

# Banking Risk Analytics in Financial Services

Understanding how data minimizes lending risk while maximizing customer value through comprehensive banking analytics.

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# Project Overview

## Dataset Structure

Multi-table banking database with 3,000 rows and 25 columns, containing client details, banking relationships, and investment data linked through primary and foreign keys.

## Technology Stack

- MySQL for database management
- Python with Pandas for analysis
- Power BI with DAX for visualization
- Matplotlib & Seaborn for EDA

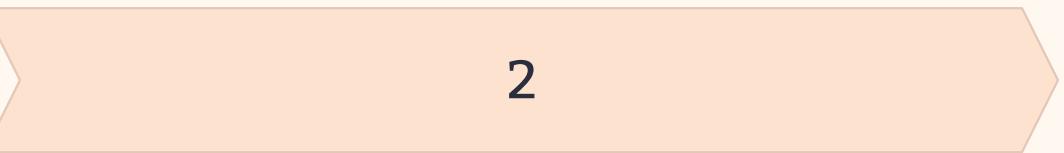


# Workflow Architecture



## 1 Database Setup

Created MySQL banking database and imported 3,000-row dataset



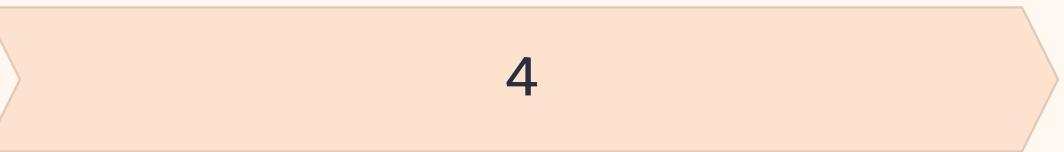
## 2 Python Integration

Connected MySQL with Python using pymysql library



## 3 EDA Process

Cleaned, transformed, and visualized data in Google Colab



## 4 Dashboard Build

Imported processed data into Power BI for business insights

# Exploratory Data Analysis



## Descriptive Statistics

Income and loan distributions showed right-skewed patterns, indicating a small subset of high-value clients driving portfolio value.



## Income Segmentation

Categorized income into Low, Medium, and High tiers. High-income customers dominate, reinforcing Private Banking concentration.



## Categorical Analysis

Assessed demographic distribution, customer segmentation, and loyalty tiers to detect lending or deposit patterns.



# Correlation Insights

## Key Findings

- **Strong positive correlation** between Bank Deposits, Checking Accounts, and Saving Accounts
- **Moderate correlation** between Business Lending and Bank Loans indicates potential overlap in loan exposure
- **Weak correlation** between Credit Card Balance and total lending suggests separate risk profile

Most clients are professionals in technical or structural roles, consistent with high-income segmentation patterns observed throughout the analysis.

# Power BI Data Preparation

01

## Engagement Days Column

Calculated client tenure from joining date to measure relationship longevity

02

## Processing Fees Logic

Applied conditional formatting: high fee structure = 0.05 processing fee

03

## Income Band Bins

Created bins: <\$100K as Low, <\$300K as Mid, remainder as High income

- ❑ **DAX Formulas Created:** Total Deposit (sum of all deposit accounts), Total Loan (sum of all lending products), Total Fees (loan amount × processing fees)



# Loan Portfolio Analysis

**\$4.4B**

Total Loans

\$1.8B bank loans, \$2.6B business lending,  
\$9.5M credit cards

**59%**

Business Lending

Dominates loan book, indicating corporate  
client focus

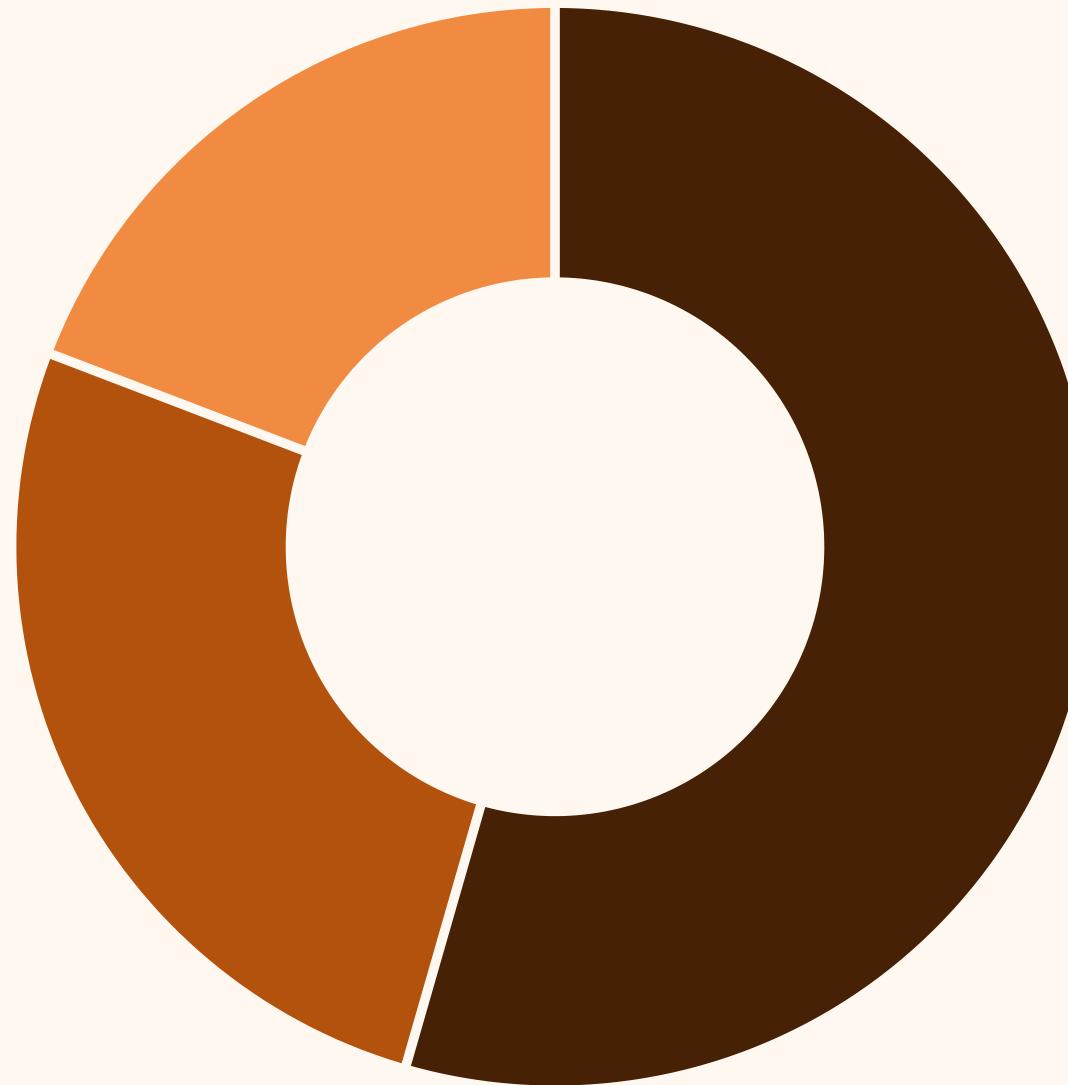
**53%**

High-Income Share

\$942.49M held by high-income clients

Private Banks lead significantly in loan issuance. European clients dominate the portfolio, with top borrowing occupations including Account Coordinators, Database Professionals, and Office Assistants.

# Deposit Distribution



■ Bank Deposits

■ Checking Accounts

■ Savings Accounts

**Total deposits: \$3.8 billion.** Private Banks dominate deposit volume, indicating high-value, low-volume client structure. High-income clients contribute 54% (\$2.03B) of total deposits.

European clients hold the largest share, followed by Asian and American customers. Geographic diversification is limited with strong Euro-centric concentration.

# Strategic Insights

## Concentration Risk

Loan and deposit exposure concentrated in Private Banking and high-income clients. Geographic risk centered on European markets requires diversification.

## Growth Opportunities

Consumer credit underrepresented with minimal credit card penetration. Expansion potential in mass retail products and diversified income tiers.

## Portfolio Stability

Current distribution ensures stability via high-creditworthiness clients but limits scalability. Balance needed between risk-return and sustained growth.



# Conclusion & Future Work

## Key Achievements

Power BI dashboards provide effective visualization of banking operations, enabling banks to track loan amounts, client distribution, and account metrics by investor type.

Private banks show highest client concentration, offering strategic insights for competitive positioning.

## Future Opportunities

- Track individual investor portfolios in real-time
- Analyze nationality-based lending patterns
- Develop strategies to increase client acquisition
- Monitor account type performance metrics

