# Accounts Payable: Invoice-to-Pay Optimization

## Project Title

Accounts Payable: Invoice-to-Pay Optimization — automated clearing of standard invoices; manual review only for unclear image invoices and high-value or high-risk exceptions

## Project Scope / Target State

From invoice receipt to payment posting, automatically process and clear all well-structured, detail-complete invoices via Excel automation and ERP integration, surface for manual review only:
  (1) Invoices that are images with unclear, low confidence data
  (2) Invoices missing required detail (no/low-detail)
  (3) High-value invoices (predefined threshold) or other flagged high-risk items

## Business Objective & Measurable Goal

- Reduce manual handling and exception backlog while improving speed and accuracy
- Achieve ≥85–95% automated clearance of incoming invoices (excluding intentionally unstructured image invoices) within 7 days of receipt
- Reduce invoice cycle time (receipt → posting) by 40–60%
- Achieve ≥98% accuracy in automated postings (measured as correct vendor, GL, amount and PO match)
- Identify and escalate 100% of high-value invoices automatically

## In-scope

- Invoice intake channels: Email, Supplier Portal, Scanned images
- Invoice capture / data capture and validation
- Auto-matching rules (2-way/3-way PO/GRN matching)
- Excel automation (pre-processing, business rules, enrichment)
- ERP posting via API / connectors (integration)
- Exception queue handling and SLA for manual review
- High-value invoice detection & routing (approval matrix)
- Vendor master data validation & enrichment for automated matching

## Out-of-scope

- Procurement policy changes or PO creation process
- Full ERP replacement or major upgrades (minor connector/config OK)
- Non-invoice payments (payroll, tax payments)
- Contract negotiation or change in vendor terms (unless necessary for automation)

## Definitions / Key rules

- **Invoice classification at intake:**
  o Structured (electronic invoice, EDI, PDF with embedded data) → candidate for full automation
  o Image (scanned photo or low-quality PDF) → < threshold → Manual Review queue
  o Low-detail invoice (missing line-item detail, missing vendor tax IDs or missing PO reference) → flagged for enrichment; if enrichment fails → Manual Review
- **High-value invoice rules:**
  o Define "High-Value" threshold (example: > €X or $Y) and exceptions list (vendor types, capital projects)
  o Any invoice meeting high-value rule is automatically flagged and routed to expedited approval flow with read-only auto-population for approvers
- **Auto-match rules:**
  o 3-way match (Invoice vs PO vs GRN) -> auto-post when exact match on amount & PO line(s)
  o 2-way match -> auto-post when invoice matches PO amount and vendor master
  o Tolerance bands (e.g., ±1–5%) should be parameterized per business rules
- **Excel automation layer responsibilities:**
  o Pre-process capture output (normalize fields, apply fuzzy vendor matching, currency conversions)
  o Implement rule engine (match rules, flagging, enrichment attempts)
  o Produce standardized upload files for ERP
  o Create exception dashboard/tab showing reasons for each exception

## DMAIC phases & deliverables (detailed)

### Define
- Deliverables: Project charter, SIPOC, Stakeholder map, Baseline data (current FPY, cycle times, cost per invoice)
- CTA: Confirm high-value threshold and expected automation % with stakeholders

### Measure
- Deliverables: Data collection plan; sample of invoices by channel (structured vs image); current exception types and volumes
- Baseline KPIs: Current automated clearance %, average cycle time, cost per invoice, # exceptions/day

### Analyze
- Deliverables: Root cause analysis of top exceptions (missing PO, vendor master mismatch, low-quality images), process map with waste spots, Pareto of defects
- Outcome: Prioritized list of automation opportunities + thresholds for safe auto-posting

### Improve
- Deliverables & actions:
  o Design Excel automation templates (ingest, normalize, enrichment, rule engine). Provide sample macros/Power Query flows or Power Automate logic
  o Configure ERP integration (payload format, field mapping, error handling)
  o Create exception handling rules & SLAs (e.g., high value: 1 business day; other exceptions: 3 business days)
  o Build approval routing for high-value invoices
  o Pilot with one vendor category or BU (10–20% of volume) and measure
- Performance targets for pilot: ≥80% auto-clear, ≤5% auto-post exceptions

### Control
- Deliverables: Control plan, dashboards (auto-clear %, exceptions by reason, cycle time), standardized Excel templates, runbook for escalation
- Handover: SOPs, training for AP and approvers, vendor communications

## Automation Design — technical & business details

1. **Capture & Classification**: First step: classify invoice as structured vs image vs low-detail
2. **Excel Automation**:
   o Use Power Query / macros flows to normalize vendor names, currency, dates
   o Implement fuzzy match against vendor master for vendor ID enrichment
   o Create match score; if > threshold → auto-map vendor
   o Produce ERP upload file containing validated invoices ready for posting
   o Maintain audit trail columns: source file, match score, rule passed
3. **ERP Integration**:
   o Prefer middleware (e.g., RPA connector, iPaaS) to push payloads and capture responses
   o Handle synchronous rejection cases: log rejection reason into Excel automation output for reprocessing
4. **Exception Queue & UI**:
   o Build an exception dashboard (Excel) with filterable queue: Unclear image, Missing details, High-value, Rejected by ERP
   o Provide one-click actions: send to vendor for clarification, route to approver or correct master data
5. **High-Value Processing**:
   o Automatically pre-fill approver inbox with invoice PDFs + header/line summary + audit columns
   o Require explicit approver acknowledgement before payment posting (unless onshore SME signs off on automatic approval for certain thresholds)

## KPIs / CTQs to track (and sample targets)
- % Auto-cleared invoices (target: 85–95%)
- % Manual exceptions (target: ≤15%)
- Average invoice cycle time (receipt → posting) (target: ≤7 days or reduce by ≥40%)
- First Pass Yield (target: ≥95%)
- Cost per invoice (target: reduce by 30–60%)
- % High-value invoices correctly flagged (target: 100%)

## Acceptance criteria for "automated clearance"
Correct vendor ID, correct GL mapping, correct amount and currency, PO matched (if applicable) and successful ERP posting response with no manual correction required for 30 consecutive days in pilot sample

## Risks & Mitigation
- **Risk**: Vendor master mismatches cause wrong vendor posting
  **Mitigation**: require vendor master enrichment stage; maintain quick vendor lookup & approval for fuzzy matches
- **Risk**: ERP rejects due to field mapping or currencies
  **Mitigation**: end-to-end tests; error capture & automatic retry/easy reprocess flow
- **Risk**: Approvers delay high-value approvals, negating time gains
  **Mitigation**: SLAs, mobile/email notifications, approval reminders, escalation matrix
- **Risk**: Security/compliance concerns with automated posting

**Mitigation**: audit trail, segregation of duties, limited service account permissions and sample audits

## Implementation Roadmap (high-level)
1. Week 0–2: Define & measure — confirm thresholds, gather sample data, set up baseline metrics
2. Week 3–6: Build Excel automation templates + mapping tables
3. Week 7–10: Build ERP connector & test environment; end-to-end test with 100 invoices
4. Week 11–14: Pilot (one BU/vendor category). Tune rules & thresholds
5. Week 15–20: Rollout phased by volume; monitor KPIs; stabilize
   (**Adjust timing to internal resourcing — this is a sample plan**)

## Control Plan & Sustainment
- Weekly KPI dashboard during rollout; monthly executive summary thereafter.
- Quarterly audit of auto-post accuracy and sample reconciliations.
- Continuous improvement backlog for additional rules/exception reductions.

## Assumptions for quantification (used consistently below)
- Business hours: 8 hours / day
- Current average handling time (AHT): 8 minutes / invoice
- Manual exception handling AHT: 12–15 minutes
- Target automated clearance AHT: ≤ 1 minute (system touch only)

## Exception Handling Matrix and Risk & Mitigation Matrix
Risk Score: Qualitative priority (High / Medium / Low)

| Exception Type | Trigger / Condition | Auto Action (System / Excel Automation) | Risk Score | Manual Action Required | Owner | SLA | Time Impact vs Current | Residual Risk |
|---|---|---|---|---|---|---|---|---|
| Unclear Image Invoice | Image confidence < 60% on key fields | Auto-route to "Image Exception" queue with reason tag | High | Validate image, request better copy from vendor if required | AP Processor | 3 business days | Manual effort retained (no improvement); backlog isolated | Medium |
| Medium Image Confidence | Image confidence 60–89% | Excel enrichment + fuzzy vendor & PO matching | Medium | Review only if enrichment fails | AP Processor | 2 business days | Saves ~6–7 minutes/invoices (automation reduces handling from 8 → ~2 min) | Low |
| No / Low Detail Invoice | Missing PO, line details, tax info | Auto-flag; Excel attempts master data enrichment | High | Contact vendor / internal request | AP Processor | 3 business days | Back-and-forth time reduced by ~1–2 days via early detection | Medium |
| High-Value Invoice | Amount > defined threshold | Auto-highlight + auto-populate approval workflow | Medium | Approval only (no re-keying) | Approver / Onshore SME | 1 business day | Approval prep time reduced by ~10 minutes/ invoice | Low |
| PO Mismatch | Price/quantity variance beyond tolerance | Auto-route with variance summary | Medium | Investigate mismatch | AP Processor / Onshore SME | 2 business days | Root cause visible instantly (saves ~15–30 min investigation) | Low |
| Vendor Master Mismatch | Vendor not found / ambiguous | Excel fuzzy match + master lookup | High | Master correction if required | Master Data Team | 2 business days | Reduces rework cycles by ~1 day | Medium |
| ERP Posting Rejection | ERP validation failure | Capture error log; auto-requeue | Medium | Correct and repost | AP Processor | 1 business day | Reprocessing time reduced by ~5–8 minutes/ invoice | Low |
| Duplicate Invoice Suspected | Same vendor, invoice #, amount | Auto-block + alert | High | Validate and confirm | AP Processor | 1 business day | Prevents 100% of duplicate payment effort (~20–30 min saved) | Medium |

## SLA Summary Table

| Invoice Category | % of Volume (Target) | Processing Mode | SLA | Avg Handling Time | Net Time Improvement |
|---|---|---|---|---|---|
| Straight-Through Processing (STP) | 70–85% | Fully automated | Same day | ≤1 min | ~7 minutes saved per invoice |
| Medium Confidence / Low Detail | 10–20% | Semi-automated | 2–3 days | 3–5 min | ~4–5 minutes saved |
| Unclear Image / High-Risk | 5–10% | Manual | 3 days | 12–15 min | No change (controlled) |
| High-Value Invoices | ~5% | Auto-highlight + approval | 1 day | 3–4 min | ~10 minutes saved |

## Per-Invoice Improvements

- Manual processing reduced from 8 minutes → ≤1 minute for STP invoices →**~7 minutes saved per automated invoice**
- Medium-confidence invoices reduced from 8 minutes → 3–5 minutes → **~4–5 minutes saved**
- High-value invoices **approval prep reduced by ~10 minutes per invoice**
- Exception **investigation time reduced by 15–30 minutes per case** due to auto-diagnostics

## Daily / Operational Impact (Illustrative)

If 1,000 invoices/day with 80% automation:

- 800 invoices × 7 minutes = ~5,600 minutes saved/day
- ≈ 93 hours/day **≈ 11–12 FTE hours freed per day**

## Cycle Time Reduction

- Invoice receipt to posting reduced from 3–5 days → **same day for STP invoices**
- Overall average invoice cycle time reduced **by 1.5–3 days**
- **Manual effort limited to only unclear image & high-value invoices**

## Quality & Control Improvements

- First Pass Yield improved from ~70–80% to **≥95%**
- High-value invoice visibility improved from **hours/days to real-time**
- Exception backlog reduced by **30–50% within first 2–3 months**

## Executive Summary

The target-state AP process enables 70–85% straight-through processing, reduces manual effort by up to 7 minutes per invoice, shortens invoice cycle time by 1.5–3 days and isolates risk to a small, well-controlled exception population