

Optimization of the Accounts Payable Process in a Mid-Sized Credit Union

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Abstract — *Automation alternatives were evaluated to improve the accounts payable process of a mid-sized credit union operating in a regulated financial environment. The existing process relied on manual document handling, informal approval practices, and repetitive data entry, resulting in processing delays and operational risk. A structured methodology was applied, including workflow mapping, bottleneck identification, process metrics analysis, and a weighted evaluation of automation alternatives. The results showed that workflow-based automation offered the most feasible improvement option by enhancing document control, approval routing, and process visibility without requiring direct core system integration. Robotic process automation was identified as a potential future enhancement to further reduce manual data entry.*

Key Terms — *accounts payable automation, credit unions, process automation, workflow automation*

INTRODUCTION

This project was conducted in a mid-sized credit union located in Puerto Rico that serves approximately 50,000 members through physical branches and digital channels. Within the organization, the accounting department managed vendor payments through a predominantly manual accounts payable process. Invoices were received through multiple channels, including email, paper documents, and vendor portals, and required manual storage, verification, approval routing, and data entry into the core banking system.

The existing process relied on informal approval mechanisms and repetitive manual tasks, resulting in extended processing times, increased workload, and exposure to data entry errors. The objective of this project was to recommend a

feasible and cost-effective improvement to the accounts payable process that could increase efficiency and reduce operational and control-related risks. The project focused on analyzing the current process, identifying improvement opportunities, and evaluating automation alternatives appropriate for a regulated financial institution environment.

LITERATURE REVIEW

Manual accounts payable processes are characterized by repetitive activities such as invoice validation, approval routing, and data entry, which increase processing time and error risk. These characteristics make accounts payable a strong candidate for automation initiatives [1, 2].

Workflow management systems have been widely recognized as effective tools for improving accounts payable operations. These systems support standardized routing, enforce approval controls, and provide visibility into process status, reducing delays and strengthening internal controls [3].

Robotic Process Automation (RPA) has also been adopted within accounting environments to automate repetitive, rules-based tasks. Studies indicate that cooperative financial institutions have used RPA to improve efficiency and reduce operational costs, although governance, process stability, and system integration remain critical success factors [1]. More advanced approaches involving artificial intelligence and machine learning have demonstrated potential for automating invoice classification and data extraction [2, 4].

In financial institutions such as credit unions, accounts payable processes are subject to regulatory, security, and control requirements. Internal controls, auditability, and system integration constraints play a critical role in

determining the feasibility of automation initiatives. Local credit unions often operate legacy core banking systems that limit direct integration with third-party automation tools. As a result, solutions that enhance document control, approval routing, and process visibility provide operational and control benefits for credit unions [1, 3].

METHODOLOGY

The project followed a structured four-phase methodology focused on analysis and evaluation. The first phase consisted of assessing the current accounts payable process through workflow mapping from invoice receipt through data entry. Following the development of the current state workflow, the process was analyzed to identify bottlenecks and improvement opportunities. This analysis focused on steps requiring manual intervention, approval dependencies, and delays introduced by system limitations. Process observations, staff feedback, and invoice-processing metrics were used to identify activities with extended processing times or high manual effort. Figure 1 illustrates the simplified current-state accounts payable workflow used to support process assessment and bottleneck identification.

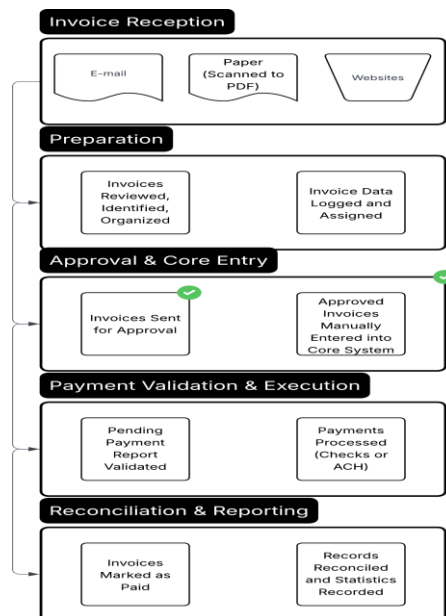


Figure 1
Current-State Accounts Payable Workflow

A detailed version of the current state workflow is presented in Figure 2.

Tables 1 and 2 present findings from survey responses and supervisor-provided invoice statistics. The data indicated a consistent and increasing invoice processing workload, high levels of manual effort, and approval-related delays. These data sources were used to contextualize the workflow analysis and to corroborate observed bottlenecks and control points.

Table 1
Accounts Payable Process Metrics and Issues

Metric	Observed Range / Findings
Average time to process one invoice	5–20 minutes
Average approval waiting time	3–5 days (when applicable)
Invoice volume per employee	26–50 invoices per week
Level of manual effort	High (25%–75% of workday)
Common causes of delays/errors	Missing or incorrect invoice information; manual data entry errors; approval delays; system limitations
Reported primary challenges	Lack of a robust AP system; highly manual invoice handling; delays caused by approvals

Table 2
Invoice Processing Volume Summary

Period	Total Invoices	Avg. Invoices per Month
2021	3,773	314
2022	3,402	283
2023	3,375	281
2024	3,919	326
2025	4,089	341

In the evaluation phase, workflow automation, robotic process automation, and accounts payable software platforms were compared using a weighted scoring model. Evaluation criteria included feasibility (25%), integration with the core banking system (25%), cost (20%), operational risk reduction (15%), and scalability (15%). Core system integration was included as an evaluation criterion due to the technical complexity and constraints associated with the credit union’s core banking platform, which limited the feasibility of solutions requiring direct system integration.

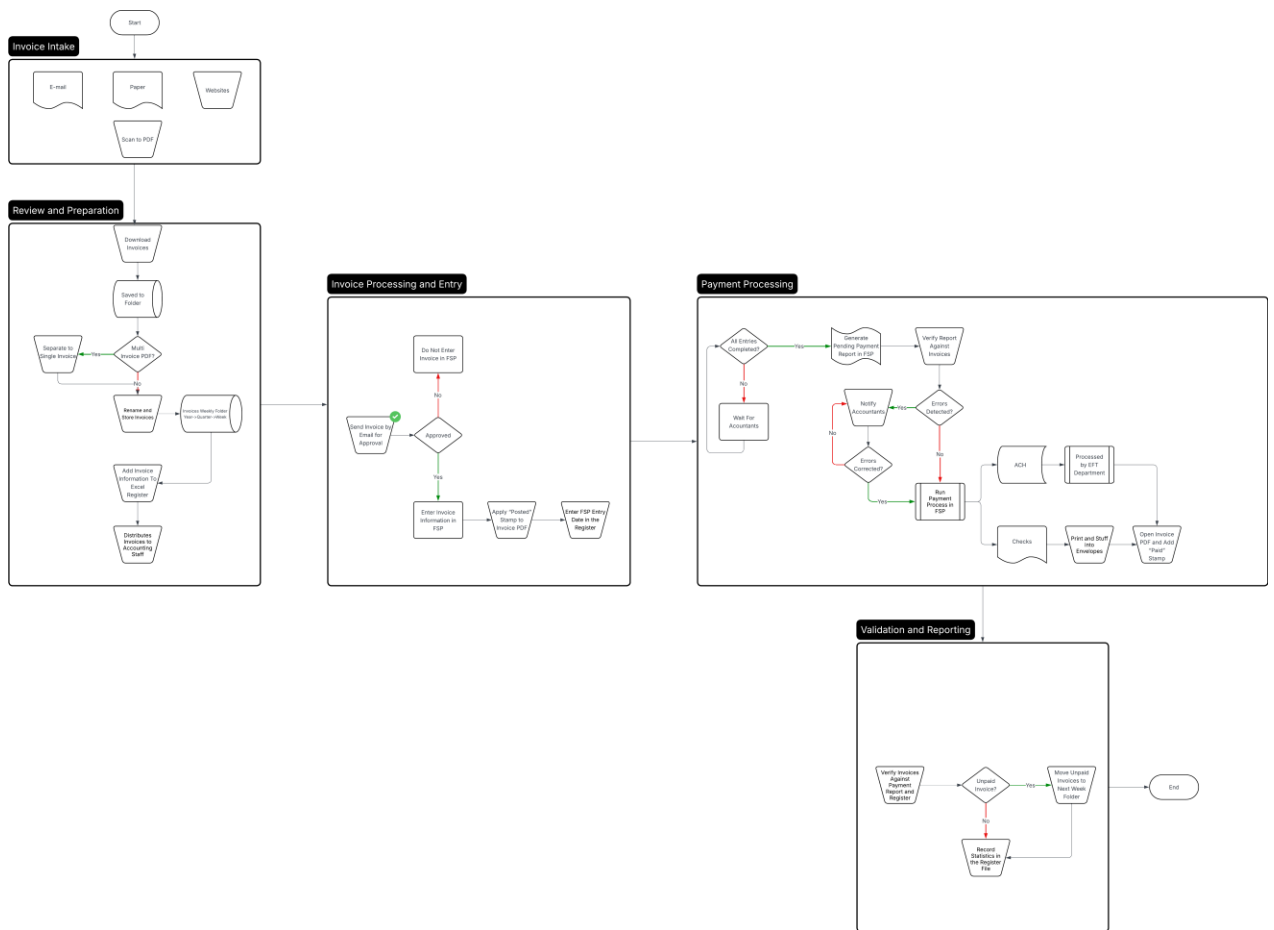


Figure 2
Current-State Accounts Payable Detailed Workflow

The criteria and weights were discussed with accounting department personnel. Each alternative was evaluated using a standardized five-point numerical scale to reflect its level of alignment with each evaluation criterion. A score of 1 indicated very low alignment or suitability, 2 indicated low alignment, 3 indicated moderate alignment, 4 indicated high alignment, and 5 indicated very high alignment. Scores were assigned based on qualitative assessment of technical feasibility, operational impact, and institutional constraints. Weighted scores were calculated by multiplying each criterion score by its corresponding weight and summing the results for each alternative. Table 3 presents the weighted evaluation results for the analyzed alternatives.

Table 3
Weighted Evaluation of Alternatives

Evaluation Criterion	Weight	Workflow Automation	Robotic Process Automation (RPA)	AP Software Platform
Feasibility	0.25	4	3	2
Core System Integration	0.25	5	5	2
Cost	0.20	4	2	2
Operational Risk Reduction	0.15	4	4	4
Scalability	0.15	4	4	4
Total Weighted Score	1.00	4.25	3.70	2.70

RESULTS

The analysis of the current accounts payable process confirmed that invoice processing activities relied heavily on manual intervention and informal controls. Workflow mapping and supporting metrics revealed that invoice intake, approval routing, and data entry into the core system were the most time-consuming stages of the process. Survey responses and invoice volume data indicated a consistently increasing workload and high levels of manual effort.

The weighted evaluation of automation alternatives demonstrated clear differences among the analyzed solutions. Workflow automation achieved the highest overall weighted score, reflecting its strong feasibility, minimal dependence on direct core system integration, moderate implementation cost, and positive impact on operational risk reduction. Robotic Process Automation ranked second, offering benefits in scalability and automation of repetitive tasks but presenting higher costs and implementation complexity. Accounts payable software platforms demonstrated strong control and risk reduction capabilities; however, their dependence on direct core system integration and higher implementation costs reduced their overall feasibility within the evaluated environment.

The results indicated that workflow-based automation provided the most balanced and practical improvement option for the credit union's accounts payable process. The analysis also showed that RPA could serve as a complementary solution in future phases, particularly for automating manual data entry in the core system.

CONCLUSION

This project evaluated automation alternatives for improving the accounts payable process of a mid-sized credit union operating within regulatory, operational, and system integration constraints. Through workflow mapping, bottleneck identification, and a weighted evaluation model, the project demonstrated that significant efficiency and

control improvements could be achieved without immediate reliance on direct core system integration.

The findings supported workflow automation as the most suitable initial solution, as it addressed key process weaknesses related to document handling, approval routing, and process visibility while remaining feasible within the organization's technical and operational context. By strengthening controls and reducing manual effort in activities, workflow automation established a stable foundation for future automation initiatives. Robotic Process Automation was identified as a viable secondary enhancement that could be implemented incrementally to automate specific repetitive tasks once process maturity improved.

Overall, the project highlighted the importance of aligning automation strategies with institutional constraints and operational realities. Rather than pursuing full automation prematurely, the selected approach emphasized phased improvement, risk reduction, and sustainability. This structured decision-making process provides a practical framework that can be applied to similar process optimization initiatives within financial institutions facing comparable challenges.

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