Financial Transaction & Risk Management Analysis Report

1. Introduction

This report presents a comprehensive analysis of financial transactions, associated risk incidents, and system/user behavior. The analysis aims to provide actionable insights for financial monitoring, risk management, and operational performance optimization.

The study leverages KPIs, visualizations, and trend analysis to simulate real-world accounting operations and detect patterns useful for AI-driven decision-making.

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2. Data Overview

Financial Transaction and Risk Management Dataset

The dataset contains records simulating accounting system operations, including:

- **Transactional Data:** Transaction IDs, amounts, categories, payment methods, account numbers, counterparties, and transaction types.
- **Risk Data:** Risk incidents such as fraud, errors, misstatements, with risk type, incident severity, and error codes.
- **System Metadata:** User activity metrics, including system latency, login frequency, failed attempts, and geographical IP region.

The dataset is designed for research in **financial risk management, fraud detection, and AI-based decision-making**.

Tables Created for Analysis

1. **Transactions** – Details per transaction per user.
2. **Risks** – Associated risk incidents per transaction.
3. **System Behavior** – User/system performance metrics.
4. **Calendar** – Date table for time intelligence and trend analysis.

Relationships Established

- `transactions[Transaction_ID] → risks[Transaction_ID]` (1:* relationship)
- `Users[User_ID] → transactions[User_ID]` (1:*)
- `Users[User_ID] → system_behavior[User_ID]` (1:*)
- `Calendar[Date] → transactions[Date]` (1:*)

3. Data Processing and Measures

To enable analysis in Power BI, **DAX measures** were created for all key KPIs.

3.1 Transactions KPIs

- **Total Transactions:** 10,000
- **Total Amount:** 49.89M
- **Average Transaction Value:** 4.99k

Visualizations:

- Transactions by Type (bar chart)
- Currency Mix (donut chart)
- Amount by Category (column chart)
- Top Counterparties (bar chart)

Slicers: Category, Transaction Type, Year

3.2 Risk & Incidents KPIs

- **Total Risk Incidents:** 1,448
- **High Severity Incidents:** 471

Visualizations:

- Incidents by Risk Type (column chart)
- Count of Risk Incidents (gauge chart)
- Incidents by Counterparty (area chart)

Slicers: Risk Type, Incident Severity, Error Code

3.3 System & User Behavior KPIs

- **Average Latency:** 300.98 ms
- **Average Login Frequency:** 5.49 logins
- **Average Failed Attempts:** 2.49

Visualizations:

- IP Regions (map visual)
- Latency vs Failed Attempts (scatter plot with trendline)
- Failed Attempts by User (line + clustered column chart)

Slicers: Year, IP Region, User ID

4. Key Insights

4.1 Transactions Analysis

- Total transactions reached **10k**, totaling **49.89M**, with an average of **4.99k per transaction**.
- High-frequency transaction types and categories highlight core business operations.
- Currency mix analysis provides insight into cross-border transactions, while top counterparties reveal key client activity.

4.2 Risk & Incident Analysis

- **471 of 1,448 incidents** are high severity, warranting attention from risk teams.
- Distribution of incidents by risk type and severity helps identify operational vulnerabilities.
- Error codes and counterparty analysis allow targeted investigation of recurring issues.

4.3 System & User Behavior Analysis

- Average system latency of **300.98 ms** indicates efficient processing.
- Login patterns (avg 5.49 logins) with **2.49 failed attempts** highlight potential authentication issues.
- Scatter plots reveal correlation between latency and failed login attempts, aiding performance tuning.
- IP region mapping identifies geographic trends and potential security concerns.

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5. Conclusion

This analysis demonstrates the power of combining **transactional, risk, and system metrics** to generate actionable insights. KPIs and visualizations enable:

- Monitoring financial performance and transaction trends.
- Detecting and prioritizing risk incidents.
- Evaluating system and user behavior for security and operational efficiency.

The dashboard and measures are designed to support **real-time monitoring**, data-driven decision-making, and AI-driven risk modeling for accounting systems.