

CREDIT CARD MARKET RESEARCH & A/B TESTING

 ROLE: DATA SCIENTIST

BUSINESS OBJECTIVE

To identify target demographics, analyse consumer behaviour, and validate product strategies through statistical methods to support the launch of a new financial product.

PROJECT WORKFLOW

- Data Collection
- Data Cleaning
- Exploratory Data Analysis
- Customer Segmentation
- Statistical Testing (A/B Testing)
- Insights & Recommendations

TOOLS & TECHNOLOGIES

Languages: Python 3.x

Libraries: Pandas, NumPy, Seaborn, Matplotlib, scikit-learn

Environment: Visual Studio Code, Jupyter Notebook, MySQL

GITHUB REPOSITORY

<https://github.com/SurajK221b/credit-card-eda>

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PROBLEM STATEMENT

Atliqo Bank is preparing to launch a new credit card product aimed at enhancing customer engagement and capturing untapped market segments.

Prior to deployment, the bank requires comprehensive data-driven insights to support strategic decision-making in the following areas:

- Identification of the optimal target age group for initial rollout
- Analysis of preferred transaction platforms across customer segments
- Evaluation of spending behaviour to tailor rewards and coupon strategies
- Design and execution of pre-launch testing (e.g., A/B testing) to assess product performance and user adoption potential

PROJECT PHASES

Phase 1: Data Cleaning & Exploratory Analysis

Conducted comprehensive data preprocessing, including handling missing values and outliers, followed by detailed exploratory data analysis to uncover customer behaviour patterns, spending trends, and credit profiles.

Phase 2: A/B Testing & Performance Evaluation

Designed and implemented controlled experiments (A/B tests) to assess the impact of the new credit card on user engagement, spending behaviour, and platform adoption. Statistical validation was performed to ensure the significance of observed differences.

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PHASE 1: DATA CLEANING AND EXPLORATION

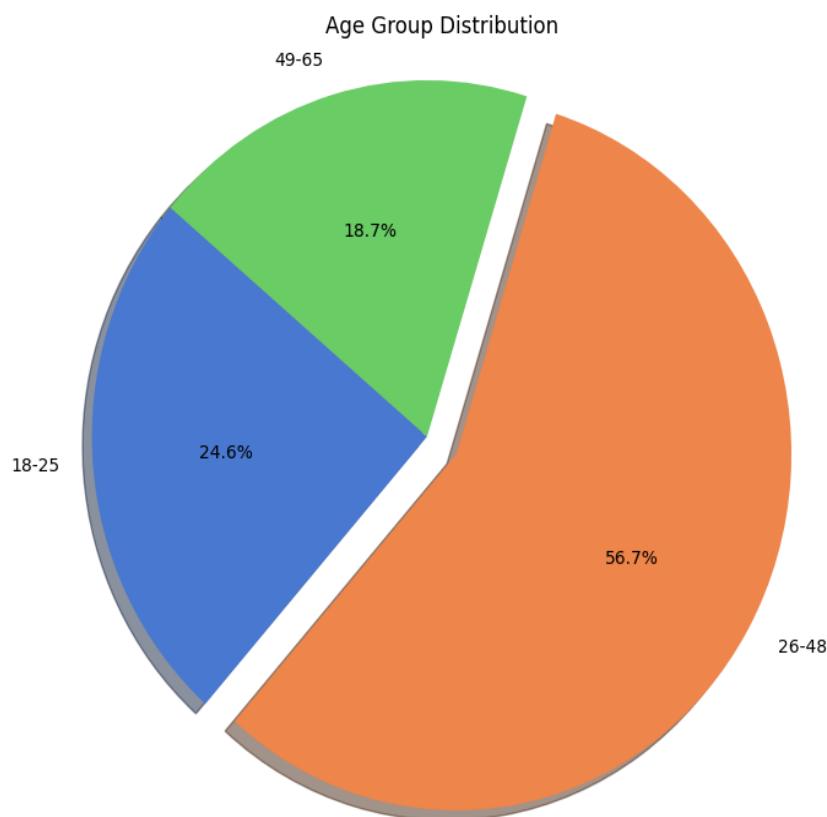
- Performed dataset-specific cleaning on customer, transaction, and credit profile data to ensure consistency and integrity across sources.
- Addressed data quality issues through:
 1. **Missing Value Imputation** using occupation-wise median values
 2. **Outlier Treatment** by replacing extreme values with average or median-based thresholds
- Conducted exploratory analysis to evaluate customer behaviour across key dimensions:

Age brackets

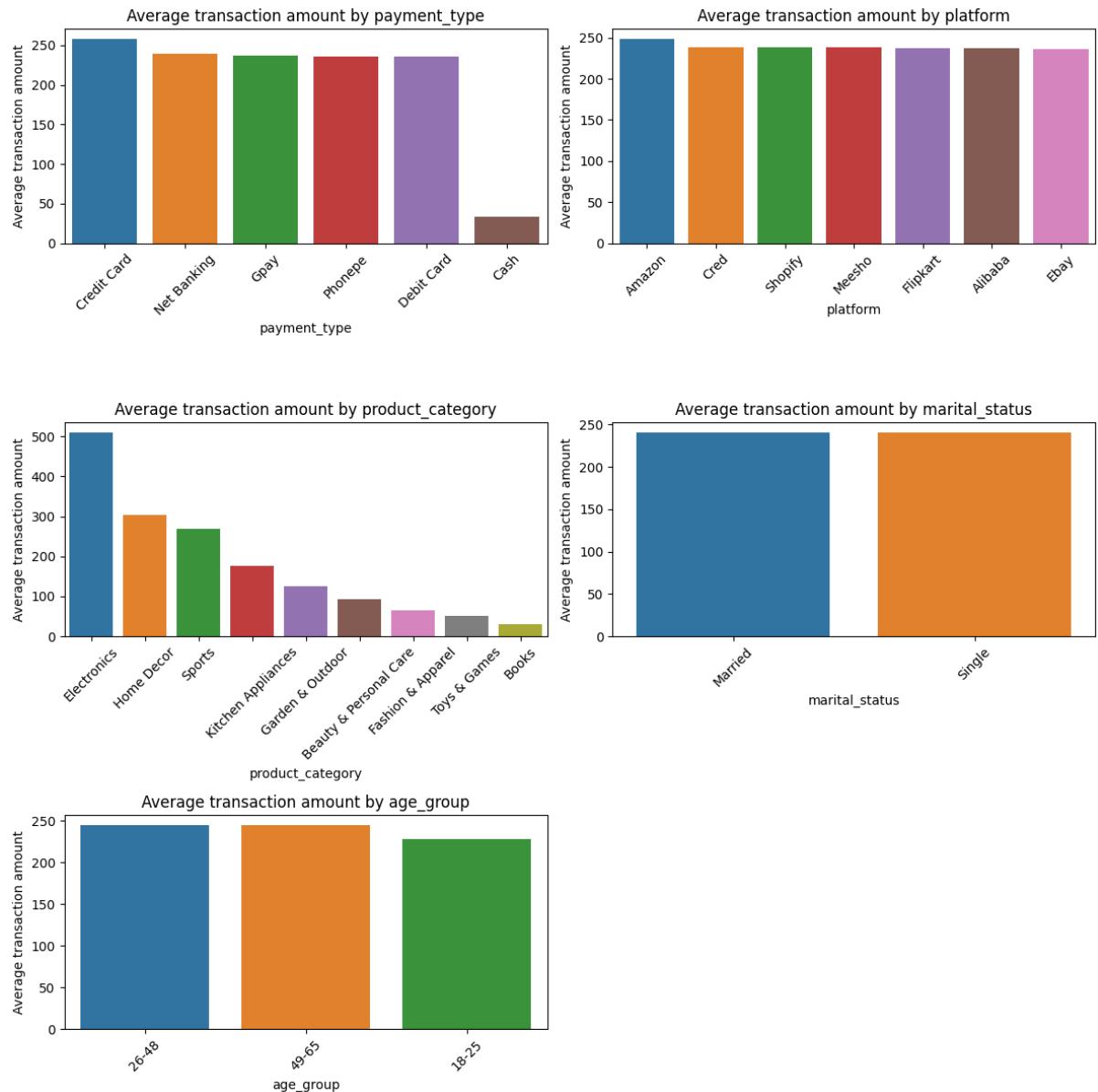
Annual income levels

Preferred payment methods

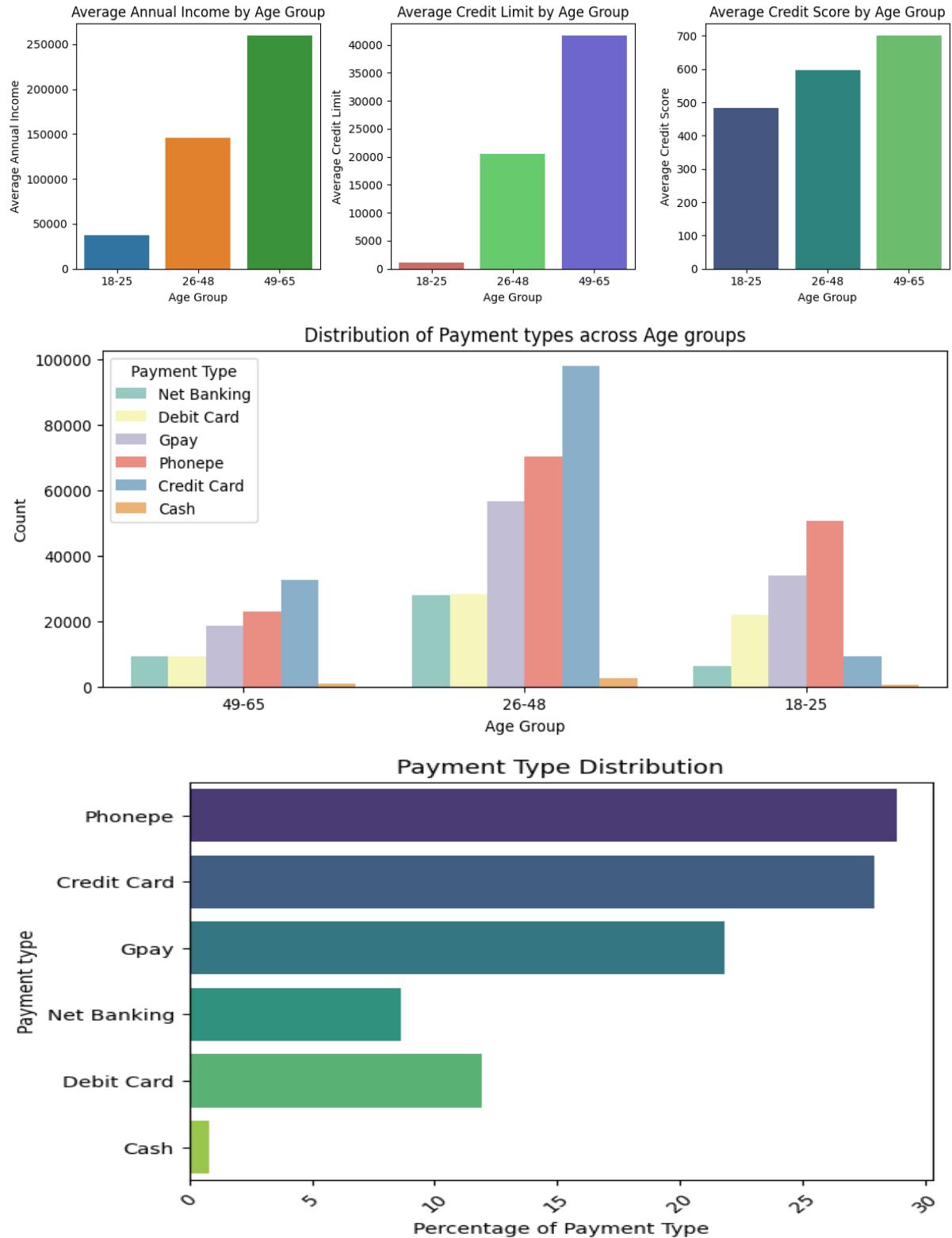
Credit history and score distribution



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PHASE 2: A/B TESTING & PERFORMANCE EVALUATION

- Designed and executed a statistically rigorous **A/B testing framework** to evaluate the impact of the newly proposed credit card offering on customer behaviour and platform usage.
- Key experiment components included:
 1. **Control Group:** Existing credit card users
 2. **Test Group:** New card users from the identified 18–25 target segment
 3. **Effect Size:** 0.4 | **Significance Level:** 0.05 | **Power:** 0.8
 4. **Methodology:** Two-sample t-test to measure differences in spending and engagement metrics
 5. **Sample Size:** 40 users in each group
 6. **Duration:** 2-month observation period
- The campaign led to the following validated outcomes:
 1. **p-value < 0.05** indicating statistical significance
 2. **Null hypothesis rejected**, confirming a measurable impact
 3. **Test group** showed increased spending and platform engagement

Target Segment – Age Group 18–25

- Based on exploratory data analysis and visual insights, the **18–25 age group** was identified as the optimal segment for the new credit card launch.
- Key characteristics of this segment:
 - Represents approximately **25% of the customer base**
 - Average annual income **below ₹50,000**
 - **Limited credit history**, ideal for entry-level financial products
 - Heavy usage of **UPI platforms** such as PhonePe and GPay
 - **Low competition** from existing credit card providers
- Strategic positioning: Entry-level credit card with **mobile app integration** and targeted **reward programs**



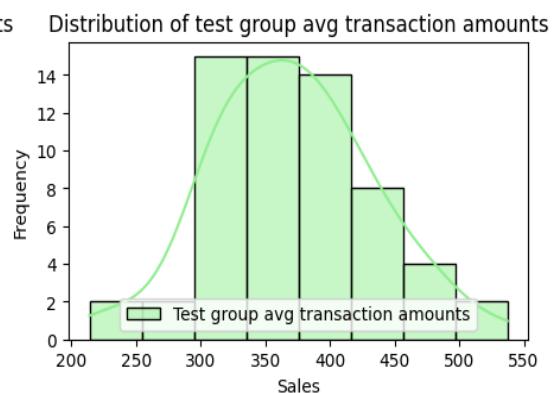
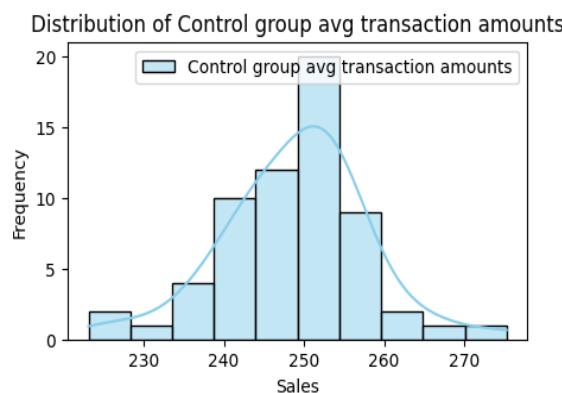
A/B Testing – Experiment Setup

- **Control Group:** Existing card users
- **Test Group:** New card users (age 18–25)
- **Effect Size:** 0.4 | **Significance Level:** 0.05 | **Statistical Power:** 0.8
- **Test Duration:** 2 months
- **Sample Size:** ~40 users in each group
- **Methodology:** Two-sample t-test to evaluate differences in spending behaviour and engagement



A/B Testing – Key Results

- **p-value < 0.05** → Result is **statistically significant**
- **Null hypothesis rejected**
- **Test group** exhibited:
 - Higher overall spend
 - Increased usage frequency



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CONCLUSION

This project demonstrates a complete data science workflow applied to a real-world financial product launch. Through robust **data cleaning, exploratory analysis**, and a well-structured **A/B testing framework**, we were able to derive actionable insights that directly informed strategic business decisions.

Key achievements include:

- **Identification of a high-potential target segment (Age 18–25)** with strong digital payment affinity and low existing credit product penetration
- **Validation of product-market fit** using statistically sound A/B testing, confirming a significant uplift in customer engagement and spend behaviour
- Translation of raw data into **strategic recommendations** that align with business objectives, market trends, and customer preferences

Overall, the project underscores the impact of **data-driven decision-making** in financial services and highlights the value of integrating analytics into product strategy.

SUMMARY AND THANK YOU

- Successfully identified an **untapped youth segment (age 18–25)** with high growth potential and low credit penetration
- Conducted **A/B testing** to validate the performance of the proposed credit card, demonstrating a statistically significant uplift in engagement and spend
- Showcased a **practical, end-to-end application of data science** for business problem-solving—from data cleaning to strategic recommendation
- This project highlights my ability to combine analytical rigor with business insight to drive impactful outcomes

LET'S CONNECT AND COLLABORATE

Feel free to explore more of my work and connect with me on:



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[Portfolio](#)