

CS 410 Lab 1 Individual Introduction

AI² – Artificially Intelligent Invoices

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1 Introduction

1.1 Background

Manual invoice processing remains prevalent across organizations, with approximately 90% of companies still relying on manual methods to handle their invoices. This process often involves staff manually opening emails, entering data, and verifying spreadsheets line by line. Such inefficiencies come at a significant cost—manual processing can range from \$12 to \$40 per invoice, compared to just \$3 to \$6 when automation is implemented [3]. For organizations managing large invoice volumes, these costs escalate rapidly.

Beyond financial inefficiency, manual processing also results in slower turnaround times and increased risk of human error. On average, manual invoice handling takes 10 to 15 days, while automation can reduce this time to only a few days. Furthermore, between 1–3% of manually processed invoices contain errors, which can lead to strained vendor relationships, payment delays, and financial discrepancies.

The problem also extends to the people performing these tasks. A recent survey found that 96% of Accounts Payable (AP) professionals report dissatisfaction with their existing tools, and a Gartner study revealed that 60% of accountants make multiple financial errors each month, often due to overextension and repetitive workloads. When automation is adopted, productivity in invoice processing can improve by up to 80%, allowing employees to focus on higher-value work, reduce mistakes, and experience greater job satisfaction.

1.2 Problem Statement

Manual invoice processing within Accounts Payable (AP) departments is both costly and inefficient. Between labor, printing, mailing, and error correction, the total cost of processing an invoice manually can range from \$12 to \$40, a figure that scales rapidly across large invoice volumes. Each invoice takes an average of 14.6 days to process, consuming significant staff hours that are largely spent on repetitive verification tasks rather than strategic financial work. These inefficiencies not only delay payments but also lead to missed discounts, late fees, and reduced operational flexibility. Moreover, the strain placed on AP staff limits organizational capacity to expand and serve new clients effectively.

At Atlantic Diving Supply (ADS), these challenges are particularly evident. The company processes more than 150,000 invoices annually from over 3,000 suppliers, with invoices arriving in diverse formats such as PDFs, scans, and spreadsheets. A small AP team of six members must manually review each invoice and cross-check it against purchase orders in the system. This high workload leads to prolonged processing times, repetitive tasks, and employee fatigue, while also introducing the risk of errors and backlogs. Figure 1 illustrates the current manual workflow used by ADS's AP department.

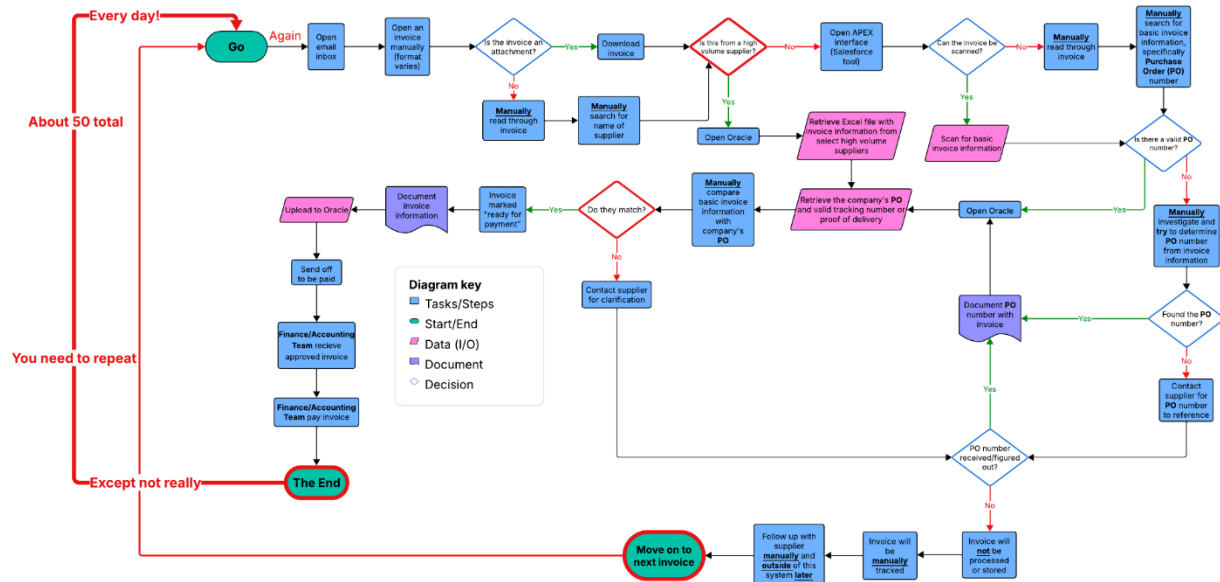


Figure 1: Current Process Flow of manual invoice processing at ADS

The effects of this inefficiency extend beyond the AP team to ADS's leadership, vendors, and clients. Slow processing and payment delays strain supplier relationships and impact financial operations. To maintain strong partnerships and support sustainable growth, ADS—and organizations like it—require a solution that can automate the intake and processing of routine invoices while empowering staff to focus on exceptions and higher-value financial tasks.

1.3 Solution

To address the inefficiencies of manual invoice handling, Artificially Intelligent Invoices (AI²) is proposed as a secure, web-based platform that automates and streamlines the Accounts Payable process. AI² integrates directly with an organization's existing financial systems, accelerating invoice processing while maintaining human oversight and regulatory compliance. The system leverages artificial intelligence to capture, interpret, and validate invoice data across diverse formats and vendors, reducing repetitive tasks and minimizing human error.

AI² automatically retrieves invoices from designated email inboxes, extracts key information, and structures it for efficient review. Each invoice is then compared to the corresponding purchase order within the organization's enterprise system, allowing routine matches to be completed instantly. When discrepancies occur, such as missing or mismatched data, the system flags the invoice for human review, learning from corrections to improve future accuracy. All actions are logged for auditability, ensuring transparency and compliance with financial and cybersecurity standards.

Beyond ADS, AI² is built to scale across organizations facing similar challenges. Its adaptable design supports new vendors, variable invoice formats, and integration with multiple enterprise systems, making it a flexible and sustainable solution for modern financial operations.

2 References

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