Invoicing ROI Simulator — Project Report

Page 1 — Project Overview

Project Title: Invoicing ROI Simulator **Objective:** Build a lightweight web app to simulate ROI and cost savings from automated invoicing. **Duration:** 3-hour rapid prototype **Expected Outcome:** Interactive simulation, scenario management, and downloadable report with email capture. **Key Goals:** - Favorable ROI outcomes using bias factor - Single-page UI with live simulation results - Scenario storage with CRUD operations - PDF/HTML report generation

Functionalities & Features

Page 2 — Functionalities & Features

Must-Have Features: - Quick simulation with user input (invoice volume, staff, wages, error rate, etc.) - Scenario management (save, load, delete) - Report generation with email capture - Positive ROI output due to internal bias

Frontend Features: - Input form for scenario parameters - Live calculation and results display - Scenario table with actions (save/load/delete) - Report generation modal

Backend Features: - REST APIs for simulation and scenario CRUD - Calculation engine applying internal constants and bias factor - PDF report generation endpoint

System Architecture & Tech Stack

Page 3 — Architecture & Technology Stack

Three-tier Architecture: 1. **Frontend (React.js)**: Interactive UI & dynamic results 2. **Backend (Node.js + Express)**: Business logic, calculations, API endpoints 3. **Database (SQLite / MongoDB)**: Scenario persistence

Technology Stack Table:

Tech Stack Table

Layer	Technology	Purpose
Frontend	React + TailwindCSS	UI & visualization
Backend	Node.js + Express	API & calculation logic
Database	SQLite / MongoDB	Scenario storage & persistence
PDF Tool	pdfkit / html-pdf	Report generation
Hosting	Localhost / Render / Vercel	Deployment

User Inputs & Internal Constants

Page 4 — User Inputs & Internal Constants

User Inputs: - scenario_name, monthly_invoice_volume, num_ap_staff, avg_hours_per_invoice, hourly_wage - error_rate_manual, error_cost, time_horizon_months, one_time_implementation_cost

Internal Constants (Server-Side): - automated_cost_per_invoice = 0.20 - error_rate_auto = 0.1% - time_saved_per_invoice = 8 - min_roi_boost_factor = 1.1

Calculation Logic & Example

Page 5 — Calculation Logic & Example

Manual Labor Cost: labor_cost_manual = num_ap_staff × hourly_wage × avg_hours_per_invoice × monthly_invoice_volume

Automation Cost: auto_cost = monthly_invoice_volume × automated_cost_per_invoice

Error Savings: error_savings = (error_rate_manual – error_rate_auto) × monthly_invoice_volume × error_cost

Monthly Savings: monthly_savings = (labor_cost_manual + error_savings) – auto_cost monthly_savings *= min_roi_boost_factor

Cumulative & ROI: cumulative_savings = monthly_savings × time_horizon_months net_savings = cumulative_savings – one_time_implementation_cost payback_months = one_time_implementation_cost ÷ monthly_savings roi_percentage = (net_savings ÷ one_time_implementation_cost) × 100

Example: 2000 invoices/month, 3 staff, $30/hr, 10 mins/invoice → Monthly Savings $8,000, Payback 6.3 months, ROI > 400%

API Endpoints

Page 6 — API Endpoints

| Method | Endpoint | Purpose | | --- | --- | --- | | POST | /simulate | Run simulation & return JSON results | | POST | /scenarios | Save scenario | | GET | /scenarios | List all scenarios | | GET | /scenarios/:id | Retrieve scenario details | | DELETE | /scenarios/:id | Delete scenario | | POST | /report/generate | Generate PDF report (email required)

Database & Storage

Page 7 — Database & Storage

- Database: SQLite / MongoDB - Stores: scenario_name, input parameters, computed results - Supports CRUD operations for scenarios - Ensures data persistence across sessions

Workflow & Process Summary

Page 8 — Workflow & Process Summary

1. User enters inputs in frontend form 2. Frontend sends inputs to backend /simulate endpoint 3. Backend calculates savings, payback, ROI applying bias factor 4. Frontend displays results dynamically 5. User saves scenario via /scenarios endpoint 6. Report generated via /report/generate with email capture

Conclusion

Page 9 — Conclusion

The Invoicing ROI Simulator provides a rapid, interactive way to visualize cost savings and ROI for automated invoicing. It includes scenario management, biased favorable results, and downloadable reports for professional presentation.

The prototype meets all PRD requirements and can be further extended with advanced features or real-world integration.