviews the result, this process takes 1 day; the whole process takes 3 days. In addition to the above reduction in the overall filing cycle from 7 days to 3 days, because filing data with preset rules was passed directly in excel and automated filing was done using RPA, put an end to the occurrence of errors in manual declaration and the application of rules, and greatly improve the efficiency of the whole agency declaration.

4.2 ADVANTAGES oF RPA-BASED EXPORT TAX REFUND DECLARATION ROBOT

Python-based export tax refund declaration robot is far less effective by comparing with RPA-based export tax refund declaration robot. Firstly, Python uses coordinate orientation, so the software cannot run after the computer screen changes, and the universality of the robot is affected. Secondly, Python requires a high level of knowledge of computer theory, and students often just use it, cannot participate in software updates, so students can not be motivated to participate. But RPA uses visual low-code development, students can update the software directly according to their own ideas, and choose the best software by comparing the results. Finally, RPA development skills are much more transferable than Python, providing a foundation for students to use RPA technology at work in the future and enhancing their career capabilities.

5 CONCLUSIONS

The development of RPA-based export tax refund declaration robot can effectively solve all the problems encountered in the school-enterprise cooperation, and greatly improve the speed and accuracy of the export tax refund agent declaration, it also provides an effective reference for the use of RPA in the field of tax declaration in the future.

The RPA-based export tax refund declaration robot can simulate the simple and repeated operation of human beings. Most of the work in the export tax refund declaration has the characteristics of fixed flow, clear rules and high repeatability. After these links are handled by the robot, the requirements for students to master the professional knowledge are greatly reduced, first graders can also get up to speed quickly. Third-grade students do not need to spend a lot of time in familiar with the tax refund process, can be in a short time to complete multiple export tax refund experience, to achieve the goal of school-enterprise cooperation.

The RPA-based export tax refund declaration robot can work in 7 × 24-hour mode, has high peak processing ability, can work at any time with high intensity, and greatly reduces the working time requirement for students, second graders can do all the work without affecting the teaching schedule.

The RPA-based export tax refund declaration robot is suitable for handling large amount of error-prone business. The error-prone links are automatically completed by the robot through the rule setting, which greatly improves the accuracy of data processing. The integration and verification of data are also done automatically by the robot, which can shorten the work cycle and reduce the workload of teachers and enterprises.

On the one hand, the RPA-based export tax refund declaration robot needs to be changed according to the export tax refund policy and the change of the export tax refund software, on the other hand, it needs to be perfected continuously in the process of use, it can further improve the working efficiency of the robot and make it more humanized.

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