

Mastercard

Case Study

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Mastercard Overview

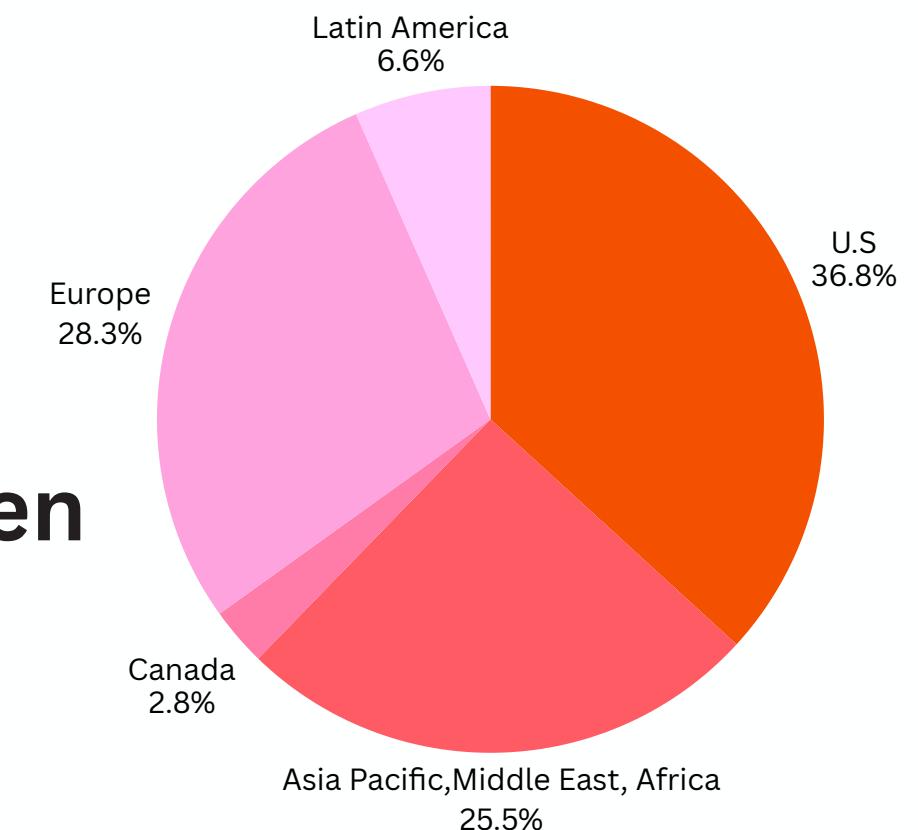
1. A global leader in payments technology, facilitating secure and efficient transactions.
2. Offers commercial card programs across Travel & Entertainment, Purchasing, and Fleet Management.
3. Enhances corporate payment processes through data-driven insights and collaborations.

3,900+
Clients in
120+
Countries

125B+
Purchase
Transaction

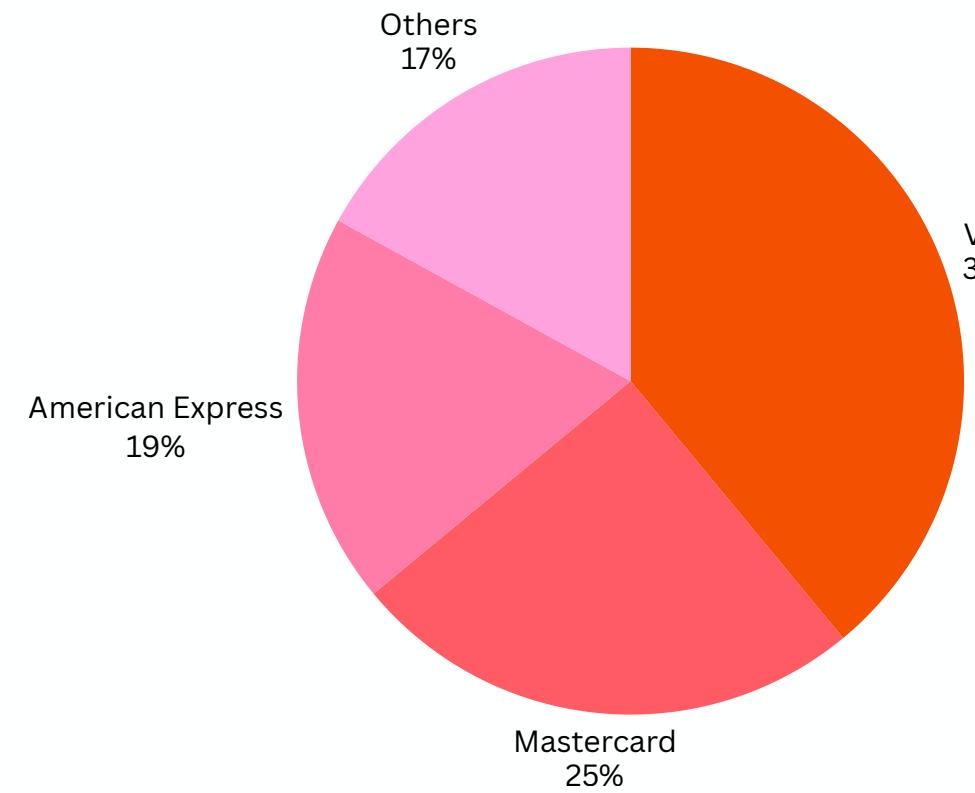
600+
Solutions
Patented

80M+
Merchant
Locations

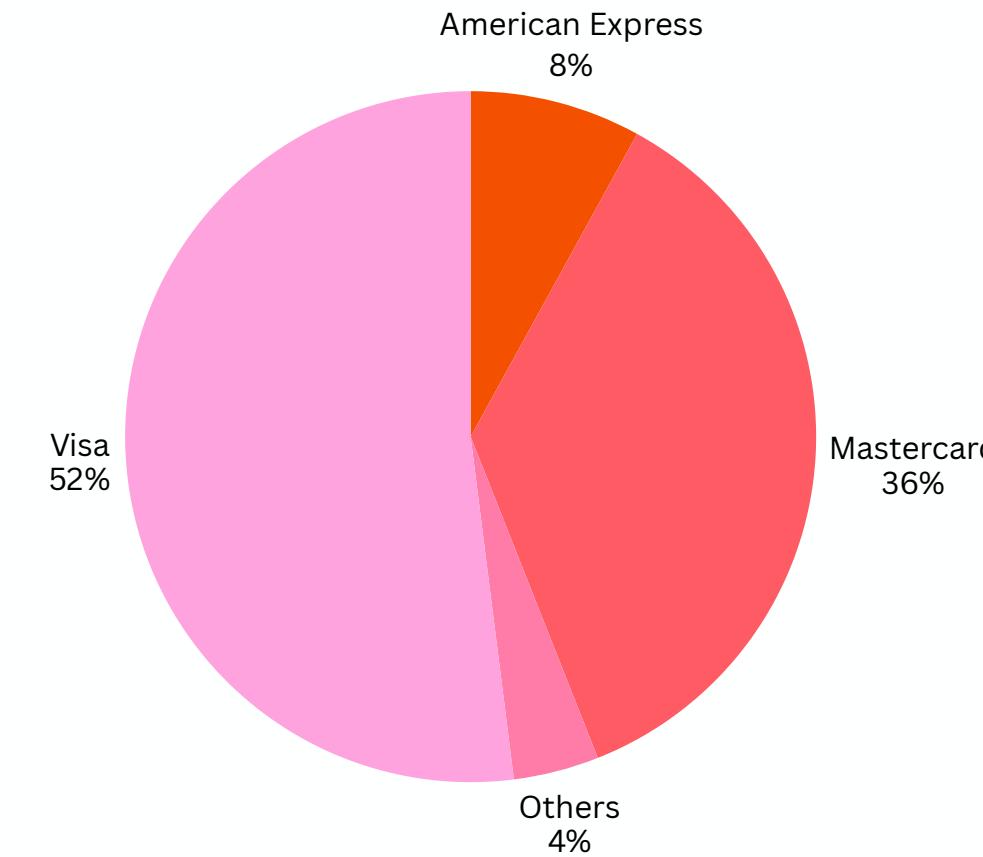


Competitor Analysis

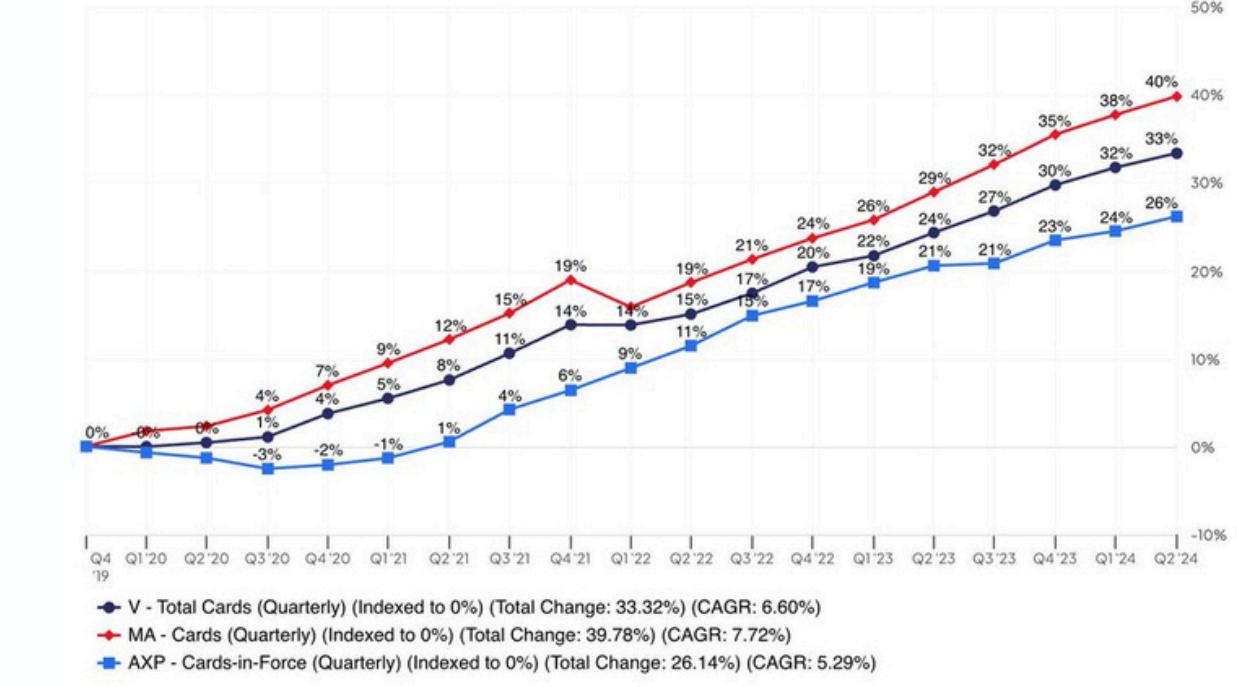
Global Market Share by Payment Networks



Global Market Share by Card Calculation



Visa v. Mastercard v. American Express



Powered by FinChat

VISA

Strengths

Global leader, strong B2B payment solutions, vast acceptance network in unurban sector.

MASTERCARD

Strong commercial card offerings, advanced data analytics, global reach

AMERICAN EXPRESS

Premium corporate card benefits, high customer loyalty

Problem Statement

Goals

- **Innovate Data Products** – Develop offerings to strengthen commercial solutions (e.g., predictive tools, spend optimization).
- **Estimate Market Potential** – Size revenue opportunities for new products.
- **Ensure Scalability & Adoption** – Prioritize technical robustness (APIs, cloud, security) and user-friendly design.

Key Challenges



Tracking Expenses Takes Forever

Finance teams spend too many hours checking receipts and bills every month.

A company with 12 finance workers wastes over 500 hours a month (like 2 full-time jobs!) just on paperwork.
Result: They miss early-payment discounts and **overspend by 15-20%**



Underutilized Transaction Data

Mastercard gathers detailed data from every transaction. However, this valuable information isn't always transformed into actionable insights that help businesses make smarter spending and budgeting decisions



Limited Benchmarking and Competitive Insights

Without industry-specific benchmarks, corporate clients can't easily compare their performance against peers or spot areas where they might cut costs or improve efficiency.



Limited Information on Card Benefits

Many companies are unaware of the benefits provided to them from different cards and end up utilizing the cards which does not have many benefits.

Ideas To Be Implemented

Intelligent Card Recommendation System

An recommendation engine that analyzes company transaction data to suggest the most suitable corporate cards. It provides personalized recommendations for upgrades and additional benefits, ensuring cost savings and optimized rewards.

- 01 Collect and integrate transaction and card data
- 02 Preprocess and engineer features
(Classify transactions into spending categories)
- 03 Assess the rewards and cost-savings derived from the company's current card based on their transaction profile.
- 04 For each other Mastercard corporate card, simulate potential benefits by applying the company's transaction data against each card's rewards and fee structure.
- 05 Compare the difference in benefits and cost-savings between the current card and other available options.
- 06 Deploy the recommendation engine as a web service or integrate it into existing Mastercard platforms for seamless access by corporate clients.
- 07 Regularly update the system with new transaction data and any changes in card offerings to ensure the recommendations remain current and accurate.

Category	Metrics	Pitfalls
Accuracy of Benefit Comparison	Correct matching of transaction categories with card perks Precision in calculating savings & benefits	Misclassification of transactions can lead to incorrect comparisons Some benefits (e.g., lounge access, insurance) are hard to quantify
Comprehensiveness of Data	Coverage of all relevant transaction categories Ability to analyze recurring vs. one-time expenses	Incomplete transaction records may lead to misleading suggestions Edge cases (e.g., vendor-specific discounts) might be ignored
Up-to-date Card Information	Frequency of updates to card benefits Correctness of reward structures & cashback rules	Credit card terms change frequently; outdated info may lead to poor recommendations
Potential Cost Savings	Difference in rewards, cashback, and fees between current & suggested cards	Hidden costs like annual fees, late payment charges may not be factored in
User Engagement & Retention	Duration a company keeps using a recommended card Reduced switching frequency leading to long-term benefits	If recommendations change too frequently, users may lose trust and engagement

Intelligent Card Recommendation System: Key Metrics and Common Pitfalls

The table evaluates the system's effectiveness while highlighting potential challenges to ensure reliable and valuable recommendations.

Ideas To Be Implemented

Anomaly Detection System

A real-time anomaly detection system that monitors corporate spending patterns to detect overspending and fraudulent transactions while ensuring data privacy

01. Data Collection

- Gather transaction data from sources like Mastercard and **ERP** systems (e.g., SAP, Oracle).
- Use **ETL** (Extract, Transform, Load) processes to standardize and clean the data.
- Store the processed data in a centralized repository for analysis.

02. Data Privacy

- Apply techniques like data masking and pseudonymization to protect sensitive information.
- Implement encryption and strict access controls to ensure data security.

03. Feature Engineering

- Identify key indicators of spending behavior and potential fraud, such as **transaction amounts, frequencies, and merchant categories**.

04. Anomaly Detection

- Train models like **Isolation Forests** and **Autoencoders** to detect unusual patterns indicative of fraud.
- Use **Graph Neural Networks (GNNs)** to analyze complex relationships between transactions.

05. Real-Time Processing & Alerts

- Implement real-time data processing tools (e.g., Apache Kafka) to monitor transactions as they occur.
- Set up automated alerts to notify relevant personnel of detected anomalies promptly

06. Continuous Learning

- Regularly update models with new data to adapt to evolving fraud patterns.
- Incorporate user feedback to refine the system and reduce false positives.

Financial Anomaly Detection: Key Metrics and Common Pitfalls

Implementing a financial anomaly detection system requires understanding essential performance metrics and their associated pitfalls. This section outlines these key metrics and common challenges to enhance system accuracy and reliability.

Metric	Description	Pitfall
Precision	Measures how many of the transactions flagged as anomalies are truly fraudulent. High precision means fewer false alarms.	Focusing only on precision may cause the system to miss many actual fraud cases, as it becomes too cautious in flagging anomalies.
Recall	Indicates how many actual fraudulent transactions are correctly identified by the system. High recall means most fraud cases are detected.	Emphasizing only recall can lead to many false alarms, as the system becomes overly aggressive in flagging transactions.
F1 Score	The balance between precision and recall, providing a single measure of a model's accuracy. A high F1 Score indicates a good balance between detecting fraud and minimizing false alarms.	Relying solely on the F1 Score might overlook specific needs of the system, such as the particular costs associated with false positives or false negatives.
False Positive Rate	Shows the percentage of legitimate transactions incorrectly flagged as fraudulent. A lower rate means fewer false alarms.	A high false positive rate can overwhelm the investigation team and annoy customers due to unnecessary fraud alerts.
False Negative Rate	Represents the percentage of fraudulent transactions that the system fails to detect. A lower rate means fewer missed fraud cases.	A high false negative rate means more fraud cases go unnoticed, potentially leading to significant financial losses.

Ideas To Be Implemented

Predictive Budgeting & Analytics

A system that uses transactional data to predict future budget trends. It provides businesses with insights to manage expenses, optimize cash flow, and make smarter financial decisions

01. Data Collection

- Gather data from **ERP systems** (e.g., SAP, Oracle) and financial records.
- Use **ETL** pipelines to clean and standardize the data.
- Store it in a centralized database for analysis.

02. Analysis & Feature Engineering

- Identify key patterns like seasonal trends, spending spikes, and recurring expenses.
- Use metrics such as cash flow ratios, category-wise expenses, and transaction frequency.
- Create new features like moving averages or spending deviations to improve predictions.

03. Development & Prediction

- Use Time Series models (**ARIMA, Prophet**) for sequential data prediction.
- Apply ML models like **Random Forest** and **XGBoost** for multi-variable financial forecasting.
- Forecast future budgets based on spending trends and highlight anomalies.

04. Visualization & Reporting

- Create interactive dashboards to display budget forecasts and trends.
- Include detailed reports on future expenses and cash flow predictions.
- Provide visual insights for smarter financial decisions.

05. Real-Time Processing & Alerts

- Integrate real-time processing tools (e.g., **Apache Kafka**) to track expenses live.
- Set alerts for unexpected budget deviations.
- Provide instant reports and notifications to managers.

06. Continuous Learning

- Regularly update the model with new data to maintain accuracy.
- Use feedback loops to refine predictions and reduce false alerts.
- Improve with time as more transactional data is processed.

Predictive Budgeting & Analytics: Key Metrics and Common Pitfalls

Implementing a predictive budgeting and analytics system requires understanding the key performance metrics and their pitfalls. This section outlines these metrics and challenges to enhance the model's accuracy and reliability.

Metric	Description	Pitfall
Accuracy	Measures how close the model's forecasts are to actual financial outcomes.	May fail if market conditions or spending patterns change unexpectedly.
Data Quality	Ensures the model uses clean, complete, and reliable data for predictions.	Incomplete or inaccurate data leads to faulty forecasts.
Model Simplicity	Evaluates if the model is easy to understand and interpret.	Overly complex models are hard to maintain and prone to errors.
Flexibility	The model's ability to adapt to new trends or updated data.	Rigid models struggle to adjust to sudden financial changes.
Communication	Clarity in presenting forecasts to stakeholders through reports and dashboards.	Poor reporting may lead to misinterpretation and wrong decisions.

Market Analysis

1. Potential Addressable Market (PAM) calculation:

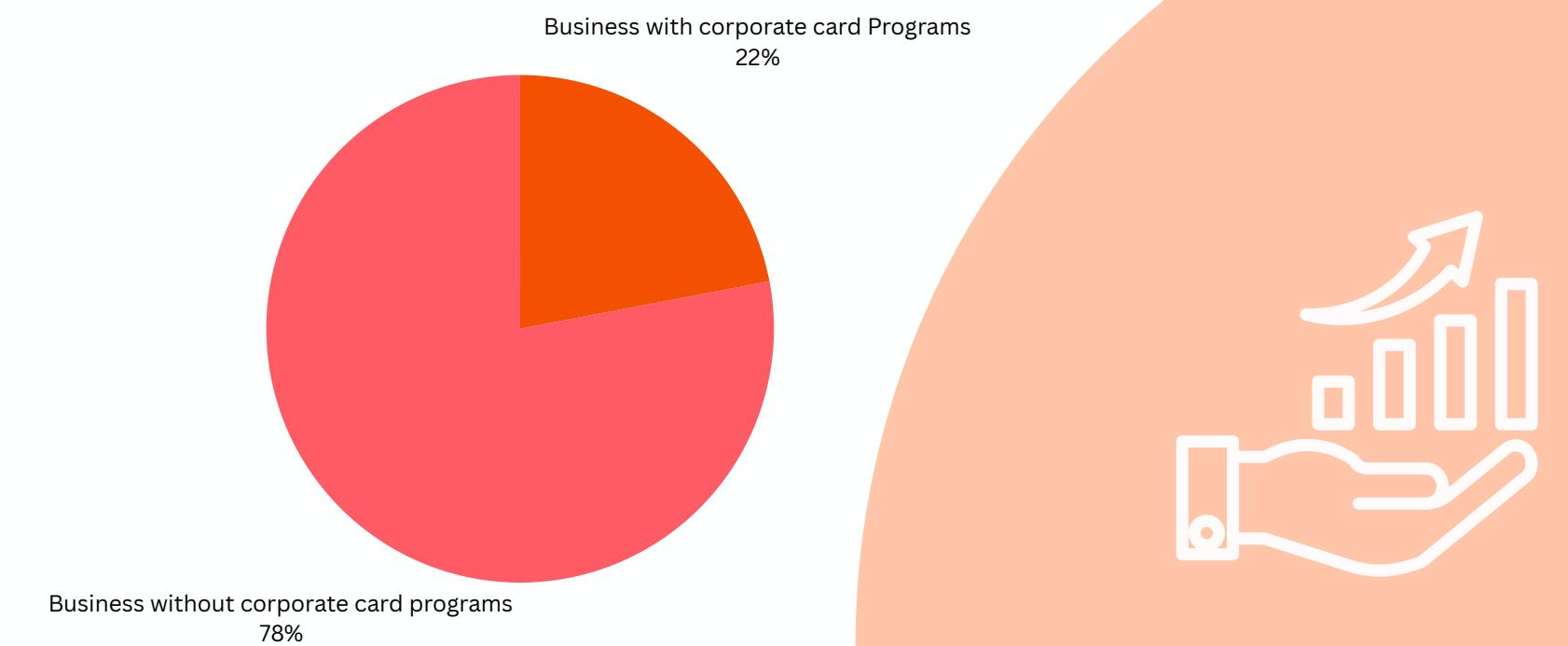
- Global businesses with ≥ 10 employees: ~310 million (World Bank, 2025 estimate)
- Businesses with corporate card programs: ~22% (Mordor Intelligence, 2025)
- $PAM = 310M \times 22\% = \mathbf{68.2 \text{ million businesses}}$

2. Total Addressable Market (TAM) calculation:

- Global corporate card transaction volume (2025): \$14.84 trillion⁵
- Average revenue per corporate card user: \$2,100/year (blended fees, interchange, and SaaS)
- $TAM (\text{businesses}) = (\$14.84T \div \$2,100) \approx \mathbf{7.07 \text{ million businesses}}$

Breakdown:

Region	Market Share	Businesses
North America	48%	3.39M
Europe	28%	1.98M
Asia-Pacific	18%	1.27M
Rest of World	6%	0.42M



Market Analysis



3. Serviceable Addressable Market (SAM) data:

- Mastercard's corporate card market share: 24% globally (vs. Visa's 52%)
- SAM (businesses) = $7.07M \times 24\% = 1.7 \text{ million businesses}$

Segmentation:

Segment	Criteria	SAM Share
Enterprises (>1,000 employees)	High spend, multi-card programs	55% (935K)
Mid-market (100-999 employees)	Growth-focused, moderate spend	35% (595K)
SMBs (<100 employees)	Low adoption, high churn	10% (170K)

4. Serviceable Obtainable Market (SOM)

Definition: Realistic 5-year capture (2025–2030) accounting for competition, adoption barriers, and Mastercard's operational capacity.

Assumptions:

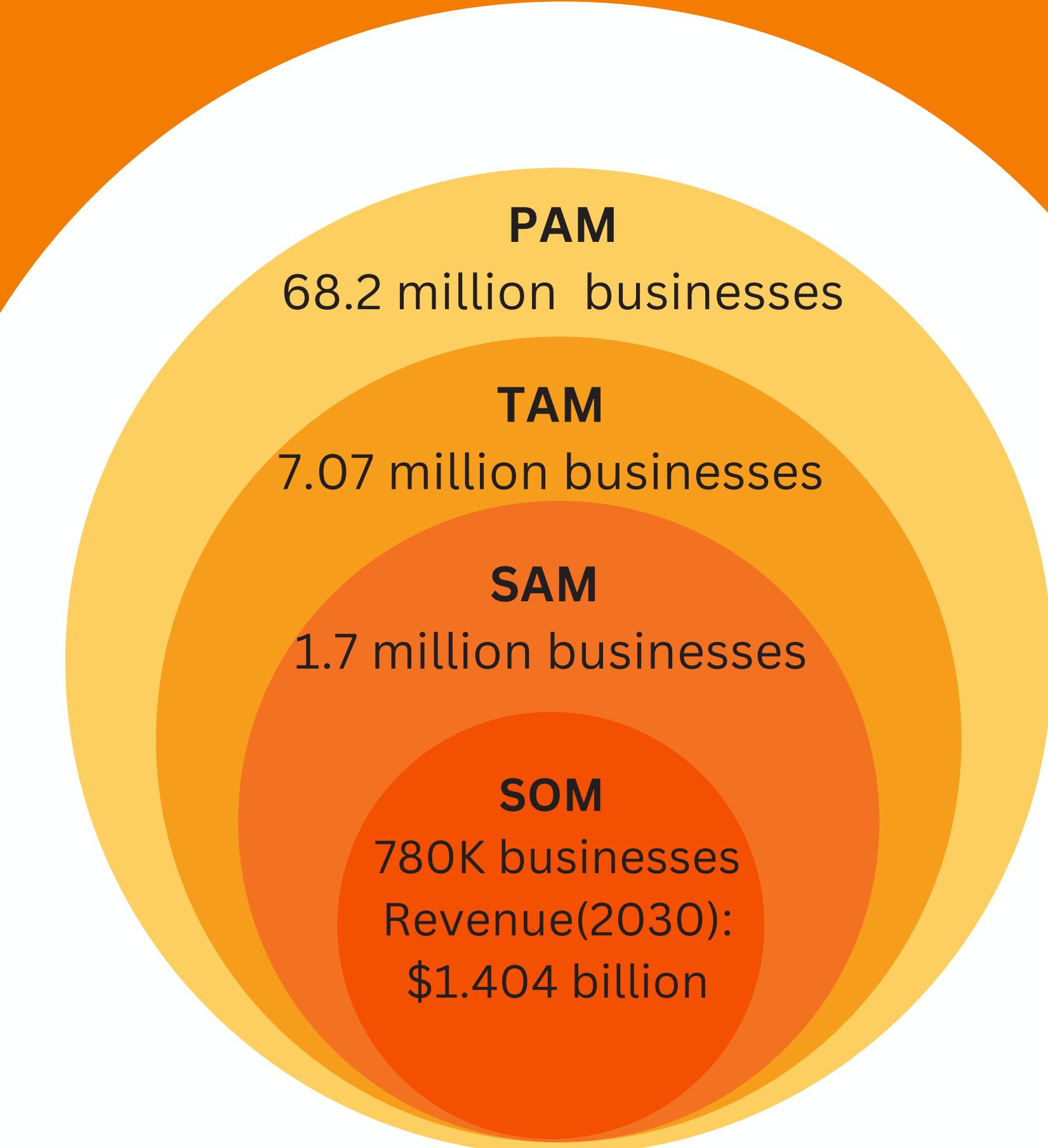
- Market penetration rate: 12% annually (conservative for AI adoption in fintech)
- Attrition rate: 8% (industry standard for SaaS tools)

Calculation:

- Year 1 (2025): $1.7M \times 12\% = 204K$
- Year 5 (2030): Cumulative adoption $\approx 780K \text{ businesses (net of attrition)}$

Market Segmentation

- PAM (68.2 million businesses): Represents all businesses globally that may have the potential to use Mastercard's data products.
- TAM (7.07 million businesses): Focuses on businesses actively utilizing credit card solutions, narrowing the scope to Mastercard's primary audience.
- SAM (1.7 million businesses): Refers to businesses that can realistically adopt Mastercard's advanced commercial solutions within the defined market.
- SOM (780K businesses): Reflects the expected number of businesses likely to adopt these solutions by 2030, contributing an estimated revenue of \$1.404 billion per year.



RICE Analysis

Intelligent Card Recommendation System

- **Reach:** Potentially impacts a large number of commercial clients.
- **Impact:** Moderate impact on revenue through increased card upgrades and benefits utilization.
- **Confidence:** Strong confidence due to existing infrastructure and proven success.
- **Effort:** Moderate implementation effort required.

Anomaly Detection System

- **Reach:** Primarily targets larger enterprises with multiple cardholders.
- **Impact:** High impact on compliance and reducing unauthorized spending.
- **Confidence:** Reasonable confidence based on existing fraud detection technologies.
- **Effort:** Relatively low implementation effort required.

Predictive Budgeting & Analytics

- **Reach:** Benefits a substantial number of medium to large enterprises.
- **Impact:** Significant improvements in financial planning and expense management.
- **Confidence:** Moderate confidence due to external factors and data variability.
- **Effort:** Higher implementation effort compared to the recommendation system.

Prioritizing Solutions

RICE Score = Reach x Impact x Confidence
Effort

Ideas	Reach	Impact	Confidence	Effort	RICE Score
Intelligent Card Recommendation System	8.5	8	90	7	874.2
Anomaly Detection System	7	8.5	75	6	743.75
Predictive Budgeting & Analytics	7.5	7	70	8	459.4

RESOURCE PAGE

- <https://www.mordorintelligence.com/industry-reports/global-credit-cards-market>
- <https://sea.mastercard.com/en-region-sea/business/large-enterprise/cards/corporate.html>
- <https://www.rho.co/blog/tam-vs-sam-vs-som>
- <https://www.salesmate.io/blog/tam-sam-som/>

THANK YOU