

RPA Implementation in Banking

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Abstract: *In recent years, Robotic Process Automation (RPA) has attracted much attention. With predetermined programs, it can execute tasks that are rule-based, high-information, and repetitive. Nowadays, RPA is used in many areas such as finance, manufacturing, accounting, retail, and supply chains to save time and improve efficiency. However, RPA is seldom used in banking. This thesis conducts a comprehensive analysis of RPA technology, proposing practical suggestions for applying RPA in banking scenarios. The study introduces the concepts, characteristics, and industry status of RPA and presents a case study of a bank integrating RPA; this case study quantifies the cost reduction and efficiency promotion for a particular bank. In addition to the potential benefits, the study also highlights risks and challenges of adopting the RPA technology and proposes efficient methods to mitigate them. Based on the analysis and extensive literature review, this study develops a 5-Step RPA Application Model and introduces three sourcing modes for RPA adoption in the banking industry. Finally, some directions for future research are presented.*

Keywords: Robotic Process Automation.

I. INTRODUCTION

RPA is a kind of software robot that performs daily, repetitive, and rule-based tasks similar to human employees, making the existing work faster, more accurate, and more efficient. RPA is the technological imitation of workers with the goal of automating tasks. Although traditional forms of process automation (like screen recording, scraping, and macros) rely on the computer's user interface, RPA's core function is via element identification and not by screen coordinates. Unlike traditional methods, RPA is not part of the information infrastructure but rather sits on top of it, implying a low level of intrusiveness, possibly reducing costs.

According to Webinar with Everest Group for Evolution of Robotic Process Automation, the development of RPA technology can be divided into three stages:

1. It is based on a principled and structured system to process data in large quantities. For example, it extracts the rule data from email, inputs it into the spreadsheet, stores the data in the internal database, and sends emails to customers and employees.
2. It is based on unstructured data and information, deals with more complex work. For example, it uses optical character recognition (OCR) tools to input irregular data into different systems or makes full use of chat robots and voice recognition technology to conduct real-time customer service.
3. It is combined with artificial intelligence to deal with cognitive and judgmental tasks. In this stage, RPA is based on professional algorithms, recommends the optimal results, and makes an assistant decision. For example, a robot can recommend the best products to customers, use machine learning for a loan review, and use professional algorithms for insurance approval. In the future, artificial intelligence will integrate with RPA to drive cognitive automation.

II. BENEFITS OF RPA

RPA will bring huge business opportunities because it will improve employees' productivity and the whole workflow efficiency. Automation is conducive to managing repetitive tasks and standardizing workflow. The main benefits resulting from the implementation of RPA are:

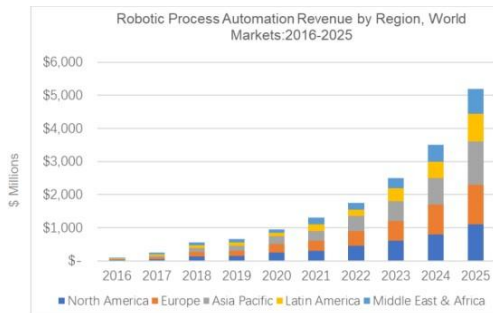
1. Save cost: "RPA implementation facilitates cost reduction of 25% to 75% by improving the performance indicators of the applied functions while maintaining production quality" [1]. According to Jones Lang Lasalle,

a real estate consultant, it is expected that the consequence of automation of banking processes will reduce the number of branches up to 20% within five years and reduce the size of an average bank branch from 5,000 to 3,000 square feet, which will save as much as USD 8.3 billion annually [2].

2. **Improve productivity:** with the application of RPA, the saved human resources can be used for higher value-added work. RPA will promote the new team division mode of "machine + 8 human" and make the whole system more efficient. For example, robots can manage information, generate reports, be responsible for data operation and maintenance, and manage accounts; people can handle special businesses, analyze reports, and regularly check business operations. RPA has no working time limitation and can handle global affairs 24 hours a day.
3. **Reduce work errors:** as long as the logic setting is correct, the correct results can be obtained, the error rate would be low, and the data is safe and reliable. If RPA is applied to repetitive tasks, the errors caused by manual operation can be reduced.
4. **Keep information confidential:** unlike other cost reduction methods (such as business outsourcing), RPA can keep all confidential information within the scope of internal staff management.
5. **Integrate different systems:** different types of work and multiple system architectures can be integrated into the same RPA system. At the same time, the RPA system has flexible deployment and robust scalability.
6. **Reduce business response time:** RPA can quickly reply to customers' questions in a standardized manner, improve customer experience, and provide high standard service for a large number of customers at the same time. In summary, RPA can assure operational and economic benefits. Banking business process automation can protect customer interests and ensure business succeed. This thesis will introduce industry status and banking business processes suitable for RPA adoption in the next section.

III. BUSINESS RPA ADOPTION

Market Size for RPA Driven by companies seeking to improve their customer experience and simplify their business operations, RPA has developed rapidly in recent years. According to the latest Gartner, Inc. forecast, PRA software revenue is projected to reach \$1.89 billion in 2021, increasing by 19.5% from 2020. By 2024, Gartner still predicts a double-digit rates growth in RPA markets from the COVID-19 pandemic [3]. shows the PRA market size by region. Worldwide RPA Software Revenue (Millions of U.S. Dollars)



RPA application in different industry segments

Banking	Insurance	Telecom	Retail	Manufacturing
Know Your Customer	Claims processing	Credit checks	Product categorization	Bill of Material (BOM) processing
Loan processing	Appeals processing	SIM swapping	Automated returns	Inventory Control
Trade execution	Responding to partner queries	Customer dispute resolution	Trade promotions	Proof of Delivery
Same day funds transfers	Form Registration	Porting customer numbers	Supply chain management	Data Migration
Account Closure	Premium renewals	Report generation	Online sales	ERP Automation
Validating and processing online loan applications	Regulatory Compliance	Simple query forwarding	Inventory monitoring	Administration and reporting
Audits	Risk Mitigation			

V. RPA ADOPTION IN BANKING

According to Grand View Research, “the banking and financial services industries were market leaders in RPA adoption in 2019, accounting for a 29% share of the global revenue” [4]. Banking Insurance Telecom Retail Manufacturing Know Your Customer Claims processing Credit checks Product categorization Bill of Material (BOM) processing Loan processing Appeals processing SIM swapping Automated returns Inventory Control Trade execution Responding to partner queries Customer dispute resolution Trade promotions Proof of Delivery Same day funds transfers: Form Registration Porting customer numbers Supply chain management Data Migration Account Closure Premium renewals Report generation Online sales ERP Automation Validating and processing online loan applications Regulatory Compliance Simple query forwarding Inventory monitoring Administration and reporting Audits Risk Mitigation 13 This is because many banking business processes involve repetitive, rules-based, and laborintensive tasks that can be easily be automated. The most suitable business process must have the following characteristics:

1. It can obtain high productivity with low-cost input, save time and reduce cost.
2. The business process chosen to apply RPA is stable and will not change frequently, so the RPA related procedures do not need to be updated frequently.
3. The business process does not involve much outdated tech. RPA software might not be compatible with legacy infrastructure [4]. Moreover, the on-premise infrastructure should be updated in real time to help with implementing an RPA system [5]. This thesis summarizes three bank business areas where RPA can be implemented based on the business process characteristics, which will be described in the following sections.
 - 2.4.1 The basic repetitive manual work The basic repetitive manual work includes simple data entry, document filing, information identification, and data transfer. For example, employees are required to manually transcribe all customer handwriting information into the bank system. That handwritten information can be automatically verified, extracted, edited, and converted to electronic form by RPA and intelligent Optical character recognition (OCR) solutions [5].
 4. Loan processing: customers need to submit paper financial statements, credit checks, employment verification, and tax payment certificates to the bank. RPA can validate and cross-check that information, and then decide whether to approve the loan or not based on specific rules. 14
 5. Credit card approval: the bank uses RPA to input all kinds of customer application information and check the credit, collaterals, and risks. After the condition assessment, RPA can straightforwardly process the card personalization, delivery, and activation.
 6. Customer service response: RPA can collect customer complaints made by email, telephone and on the website and then automatically provide solutions in real-time and reduce turnaround time to seconds. 2.4.2 Cross-system check process The bank extracts data from the external system and then cross-checks the authenticity and accuracy of the data provided by customers. Cross-system checks include the most basic customer identification checks and suspicious banking transactions catching. This business process aims at anti-money laundering and preventing corruption. Banks need to identify customers, prove the legal source of funds, and strengthen monitoring of holders’ account. Also, the bank can connect with the national tax system, provide the tax bureau with the account holders’ transaction information, and collect tax payment information from the system to review the accuracy of tax declarations and deductions. 2.4.3 Frequently used and stable operation management system.

Considering the development and the following update cost of the RPA platform, banks should first develop it with a stable business process. If the application technology or process often changes with the market, the RPA software needs to be updated frequently. The most frequently used and stable bank' operation management systems include Customer Relationship Management (CRM), Enterprise Resource Planning (ERP) system, internal audit system, and document management system. These kinds of operating systems are less affected by market changes and should be prioritized when applying RPA.

Time saved after applying RPA

According to the calculations shown in Table 3, if the bank applies RPA combined with AI technology, the robot can automatically validate and approve the application within 7 minutes. So, it could save 43 minutes per application

compared with an employee.

Table Time consumed in each specific process

	Information received from online channels and download	Transcribe Customer Information into the Bank Platform	Credit Scoring & Risk Assessment	Decision making	Total Time Consuming
Manually (Mins)	5	20	20	5	50
AI+RPA (Mins)	5	1.8	0.1	0.1	7

Risks

There are many ways that RPA can lead to risks if not handled effectively. Below are the three most common RPA application risks we regularly encounter, along with suggestions on how to mitigate them: design risk, data-security risk, and bank system inherent risk.

Design Risk

Not every process or task is suitable for automation. Repetitive, time-consuming, and rulebased processes are the ideal areas for applying RPA [20]. It is manually performed with a high 19 level of consistency but requires little judgment. If the bank chooses an unsuitable process, the RPA application will not deliver enough value to the investment.

Data-Security Risk

Due to the particular characteristics of the banking business, RPA will hold a large number of organizational passwords and credentials to access various information of employees, customers, and suppliers through accessing databases and performing operations. Once manipulated, a large number of confidential business data will be modified or leaked. This data security risk involves unauthorized users accessing confidential data through the RPA platform and connecting data sources without permission. Unauthorized users, such as internal bank employees, RPA suppliers, and malicious hackers, can access the bank's internal databases, network servers, and cloud storage through the RPA platform, stealing confidential data and damaging its specific functions.

Bank System Inherent Risk

Because the RPA robot controls other software through UI interaction, the development and use of RPA rely heavily on the existing software infrastructure, which is still part of the bank's IT infrastructure. Once the existing platform has problems, RPA must quickly diagnose the problem and find solutions. Also, RPA must activate updates in time if there are updates in the existing software. Otherwise, the RPA robot will stop working and create operational disruptions.

Ways to Mitigate Risks

It is advisable for banks to establish a business performance team to conduct a detailed analysis to identify and prioritize the automation process. The developer needs a clear version of the existing system where RPA will deploy. The bank also needs to assess the operational issue's 20 impact and the efficiency gains that RPA will deliver. Each selected process would deliver much more value to the bank if performed more frequently or continuously with a bot's help [6]. To ensure data security, the bank should protect both the data being transmitted and the user who needs to access the data. Based on the HTTPS (SSL) transmission protocol, banks have to encrypt login information and sensitive data; establish unified identity authentication and system authority; include internal audits to record the system operation and access log. The bank also needs to "limit the bots' access by implementing the principle of least privilege and granting them privileged access only to the specific applications they need to perform their tasks" [7]. The way to mitigate inherent system risk is to create detailed, desk procedure level documentation for each process so that users could be well prepared for disruptions. Another way to mitigate the inherent risk is to establish an abnormal early warning notification mechanism and also to monitor the operation status in real-time.

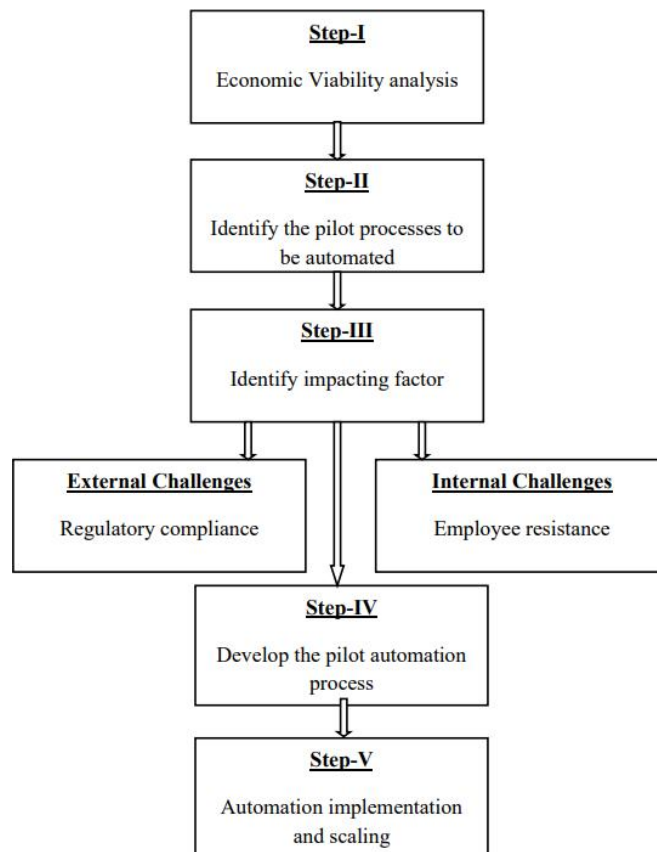
Steps to implement RPA in a Bank

RPA Application Model Based on the above analysis and extensive literature review, this study develops a model for RPA application in the banking industry. The 5-Step RPA Application Model for Banking is divided into the five steps

of the implementation process.

- Step 1: Economic viability analysis. The bank’s strategic plan should be based on the return on RPA adoption investment. The bank should measure the cost and savings achieved over time with the adoption, and evaluate the existing system, map all of the people involved this process, and assess process automation feasibility. The related costs involve cost of automation, time and change management cost, estimation of return on investment, and scaling of the job fit for automation [8].
- Step 2: Identify the pilot processes to be automated. The critical analysis should be done in process scope and fit with current baseline [8]. According to this study’s analysis in 2.1, it is better for the bank to choose an introductory test drive to apply RPA to basic repetitive manual work, cross-system checks, and frequently used and stable operation management systems. This step will reduce both the learning curve and risk of failure [7].
- Step 3: Identify internal and external challenges and risks. “Critical analysis of impacting factors is the core element of transformation” [8]. External challenges come from compliance with the statutory obligations. The bank should clearly study government regulations before any transformation. Moreover, internal resistance may come from “employees who distrust change and fear such measures will make their own jobs obsolete” [9]. Clear communication, training, 24 and engagement will reduce employee resistance and provide valuable insights into the change process.
- Step 4: Develop the pilot automation process. Once the bank has the workflow properly mapped, it needs to choose the sourcing method according to the selected automation process. The next section will introduce three sourcing modes for banks to apply RPA.
- Step 5: Automation implementation and scaling. Broaden the application to the enterprise-wide scope after learning from the pilot testing.

VI. STEP RPA APPLICATION MODEL



VII. CONCLUSION

This study presents an investigation of applying RPA in the banking industry. It was based on the analysis of RPA's concepts, characteristics, benefits, and risks. The main benefits of applying RPA, such as cost reduction, productivity improvement, and error reduction, have been proved. The case study has revealed the cost reduction and efficiency improvement of RPA. Robots implemented in the credit card processing sector could validate and approve the application within 7 minutes, while an employee needs 50 minutes for the same process. This efficiency improvement could save a bank \$36 million a year.

However, banks still need to consider the risks, such as cost and possible risks of implementing RPA include development costs, maintenance costs, information confidentiality, and operational security. By analyzing RPA technology characteristics, business owners should prioritize the business processes with lower development costs and higher outputs. Employees in banks may be skeptical about and resistant to RPA. It is important to communicate the value and launch tactical pilots to make visible those benefits. The bank should focus not only on improving organizational performance but also on investigating the influence on employees so that an optimum balance can be established. A 5-Step RPA Application Model for Banking has been developed, along with three sourcing modes to implement RPA for the bank's business process. When it comes to deciding on the application of RPA, banks should set realistic goals and expectations and not misuse it for an isolated area.

Although RPA technology can drive innovation and maximize competitiveness, it is not suitable for all processes. Banks should constantly monitor their business process to identify the processes suitable for applying RPA. The combination of RPA and AI technology brings a significant change in the business process, affecting the workflow of digital processes throughout each industry. Technologies like OCR, NLP, and ASR are being integrated with RPA in the business process where unstructured information is analyzed. Future studies are required on cognitive automation tools.

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