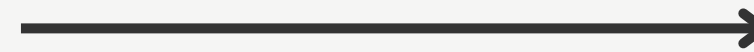# *Technical Test Presentation*

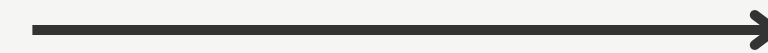Aug 2025

Presented by

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Objective

- Analyze user behavior based on transaction, card, and profile data
- Identify transaction patterns, user segments, and potential risks & opportunities
- Create an interactive dashboard to visualize insights effectively

Data Overview

3 Dataset

- users_data: user profile information
- cards_data: card details
- transaction_data: user transaction activities

1212 User

Represents unique users with complete profile, card, and transaction history for behavioral analysis.

3 Periode

Data spans 3 years (2017–2019), providing insight into user behavior over time.

Methodology

SQL

Used to query, clean, and transform raw datasets from users_data, cards_data, and transaction_data into a unified structure for analysis.

Fct Table

A fact table combining user profiles, card details, and transaction activities — serving as the core dataset for building metrics and insights.

Looker Studio

Tool used to create interactive dashboards, visualize user behavior trends, and explore insights across the 2017–2019 period.

User Demographics

28.09%

Some users have high credit scores, indicating healthy finances and low risk for financial institutions.
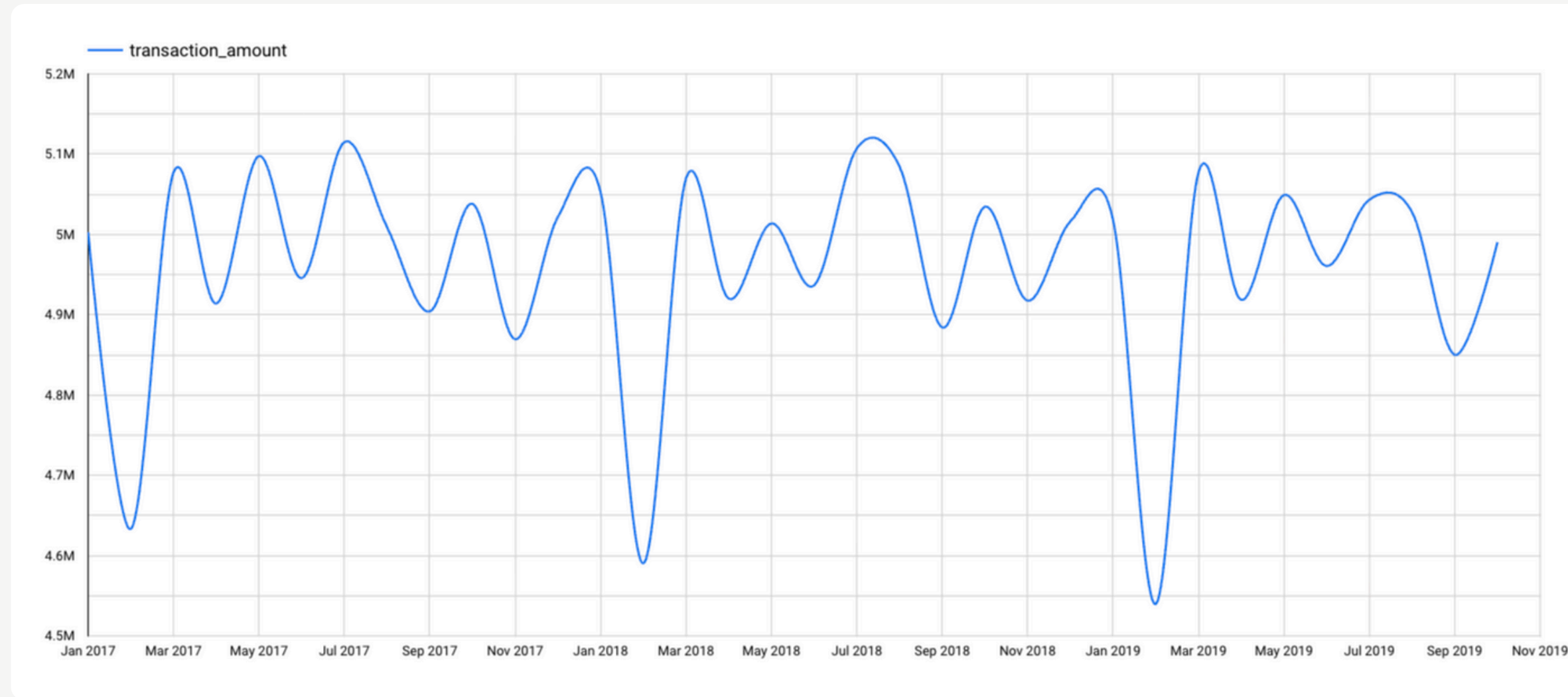
59.02%

More than half of the users have debt exceeding their income, indicating potential financial risk.

84.10%

The majority of users transact at physical merchants, indicating strong offline engagement and opportunities for in-store services.

Monthly Transaction Trend (2017–2019)

The chart shows that monthly transaction amounts remained relatively stable between 4.7M and 5.1M over the 3-year period, with noticeable drops occurring consistently around February each year — indicating a seasonal pattern or cyclical behavior in user spending.

Gender Distribution by Generation
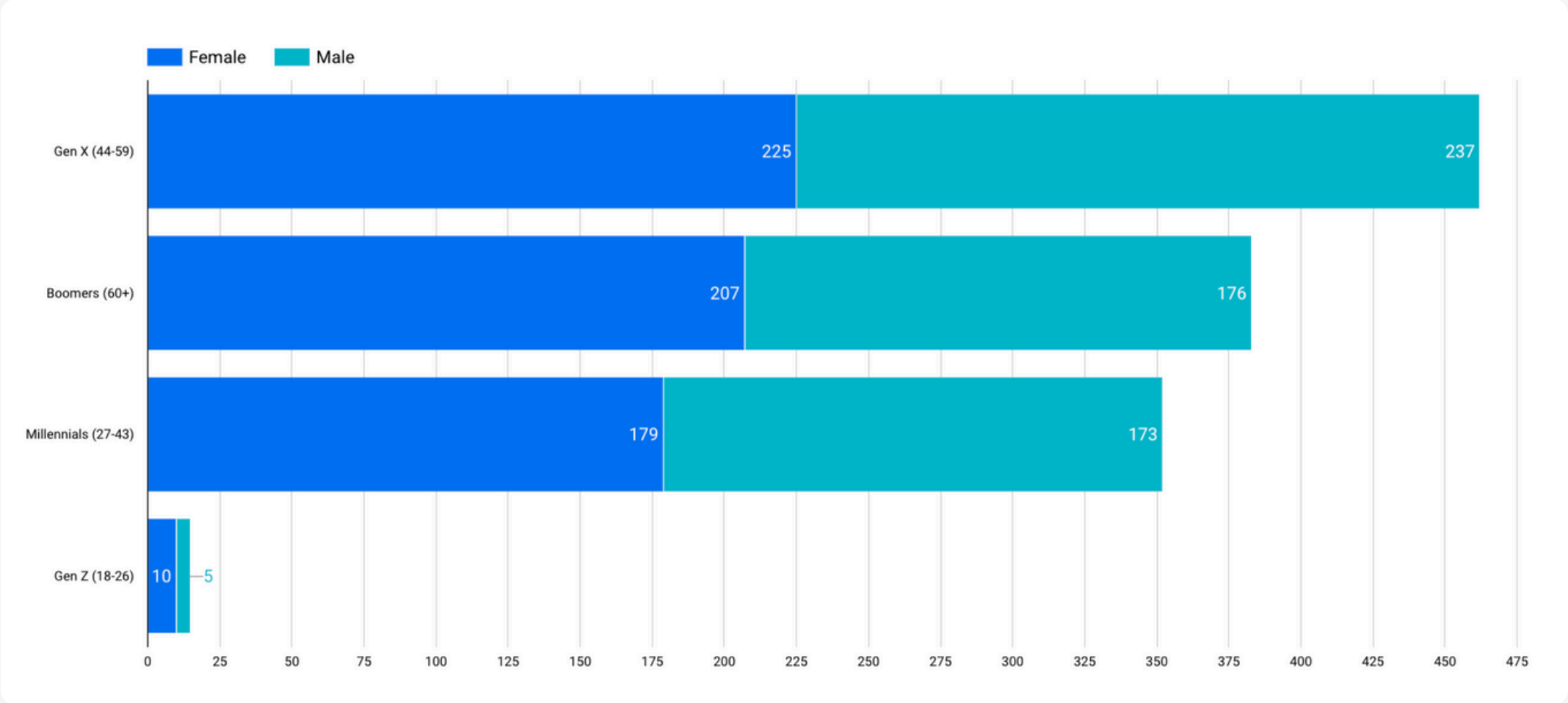
The chart shows that Gen X (ages 44–59) dominates the user base with 462 users, followed by Boomers (60+) with 383 users and Millennials (27–43) with 352 users. Gen X and Boomers have slightly more female users, while Millennials show a nearly balanced gender split. In contrast, Gen Z (18–26) is significantly underrepresented with only 15 users, indicating either lower financial engagement or untapped potential in this younger segment. This generational breakdown highlights that middle-aged to older users remain the core audience, while younger users may require targeted outreach.

Debt vs Income Across Generations
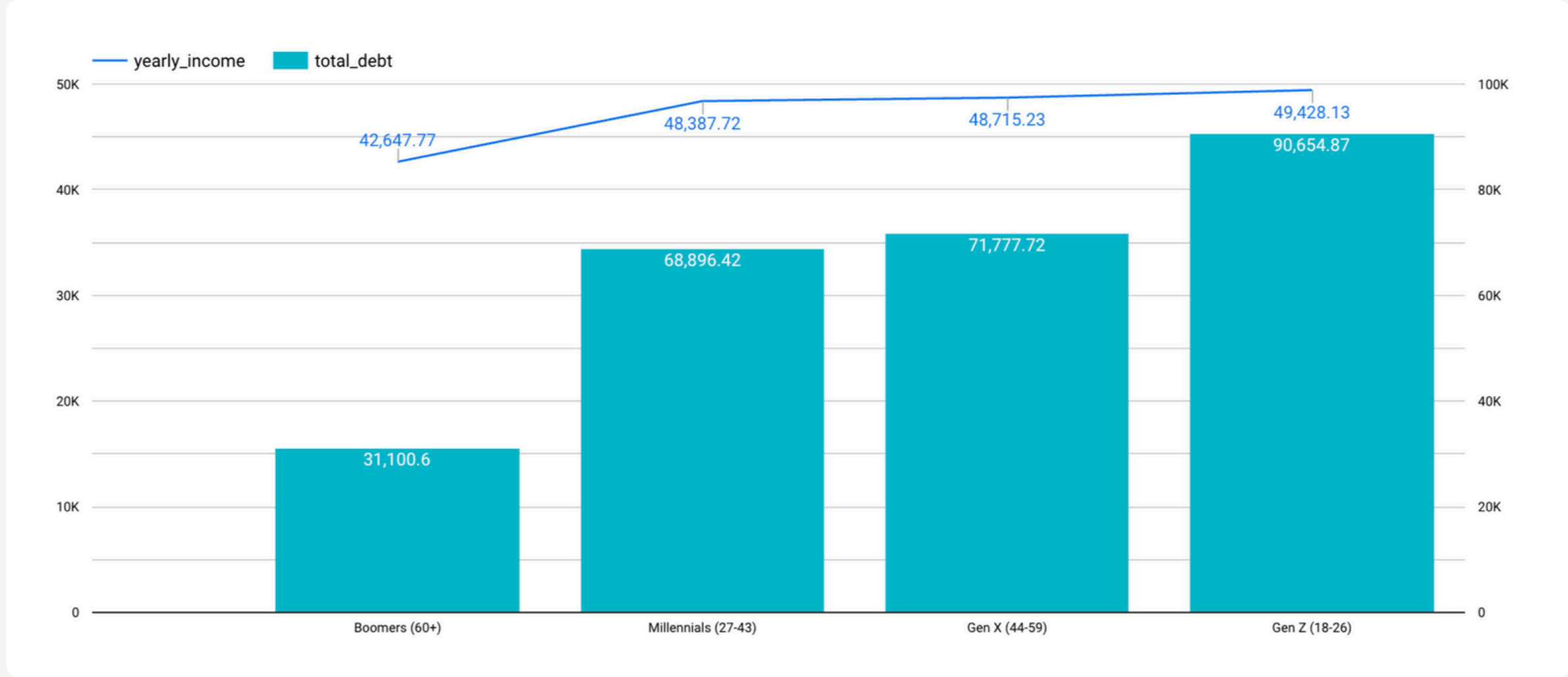
The chart compares average yearly income and total debt across generations. It reveals that Gen Z (18–26) holds the highest average debt at 90,654.87, despite having only a slightly higher average income (49,428.13) than other generations. In contrast, Boomers (60+) have the lowest total debt (31,100.6) and also the lowest income (42,647.77), indicating more conservative financial behavior. Gen X (44–59) and Millennials (27–43) have similar incomes (~48K–49K) but moderately increasing debt levels. This suggests that younger users, especially Gen Z, are accumulating debt at a faster pace than their income growth, highlighting a potential risk group for financial institutions.

# Transaction Method Preferences by Age Group
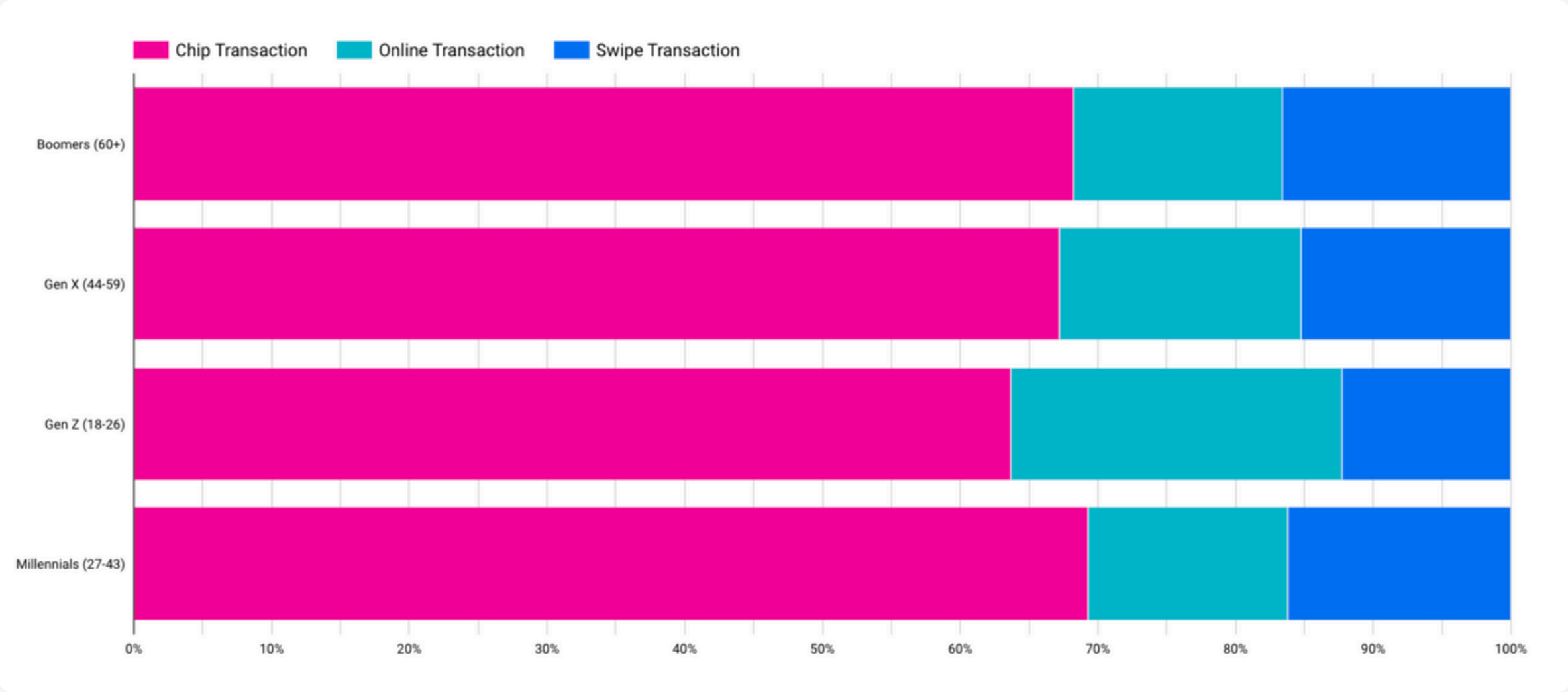
The chart shows that chip transactions dominate across all age groups, particularly among Boomers and Gen X. However, younger generations — especially Gen Z — display a higher preference for online transactions, indicating stronger adoption of digital payment methods. Swipe transactions remain the least used across all groups.

Card Network Distribution by Card Type
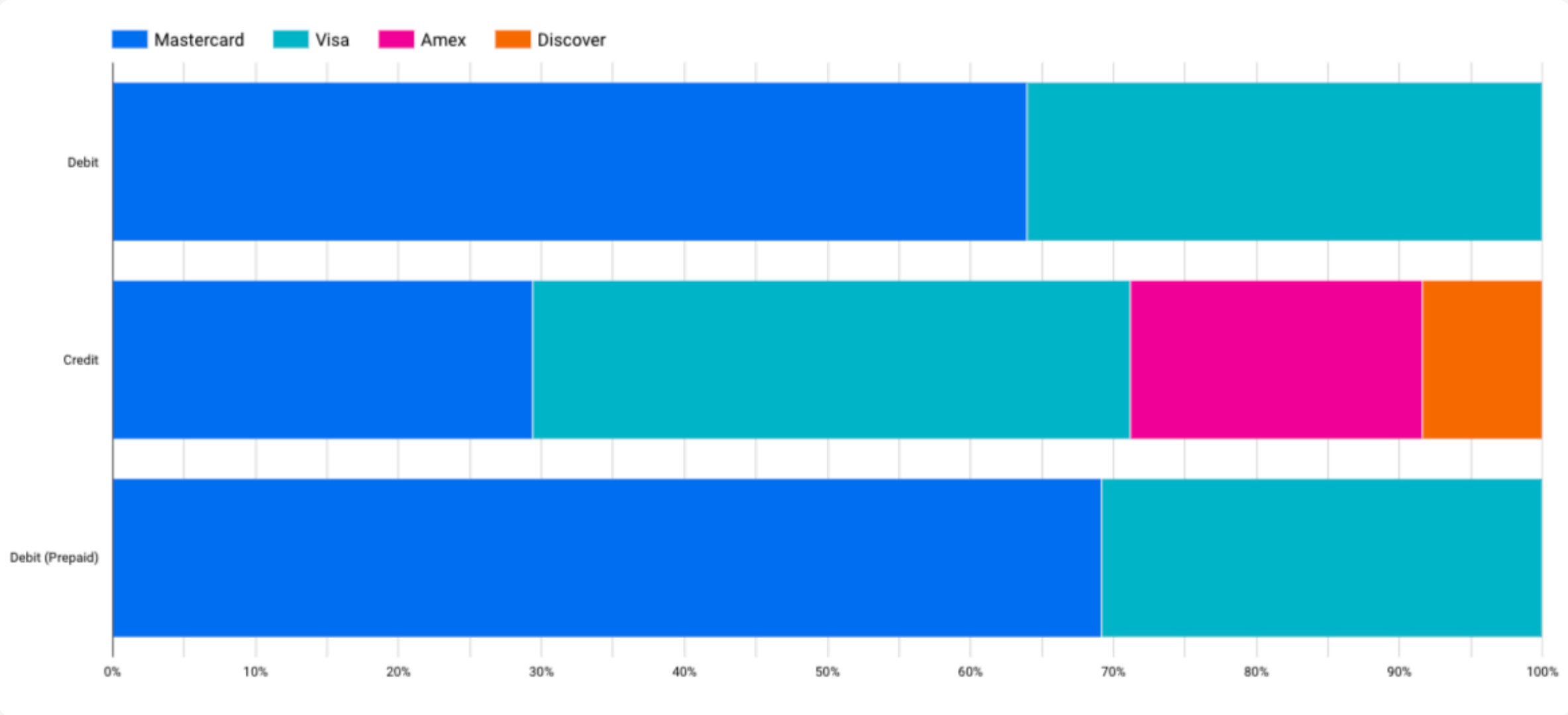
The chart illustrates the distribution of card networks across different card types. Mastercard and Visa dominate all categories, with Mastercard leading in both debit and prepaid debit cards. Credit cards show a more diverse distribution, with Visa maintaining a significant share, but Amex and Discover also having a notable presence—unlike in debit cards, where their use is minimal. This suggests that Mastercard and Visa are the preferred networks for everyday spending, while Amex and Discover are primarily used for credit-based transactions.

Breakdown of Transaction Errors: Merchant vs Online
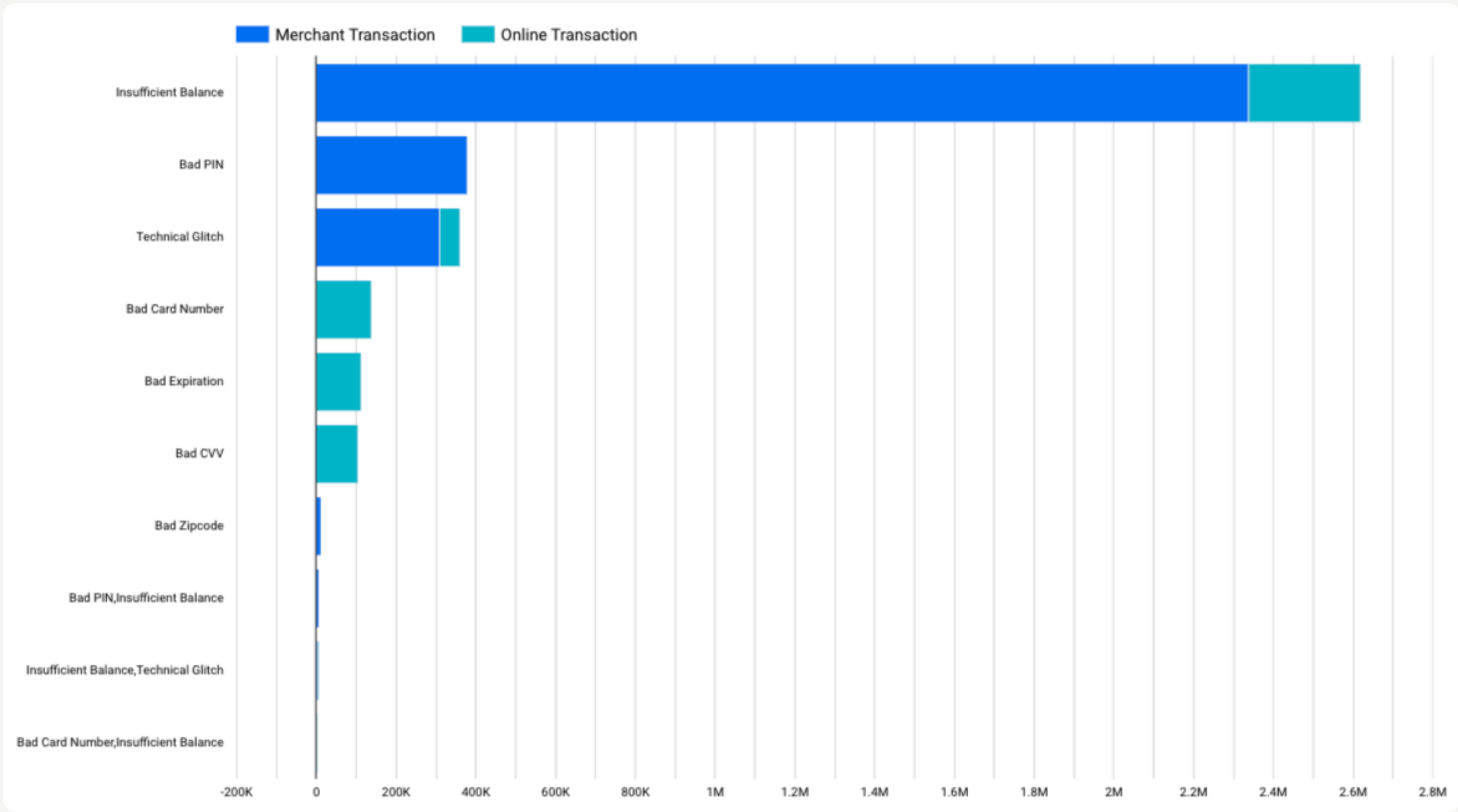
The chart highlights that "Insufficient Balance" is the most common cause of transaction failures, particularly for merchant transactions, followed by "Bad PIN" and "Technical Glitch." Meanwhile, online transactions are more prone to errors related to card information, such as bad card number, expiration date, and CVV. This suggests the need for better card validation systems for online platforms, and more financial awareness or balance alerts for offline users.

Summary

This project analyzed user behavior using transaction, card, and profile data across a 3-year period (2017–2019), covering 1,212 unique users. The data was unified into a fact table and visualized through an interactive Looker Studio dashboard. Key findings include:

Demographics:
- Gen X and Boomers dominate the user base, while Gen Z remains underrepresented.
- 59% of users have debt exceeding their income, and only 28% have high credit scores—raising financial risk concerns.
- Most users transact at physical merchants rather than online.

Spending Behavior:
- Transaction volume is relatively stable but dips every February, indicating seasonal trends.
- Gen Z holds the highest average debt despite moderate income, making them a potential high-risk group.
- Gen X and Millennials have similar income levels with rising debt.

Transaction Preferences:
- Chip transactions are dominant, especially among older generations.
- Gen Z shows a higher share of online transactions—reflecting digital adoption.
- Mastercard and Visa dominate card usage, especially in debit and prepaid cards, while Amex and Discover are mostly used for credit.

Errors & Risks:
- The most common error is Insufficient Balance, especially in merchant transactions.
- Online transactions are more prone to card information errors (e.g., bad CVV, expiration).
- This indicates the need for both technical improvement and user financial literacy.

Recomendations

- Target High-Risk Groups : Monitor users with high debt-to-income ratios, especially within Gen Z, and introduce financial education or product limits.
- Boost Digital Engagement for Older Users : Since Gen X and Boomers dominate the base, promote digital transaction options (e.g., app upgrades, e-wallet integration).
- Improve Card Validation for Online Transactions : Reduce online transaction errors by enhancing input checks and real-time feedback for bad card details.
- Enable Balance Alerts & Smart Limits : Deploy in-app balance notifications and spending caps to reduce insufficient balance errors.
- Leverage Network Loyalty : Partner with Mastercard and Visa, which dominate usage, to create rewards programs tied to spending behavior.
- Expand Outreach to Gen Z : Although underrepresented, Gen Z shows strong online preferences — tap into this segment via digital-first products or gamified finance tools.