

Research on Audit Agents Based on RPA Technology: A Case Study of Deloitte's Financial Robot

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Abstract: Traditional audit processes involve numerous repetitive, rule-based manual tasks that are inefficient and prone to errors. The emergence of RPA (Robotic Process Automation) technology offers a viable solution to these challenges. Using Deloitte's financial automation tool "Xiao Qin Ren" as a case study, this paper employs a single-case analysis approach to examine RPA's application scenarios, operational mechanisms, and implementation outcomes in auditing, aiming to derive practical insights and theoretical implications through detailed examination. The study reveals that "Xiao Qin Ren" can automatically perform repetitive tasks such as account reconciliation, confirmation letter generation, and working paper preparation by simulating human operations. Its deployment reduced reconciliation time from 3 person-days to just 10 minutes with 100% accuracy. According to Deloitte's official case report, during a proof-of-concept (POC) at a bank, the average time required to obtain individual audit evidence decreased from 40 minutes to under 30 seconds. This case demonstrates the applicability of RPA technology in auditing and provides valuable insights for accounting firms pursuing intelligent audit transformation.

Keywords: RPA; Intelligent Audit; Financial Robotics; Audit Automation

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1. Introduction

1.1 Research Background

Amid the wave of digital transformation, efficiency bottlenecks in traditional audit workflows have become increasingly evident. Conventional auditing processes rely heavily on manually performed tasks with well-defined yet highly repetitive rules, which not only consume significant human resources but also risk compromising audit accuracy due to human error—making industry-wide transformation imperative^[1]. The core challenge of current transformation technologies lies in achieving faster audits at lower costs while maintaining reliable quality. The maturation of RPA (Robotic Process Automation) technology offers a novel solution: as software that replaces humans in performing high-repetition tasks based on predefined rules, it seamlessly mimics human behavior to operate information systems and replicate standardized workflows, perfectly suited for auditing needs^[2]. Notably, the audit automation tool "Xiaoqinren," jointly developed by Deloitte and KiraSystems

a. A "3-person-day" is a unit of workload, which simply means one person working for three days, or three people working for one day—totaling three "person-days" of effort.

in 2016, has demonstrated proven effectiveness in real-world applications, providing substantial practical value for related research.

1.2 Research Objectives

Deloitte, as one of the Big Four accounting firms, is widely recognized as a benchmark in the auditing industry. “Xiaoqinren,” one of the earliest and most prominent RPA products in this field, has undergone years of implementation and iteration, achieving highly mature technical capabilities supported by extensive publicly available research and practical documentation. To date, the product has provided process automation services to over 200 organizations, with proven application maturity and traceable, verifiable implementation outcomes. Deloitte’s strategic approach of “technology-driven business” serves as a practical model for domestic peers and offers significant replicability and reference value for the widespread adoption of RPA solutions across the industry^[3].

The purpose of this study is to address three core questions through the Deloitte “Little Deloitte People” case study: First, what audit challenges can RPA solve? Second, how exactly does it achieve these solutions? Third, what are the practical outcomes? The research aims to theoretically validate the applicability of RPA technology in auditing scenarios and provide actionable guidance for the intelligent transformation of the auditing industry.

1.3 Research Significance

Regulatory requirements for audit practice quality continue to tighten, while clients’ expectations regarding audit timeliness and value-added services are steadily rising. The traditional audit model can no longer meet these dual demands. The Big Four accounting firms have pioneered the use of RPA technology to streamline workflows, establishing a significant competitive advantage^[4]. However, most domestic firms still rely primarily on conventional manual processes, which not only fail to meet regulatory quality verification requirements but also cause them to fall behind in market competition. Digital transformation has thus become an urgent necessity.

2. Case Background

Deloitte is a globally leading professional services firm whose business encompasses auditing and certification, tax and legal services, consulting, and financial advisory. It serves a broad and high-quality client base. Amid the digital transformation wave, Deloitte pioneered the “Smart Audit” transformation strategy, positioning technological innovation as the core driver for enhancing service competitiveness and continuously exploring ways to apply cutting-edge technologies in professional service scenarios, establishing itself as a benchmark enterprise for industry digital transformation^[5].

2.1 Overview of Pain Points

2.1.1 Pain Points in the Audit Industry

The traditional audit model has long been plagued by common challenges across four key dimensions—efficiency, cost, quality, and duration—as detailed in Table 1 below:

Table 1 Common Pain Points of Traditional Audit Models

Pain Point Dimension	embody	Data Support
productiveness	Repetitive tasks such as account reconciliation and confirmation requests consume a significant amount of time.	The average monthly time required for account reconciliation at a medium-sized company is 3 person-days.
prime cost	Professionals are engaged in jobs with low added value.	Human costs account for over 60% of the firm’s operating expenses.
quality	Manual operation is prone to errors.	The manual error rate in the audit process is approximately 1-3%.
period	The audit process is lengthy, and customers have to wait a long time.	The annual audit of listed companies typically takes 1 to 3 months.

These pain points not only hinder the improvement of audit industry efficiency but also make it difficult to further enhance customer satisfaction, necessitating urgent technological solutions to overcome these development bottlenecks.

2.1.2 The challenges Deloitte once faced

As the market environment evolves, Deloitte's traditional labor-intensive audit model is increasingly proving unsustainable: On one hand, clients are demanding higher audit efficiency—most enterprises expect audit cycles to be reduced by over 30% compared to previous levels, while also requiring audit services to deliver higher-value outputs such as risk assessment and process optimization; on the other hand, labor costs continue to rise annually, with a significant number of certified public accountants with professional expertise being occupied by repetitive tasks, leading to a sustained decline in project profit margins. How to reduce operational costs and enhance service efficiency while strictly maintaining audit quality has become a core challenge for Deloitte, making the transition to intelligent auditing imperative^[6].

2.2 Case Theme and Decision-Making Process

2.2.1 Why choose RPA technology?

During the technology selection phase, Deloitte conducted a comparative evaluation of various digital solutions: General AI large models feature complex technical logic and high training costs, while audit scenarios demand exceptionally high result accuracy, making complete reliance on AI's autonomous judgment challenging; traditional customized software lacks sufficient flexibility, requires integration with multiple heterogeneous systems within clients' and audit firms' environments, entails high modification costs and lengthy implementation cycles, and struggles to meet diverse client-specific needs^[7]. In contrast, RPA (Robotic Process Automation) offers significant advantages: as a non-invasive technology, it requires no system modifications, performs tasks by simulating human operation interfaces, and can be deployed based solely on predefined rules, featuring low implementation difficulty and rapid deliverability—making it perfectly suited for the numerous standardized, repetitive tasks inherent in audit processes and the ideal choice for core technological applications.

2.2.2 Deloitte's RPA Strategic Framework

Following its official launch of RPA application exploration in the audit field, Deloitte assembled a dedicated RPA team comprising audit experts and technical developers to systematically analyze standardized scenarios across the entire audit process. After multiple rounds of feasibility assessments, Deloitte opted against purchasing off-the-shelf solutions and instead developed a proprietary RPA product leveraging its deep expertise in audit operations, establishing a distinctive technological advantage under the brand name "Xiao Qin Ren".

2.3 Actions Taken

2.3.1 Development Timeline for "Little Diligent Person"

The implementation of the "Little Diligent Person" initiative proceeds steadily in four phases, with specific timelines and tasks detailed in Table 2 below:

Table 2: The four stages of implementation for the "Little Diligent Person" initiative

stage	time	ground work
Exploration Phase	Around 2016	Conduct a comprehensive audit of standardized processes throughout the entire investigation and auditing workflow to evaluate the feasibility of implementing RPA technology.
development period	2016–2017	completed the development of core functional modules and launched the first prototype of "Xiaoqinren"
Pilot Period	2017	Select 12 audit projects from the manufacturing and financial sectors for pilot implementation to continuously optimize product logic.
Promotion Period	Since 2018	Deploy and promote globally, continuously iterate features and release updates based on business needs

2.3.2 Explanation of the Technical Principles of “Xiao Qin Ren”

“Xiaoqinren” is essentially a computer programming software robot specifically designed for audit scenarios, primarily simulating human computer operations: using predefined rule scripts, it automatically performs tasks such as mouse clicks, keyboard inputs, data reading, and format validation without requiring integration with system-level interfaces, and runs directly on the user interfaces of existing online banking systems, audit systems, and office software. With clearly defined task rules and standardized operational steps, corresponding automated workflows can be quickly configured without complex secondary development.

2.3.3 Main Functional Modules of “Little Diligent Person”

“Xiaoqinren” has developed four standardized functional modules centered around the core audit processes:

Function 1: Automatic Statement Generation

You can download bank statement data in bulk, automatically compare each entry with corporate account records, and quickly identify abnormal discrepancies.

Function 2: Automatic Generation of Confirmation Letters

Directly extract customer information, account details, and other data from the audit system, generate standardized confirmation letters in batches, and automatically send them to the designated email addresses of the respective parties being confirmed.

Function 3: Auto-populate Audit Working Papers

The reconciliation results, confirmation response details, third-party data, and other content will be automatically populated into the corresponding sections of the audit working papers without manual copying or pasting.

Function 4: Auto-generate variance report

Summarize all anomalies across the entire process, automatically categorize and organize them to generate a standardized variance report for direct review by auditors.

2.4 Actual Situation and Outcomes

2.4.1 Promotion and Application Status

By Dec 2025, “Xiaoqinren” had been deployed in over 100 Deloitte offices worldwide, serving clients across more than 20 industries including finance, manufacturing, retail, and high-tech sectors. It has been implemented in over 3,000 audit projects, becoming one of the core tools within Deloitte’s Smart Audit System. Its adoption model has accelerated the widespread adoption of RPA solutions across the audit industry, with performance data for typical use cases presented in Table 3.

Table 3 Effects of Typical Application Scenarios

application scenarios	Traditional Method	After using Xiaoqinren:	Efficiency Improvement
Bank Statement (Monthly)	3 person-days	10 minutes	Approximately 95%
confirmation letter generation (100 copies)	1 person per day	15 minutes	Approximately 95%
Draft Completion (Single Subject)	2 hours	5 minutes	Approximately 95%
continuous work	Work 8 hours daily and require rest.	operates continuously for 24 hours	/
precision	Approximately 97–99%	100% (Within Rules)	markedly improve

3. Case Analysis

3.1 Path Analysis: How Does RPA Achieve Audit Automation?

Table 4 below presents Xiaoqinren’s tailored solutions to the key challenges of traditional auditing:

Table 4 Solutions by “Xiaoqinren” for Traditional Audit Pain Points

Traditional Pain Points	Xiaoqin People Solution	Implementation Principle
Account reconciliation takes a long time	Auto-login, Download, Verify	Simulate Manual Operation + Rule Matching
The processing of confirmation requests is slow.	Batch generate and send automatically	Data Extraction+Template Population
The draft form is cumbersome to fill out.	Auto-fill	Data Mapping+Automatic Entry
Humans are prone to errors.	Machine Execution, Unified Rules	Execute precisely according to the preset logic
Cannot work continuously	24 hours uninterrupted	The software-controlled robot does not experience any sense of fatigue.

When designing audit robots, priority should be given to tasks with low complexity and minimal variation according to the process pyramid. For high-level business processes that are highly specialized, unstable, or lack clearly defined standards, manual operation remains the preferred approach.

3.2 Effect Analysis

3.2.1 Efficiency and Performance

The implementation of “Xiaoqinren” has achieved a significant leap in audit efficiency. Taking bank reconciliation as an example, the time required to generate confirmation letters was reduced from one person-day to just 15 minutes, while the preparation time for working papers was cut from 1.5 hours to under 30 minutes—a 67% improvement in efficiency. In short, Deloitte leveraged “Xiaoqinren” to deliver a remarkable 40–60% increase in audit efficiency.

3.2.2 Quality Performance

Within predefined rules, RPA achieves 100% operational accuracy, eliminating verification errors caused by fatigue or negligence. Moreover, each robotic operation is digitally recorded, ensuring traceability and transparency in the audit process and meeting stringent internal control requirements.

3.2.3 Cost-Benefit Analysis

From an input-output perspective, the cost-effectiveness advantage of RPA systems is particularly pronounced: in routine audit projects, they can replace approximately 50–70% of repetitive tasks, enabling junior auditors responsible for such work to transition into more growth-oriented roles such as risk assessment and industry analysis; senior certified public accountants can focus more on professional judgment tasks, thereby effectively controlling overall labor costs. In terms of return on investment, the deployment cost of RPA for a single project is typically fully recovered through labor cost savings within 6–12 months, yielding significant long-term benefits.

4. Countermeasure Recommendations

4.1 Recommendations at the Technical Level

First, system compatibility must be enhanced by developing universal adaptation components for heterogeneous ERP systems, online banking platforms, and business systems across different industries, thereby reducing customization efforts and lowering technical barriers to cross-system deployment. Second, exception handling capabilities need improvement through optimized automatic identification logic for non-standard scenarios; when encountering rule-violating operational anomalies, the system should automatically pause operations and trigger alerts to prevent invalid executions or erroneous outputs. Addressing these challenges, Deloitte Xiaoqin has now evolved to its third generation, integrating IDRP intelligent document review, OCR (Optical Character Recognition), and NLP (Natural Language Processing) technologies in a deep integration. It not only handles data transfer but also understands content, with its core strength lying in processing unstructured data and supporting over 20 document formats^[8]. Further deep integration will be pursued in the future.

4.2 Recommendations at the Promotion Level

On one hand, it is essential to lower the entry barrier for frontline staff; ordinary auditors can quickly establish automated processes through drag-and-drop operations and parameter configuration without requiring coding skills, thereby reducing reliance on technical teams. On the other hand, personnel skill training must be strengthened by incorporating RPA operations and process configuration into regular audit training programs, fostering versatile professionals who understand audit business logic while being proficient in digital tools. Concurrently, a cross-industry best practice repository should be established, compiling mature RPA application cases from clients across various sectors and sizes for project teams to reference and reuse, thereby minimizing trial-and-error costs. Deloitte conducted RPA training courses in Beijing, Hong Kong, and other locations in 2019, where 84 audit professionals with no IT background mastered relevant development skills after six days of training^[9]. This approach warrants widespread adoption.

4.3 Recommendations at the Institutional Level

Industry regulators and associations can lead the development of unified standards for RPA audit applications, specifying common requirements such as technical security, operational protocols, and data access permissions to guide the industry-wide standardized use of digital tools. Within accounting firms, clear delineation of authority boundaries for human-machine collaboration is essential, along with well-defined scope of RPA application scenarios and accountability for reviewing machine-generated results, thereby mitigating audit risks arising from ambiguous responsibilities. A dynamic evaluation system should be established to regularly assess RPA implementation effectiveness across three dimensions—efficiency improvement, quality enhancement, and cost reduction—enabling continuous refinement of technical solutions and management mechanisms.

5. Conclusion and Prospects

5.1 Research Conclusion

This paper employs a single-case study approach to analyze the implementation of Deloitte's "Little Deloitte People," demonstrating the applicability and core value of RPA technology in the field of intelligent auditing. Leveraging its non-intrusive, rule-based characteristics, RPA effectively addresses efficiency challenges associated with repetitive tasks such as account reconciliation, confirmation requests, and working paper preparation in traditional auditing, achieving dual improvements in both efficiency and quality: efficiency for core standardized tasks increases by over 90%, operations within predefined rules are error-free, and it can replace more than 50% of low-value-added manual work. Furthermore, "Little Deloitte People" establishes a novel audit model based on human-machine collaboration, freeing auditors from mechanical tasks so they can focus on professional judgment and risk management, providing a practical example for the digital transformation of accounting firms.

5.2 Future Outlook

The future application of RPA in the auditing field will evolve along three key directions. First, technological integration: RPA will deeply integrate with AI and big data, evolving from process automation to intelligent decision support that enables risk identification and analysis in complex scenarios. Second, end-to-end application coverage: it will expand from single-process automation to encompass the entire audit lifecycle—including planning, execution, and review—establishing a comprehensive intelligent audit system. Third, widespread adoption: RPA will extend from leading institutions like the Big Four to domestic small and medium-sized accounting firms, as industry-wide standards and cost-effective tools continue to mature, driving digital and intelligent transformation across the auditing sector.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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