



RMIT BUSINESS ANALYTICS CHAMPION

SEASON 5

ROUND 2 CASE STUDY

TEAM NAME:

DREAMWEAVERS

TEAM MEMBERS:

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EXECUTIVE SUMMARY

SITUATION

SHBFinance is a **dynamic financial institution** specializing in consumer finance, with a primary focus on providing financial support to low and middle-income individuals.

SHBFinance faced **significant challenges** due to the COVID-19 pandemic because of the **reshaped its customer demographics** and **altered the characteristics of its loan portfolios**

COMPLICATION

SHBFinance has yet to effectively **improve the quality of high-performing loan packages**, presenting a challenge to maximize their potential impact.

SHBFinance **has not clarified the differences** in benefits and interest rates among the **Credibility** groups.

SHBFinance **faces challenges** in **automating loan package consultations** for customers.

QUESTION

- Describe the **portrait of customers** and provide insights into each customer group.
- Analyze the **characteristics of loans** and relate them to the characteristics of customer groups.
- Provide **recommendations** to improve loans operation and enhance engagement in each customer segment.

ANSWER

Enhance and promote 24 and 36-month loan packages, while gradually building interest in longer-term products.

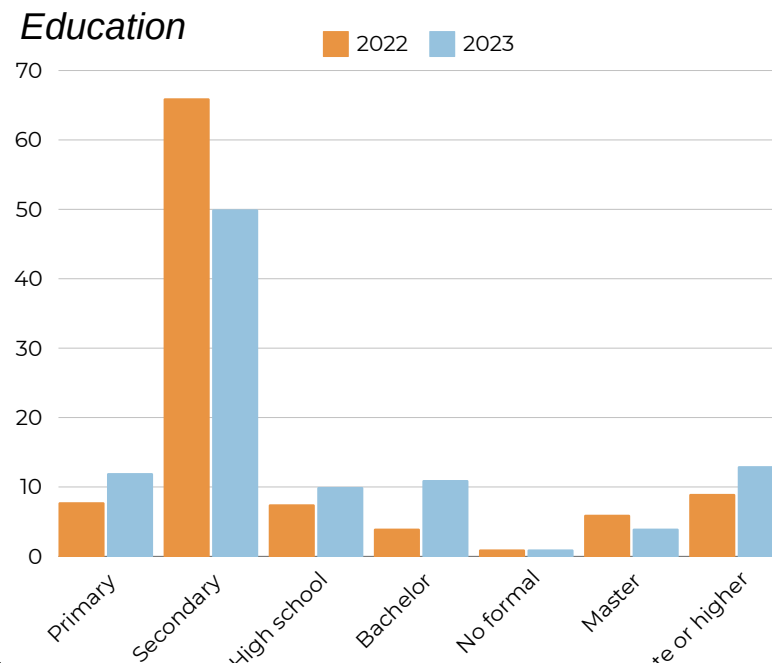
Implementing a **Credibility diversification strategy** to offer differentiated benefits and interest rates for each credit group

Integrate Large Language Model (LLM) and upgrade the system to automatically suggest suitable loan packages based on customer characteristics.

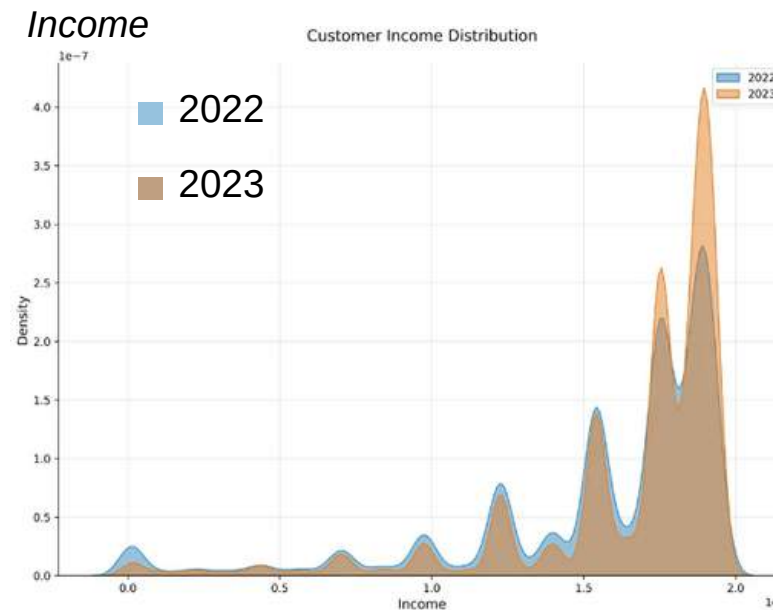
SHB Finance has observed changes in customer profiles from 2022 to 2023, specifically:

1 Be **more educated**, which correlate with **rising income levels**.

In 2023, more customers had **higher education** than in 2022.



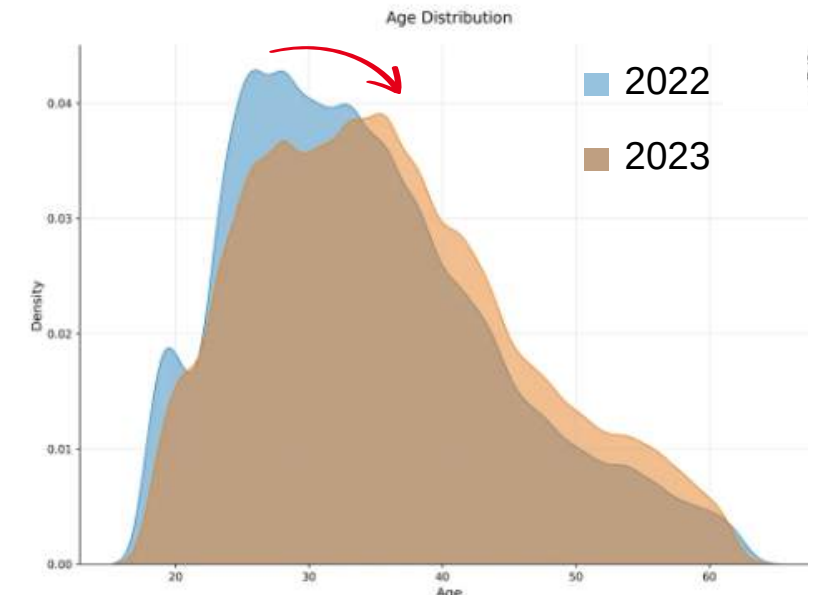
In 2023, high-income borrowers increased, SHBFinance **attracted wealthier customers**.



2 SHB targets financially **stable individuals** who are more likely to repay their loans.

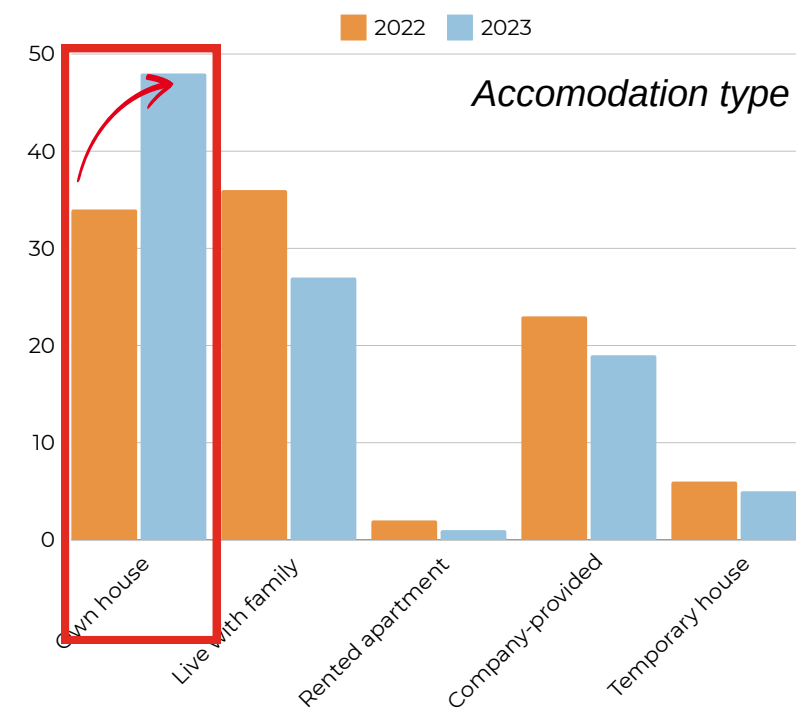
In 2022, most customers were between **20-35 years old**

In 2023, the age range **widened** to include more customers aged **25-45**

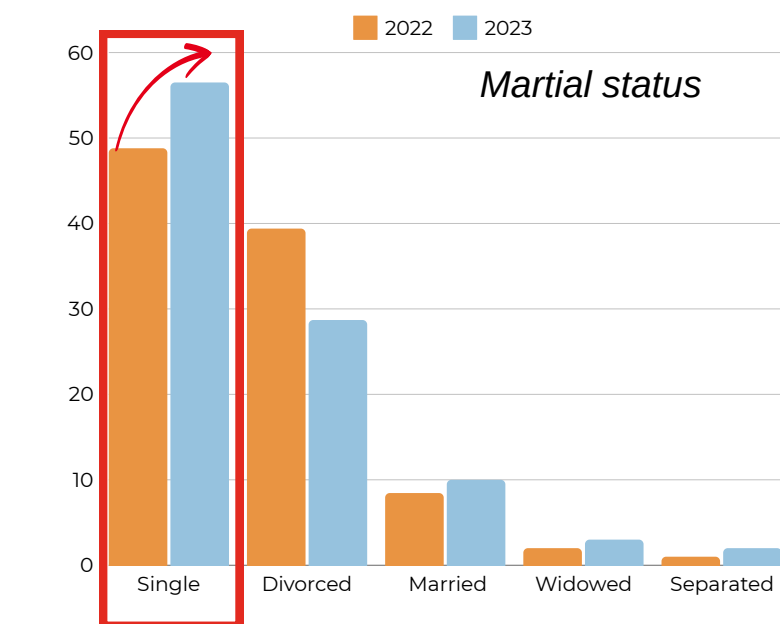


Financial stability may make customers **less likely to miss payments**.

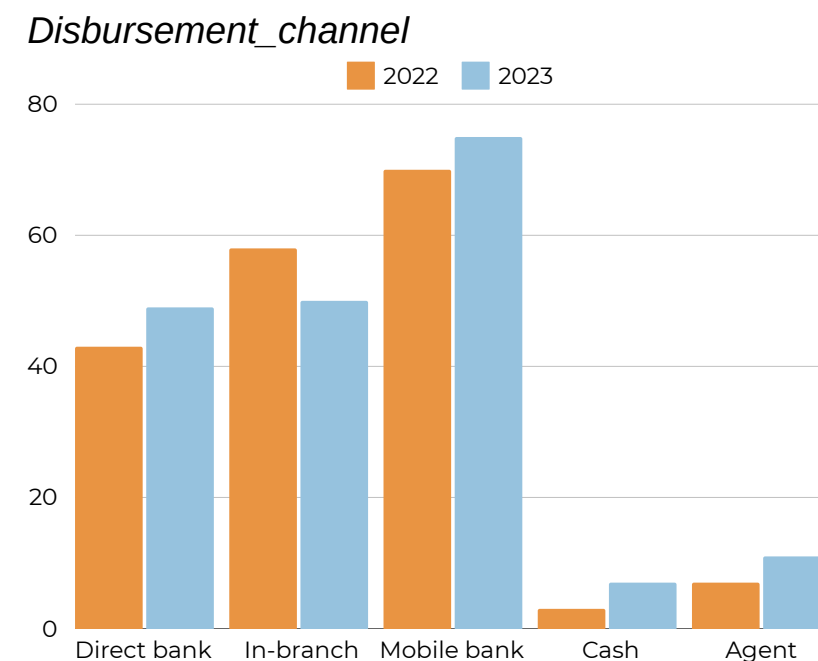
More customers with **stable housing**



Outreached to **individuals** with **fewer financial obligations**, aiming to attract **lower-risk profiles** with more disposable income for loan repayment.



3 Customers prefer the **convenience** of **mobile banking or app-based transfers**



Improve user experience

- Offer **advanced features** like financial advice & budget tools to meet customer demand for convenience.
- Offer **rewards** for mobile app transactions
- Integrate **digital scheduling & faster processing** to streamline services for branch users

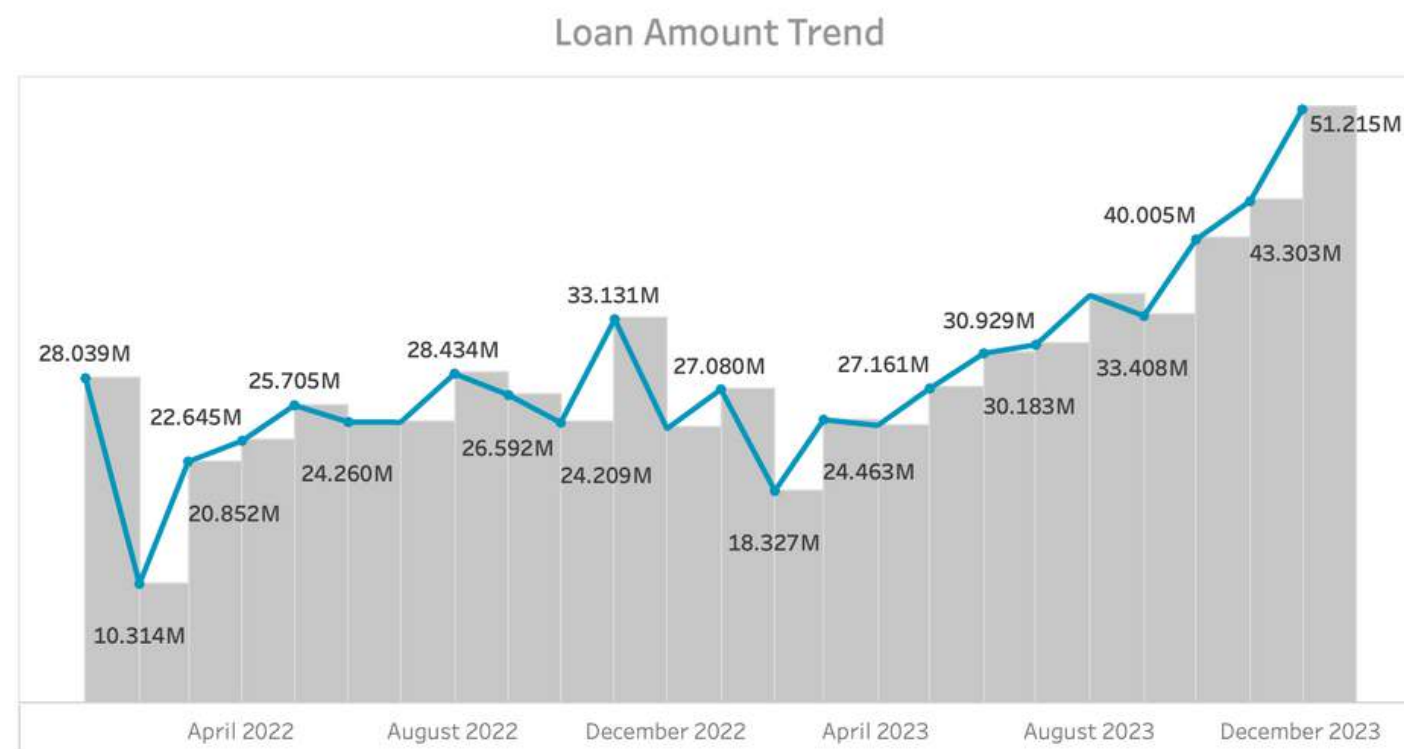
► Shift to a **wealthier, more mature demographic** in 2023 aligns with the broader trend of appealing to more **financially stable borrowers**

Based on the above analysis, the team decided to define the customer profiles of each group as follows...

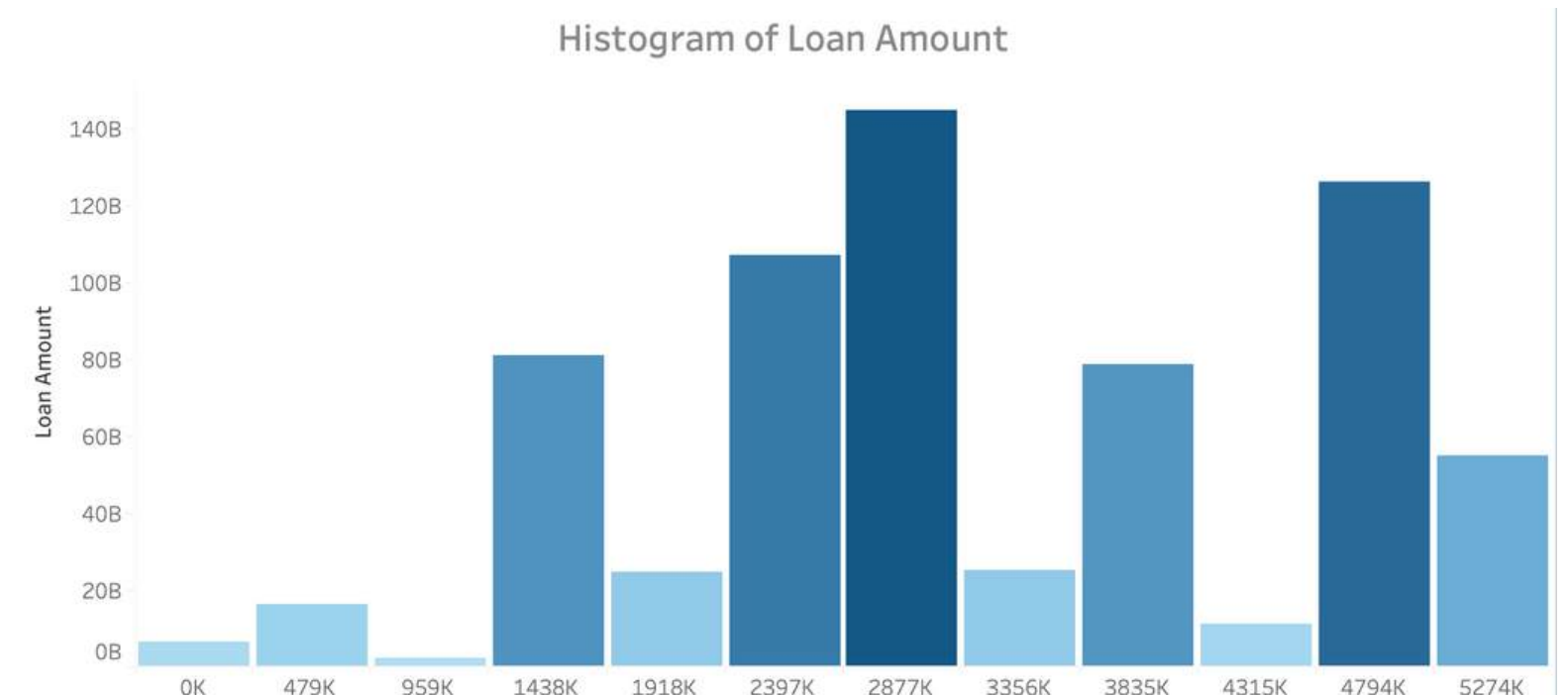
Customer Segment	Profile	Digital Behavior	Financial Knowledge	Pain Points	Communication Channels	Timing	SHB Recommendations
YOUNG ADULTS	Low to medium income	Highly digital , preferring mobile banking apps.	Basic to moderate	Limited credit history.	Mobile apps and SMS	Find personal loans at start of year or around educational enrollment periods	User-friendly app, competitive interest rates, finance management seminars, partner with universities
WORKING ADULTS	Medium to high income, single or married	Prefers in-branch for complex needs.	Moderate to high	Limited time for financial management.	Open to email notifications , appreciates personal consultations	mortgage/investment loans at the beginning of the year	Competitive mortgage loans, diverse investments, retirement planning, professional events
FAMILY-ORIENTED CLIENTS	Married, high school to university educated	Prefers in-person for major transactions .	Moderate	Balancing family expenses and future savings	Direct communication	Borrow for education during enrollment periods or for housing/insurance needs throughout the year	Flexible mortgage and education loans, comprehensive family insurance, children's savings accounts
AFFLUENT INVESTORS	Highly educated, high income	Prefers personal service for wealth management.	High	Need complicated financial advice.	Private consultations , exclusive events	Invests continuously, often at start of the fiscal year	Exclusive wealth management, high-return investments, inheritance planning, upscale events
SMALL BUSINESS OWNERS	Agriculture/manufacturing, medium to high income.	Online banking with personal assistance .	Moderate	Cash flow management, capital access	Direct communication	At the start of fiscal year or for business expansion phases	Competitive business loans, financial management advice, business association partnerships
RETIREEES OR NEAR-RETIREEES	Low to medium income		Low to moderate	Inflation eroding purchasing power	Direct communication	Throughout the year, especially during health crises/significant changes	Senior health insurance, secure income-generating products

Regarding Loan Amount, SHB's loan portfolio shows positive growth in total loan amounts and applications...

- 1 The loan amount trend **shows an upward trajectory** over time, with notable **peaks in November 2022** and **significant growth in late 2023 in December 2023**



- 2 The histogram displays the distribution of loan amounts across different bins. **The highest loan amounts fall in the 2.877M VND and 4.794M VND bins**, indicating that these ranges are the most popular among borrowers.



Witnessing an increase toward the end of the year

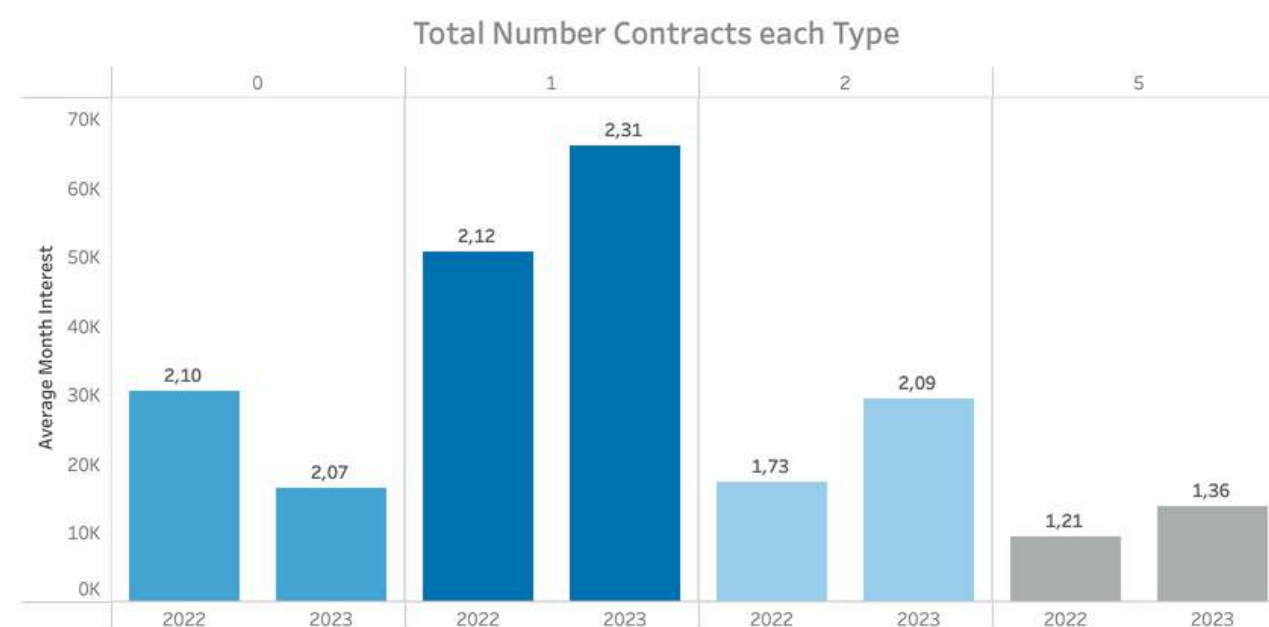
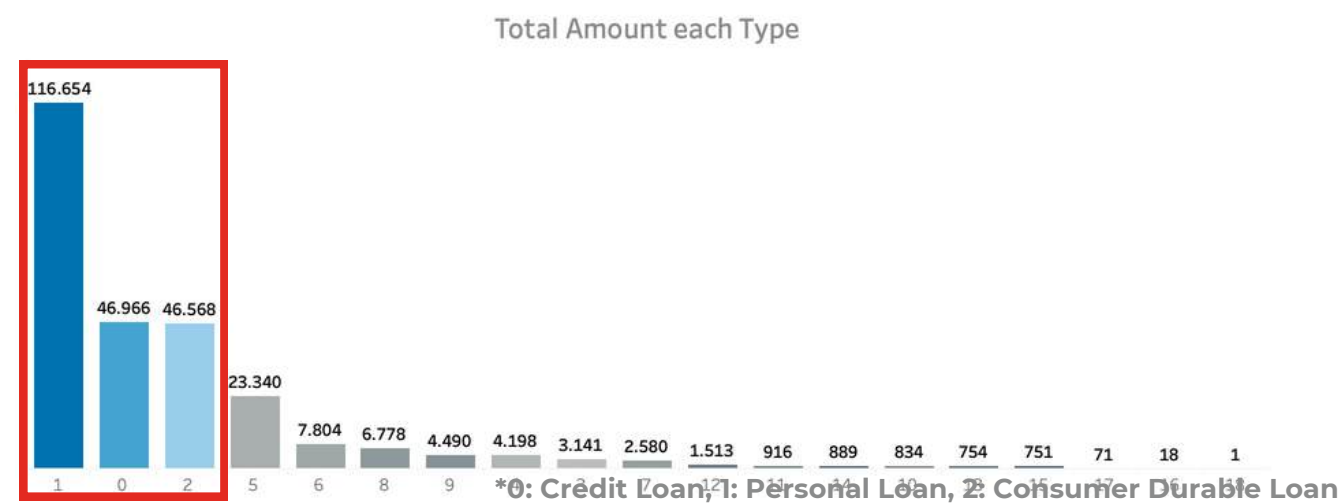
Monitor and Manage Credit Risk with Growing Loan Demand

Optimize Loan Processing Capacity During Peak Periods

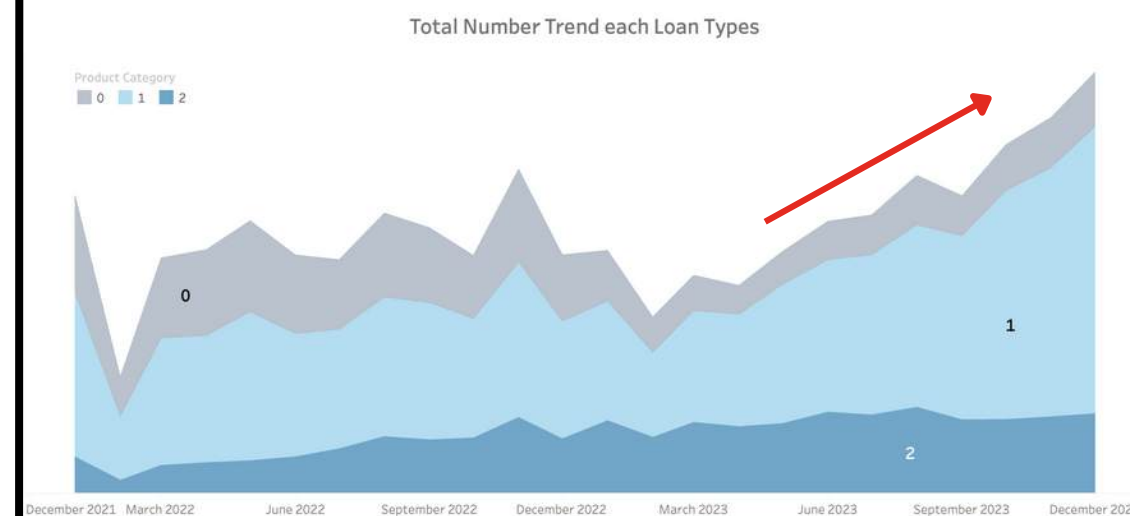
Implement Seasonal Loan Promotions

The trend in the usage of different loan types shows significant differences over the two years...

1 Personal Loan type is the most common and has been increasing since 2023



2 Credit Loan type has seen a **significant decline from 2022 to 2023**



Reason

- Tighter regulations on credit loans
- Risk management and product portfolio adjustment strategy
- Market Shifts

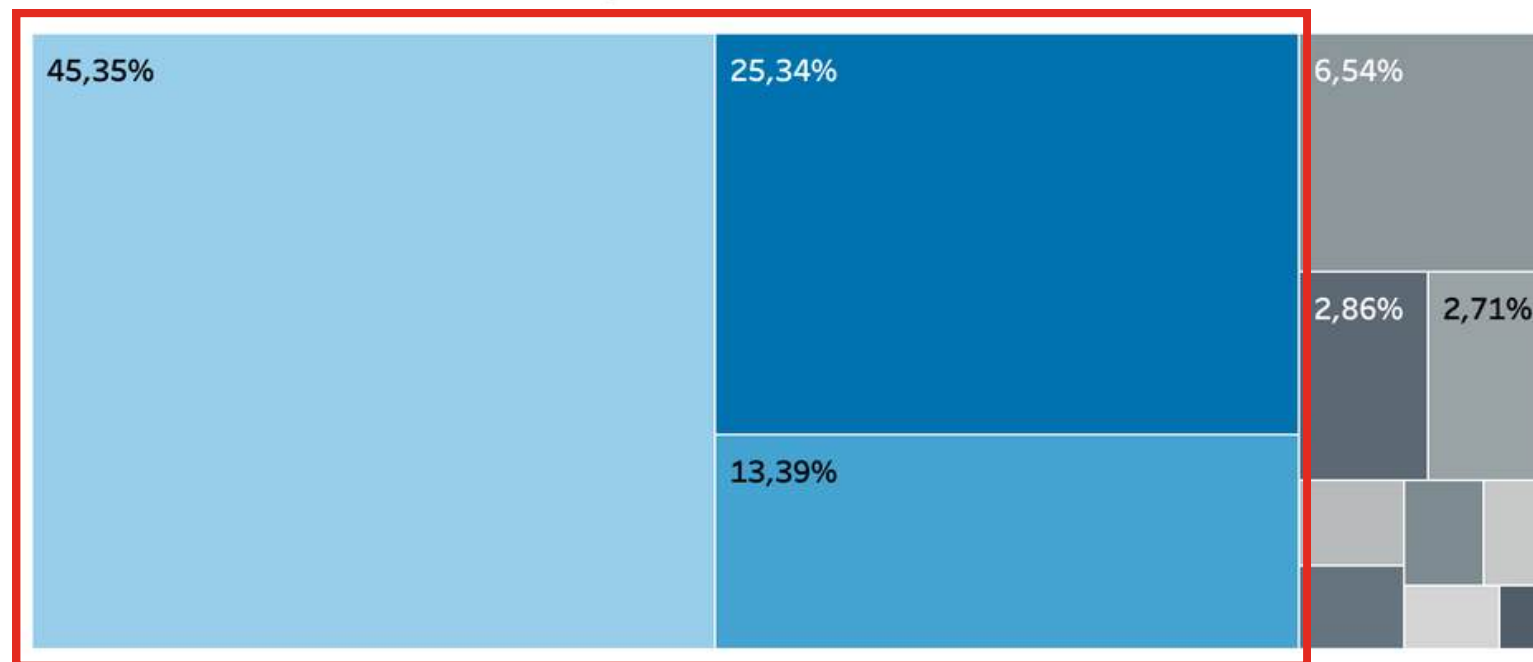
In the **last quarter of the year**, people tended to borrow more, possibly due to the **demand for preparation for the New Year** and take advantage of **Sales and Promotions**

Analyze customer demand by season and develop appropriate strategies.

When it comes to Loan Term, SHB Finance experience an significant rising in demand of long-term loan...

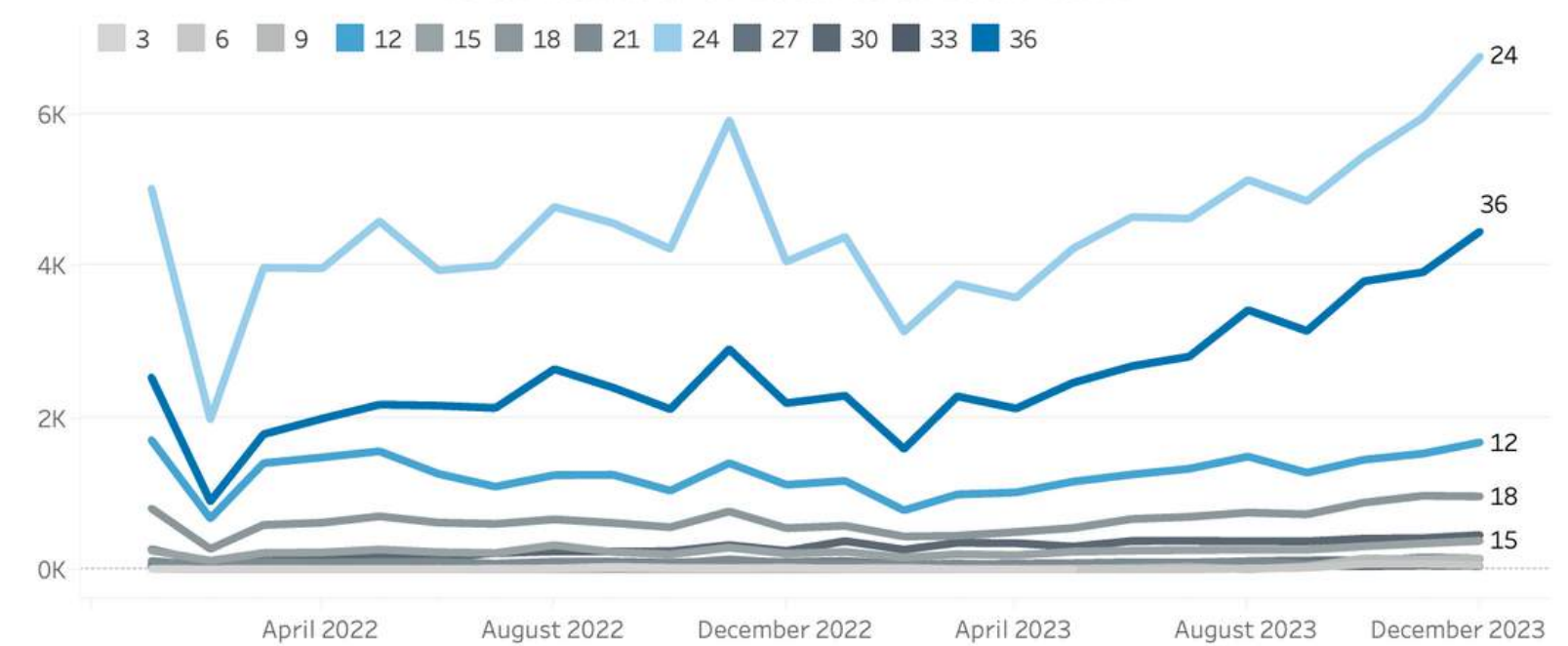
- 1 The analysis of SHB Finance's loans by term reveals that **loan terms of 24 and 36 months are the most popular**, making up 45.35% and 25.34% of the total loans, respectively.

Tree Map of Loan Term Contribution



- 2 The trend line shows a **steady increase** in loans with these terms, suggesting that customers **prefer medium to long-term loans for managing their financial needs**.

Total Number of Loan each Loan Term



Recommendation

Objectives

Encourage **Cross-Selling** with Medium-Term Loans

Enhance customer loyalty and increase the overall lifetime value of each client

Focus on 24 and 36-Month Loan Product Development

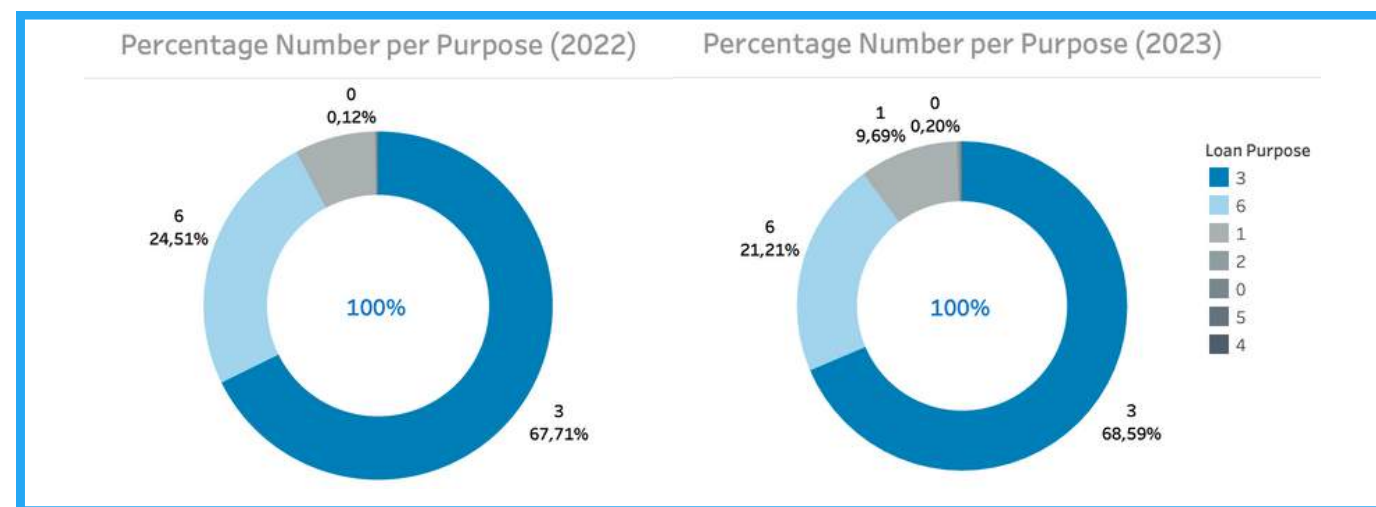
Offer attractive packages for these durations, possibly with competitive interest rates or flexible repayment options.

Monitor Shifts in Loan Term Preferences

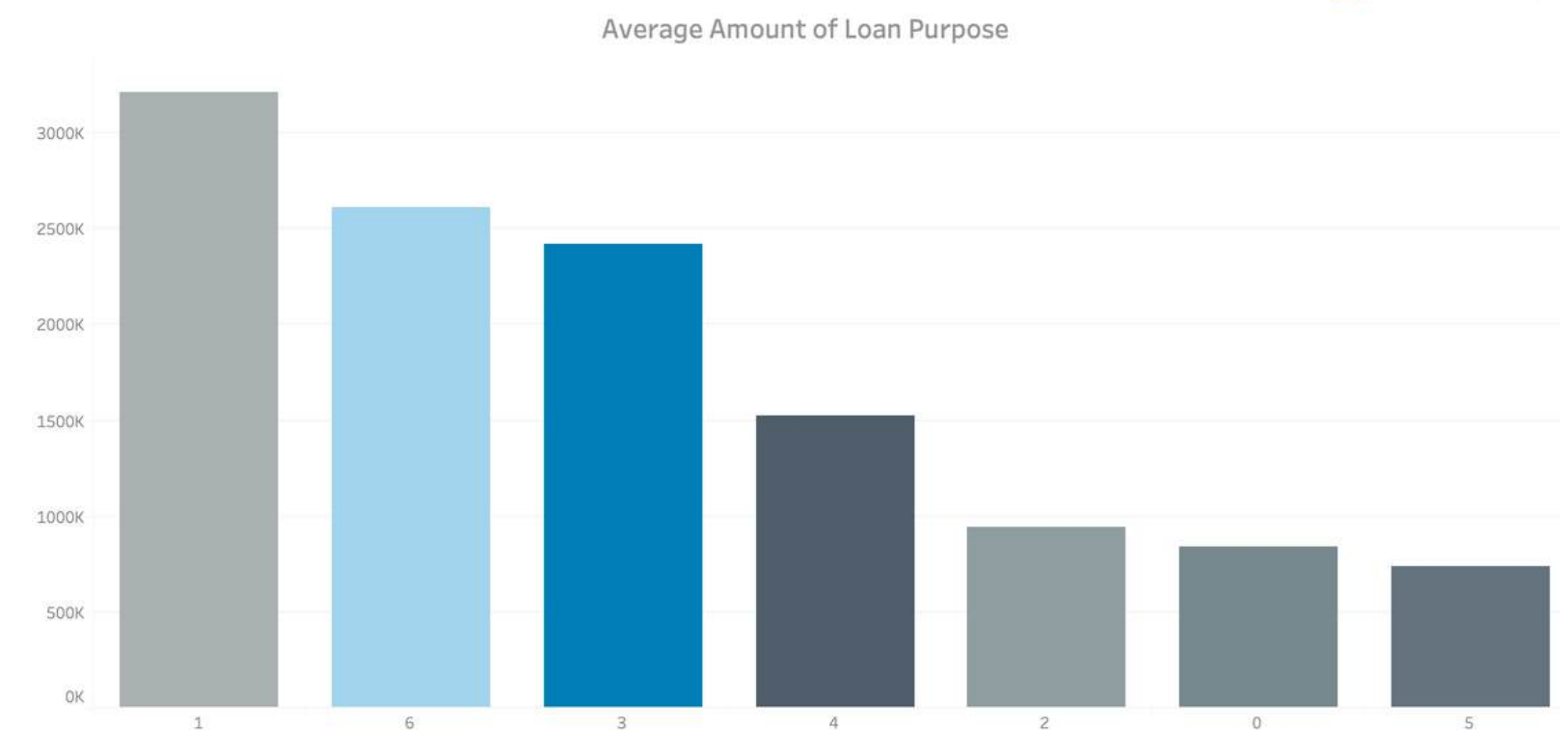
Adjusting the loan portfolio and product offerings in line with customer demand

When referring to Loan Purpose, we need to pay attention to the following trends.

- 1 There is a noticeable **rise in demand for personal loans** and customers **primarily** borrow for **Purpose 3 (Personal Need)** rather than Purpose 1 (Consumer Need) and Purpose 6 (Vehicle Loan).



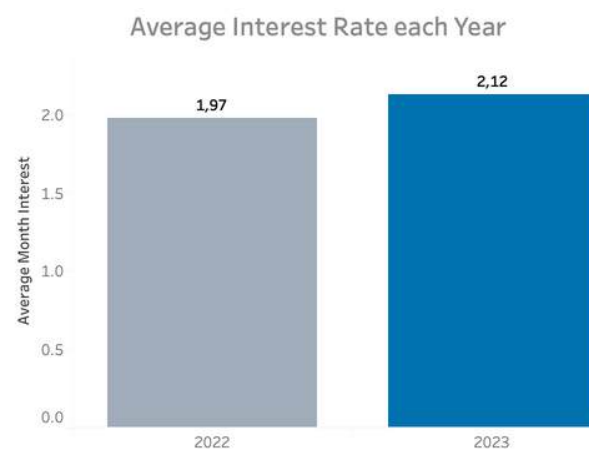
- 2 **Personal loans** often **come in smaller amounts**, as they address **immediate and short-term financial needs** rather than significant investments.



This trend reflects **customers' needs** to cover various personal expenses, such as **medical bills, education fees, or home renovations**

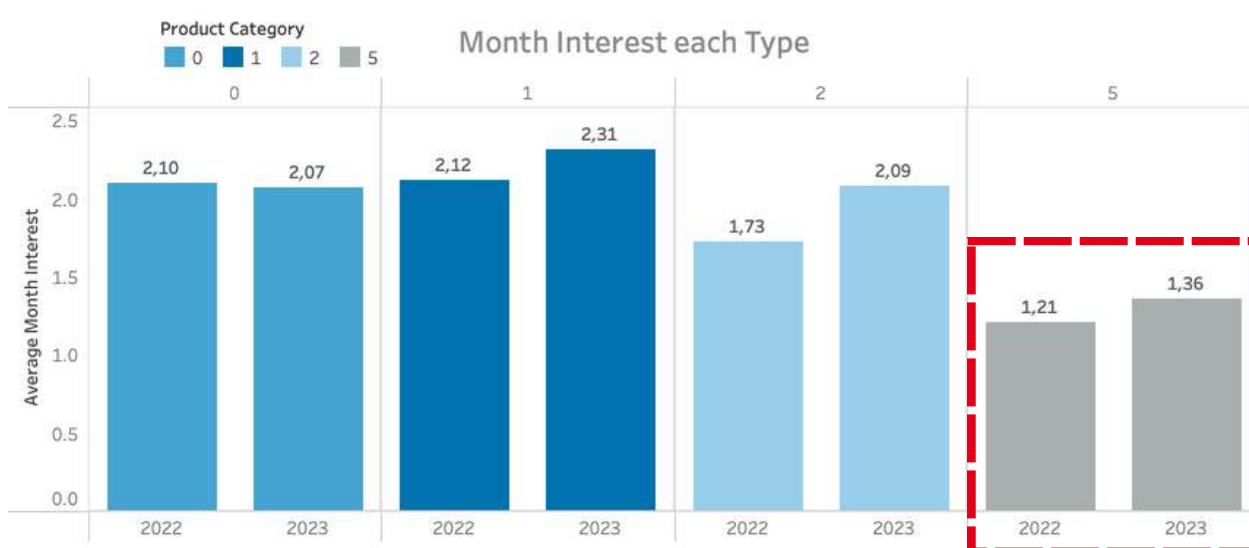
SHB has experienced significant fluctuations in loan interest rates from 2022 to 2023, specifically...

- The average **interest rates** across loan types have generally increased

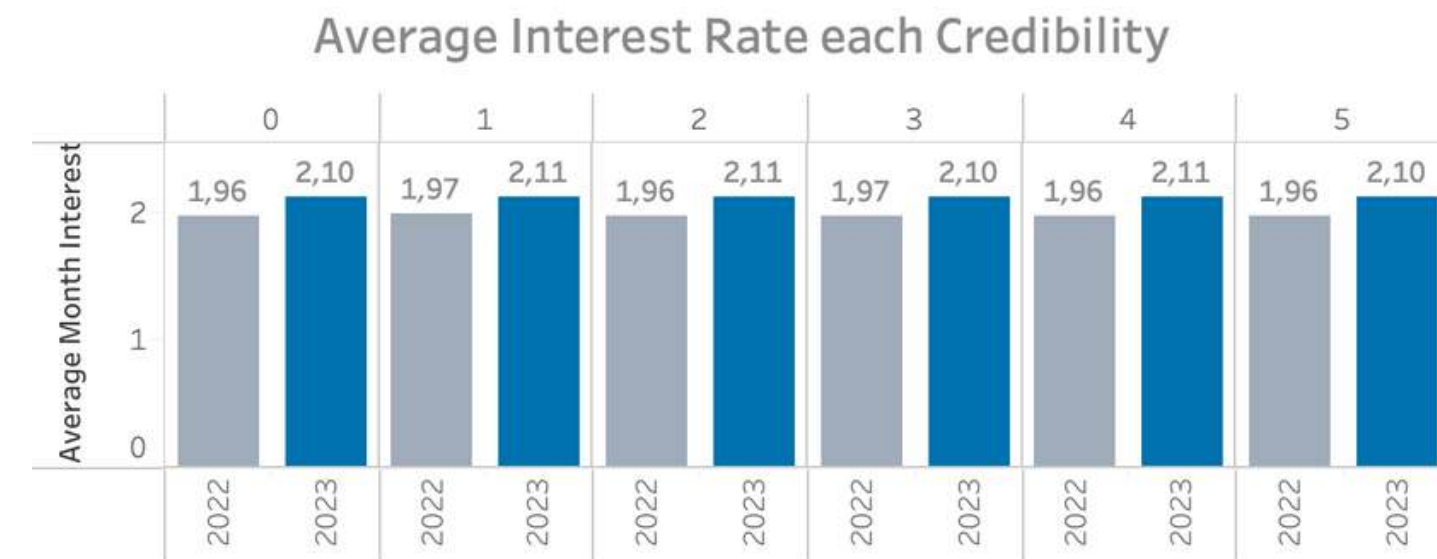


↑ 7,6%

...however, the **interest rate for Credit Loans** has slightly decreased



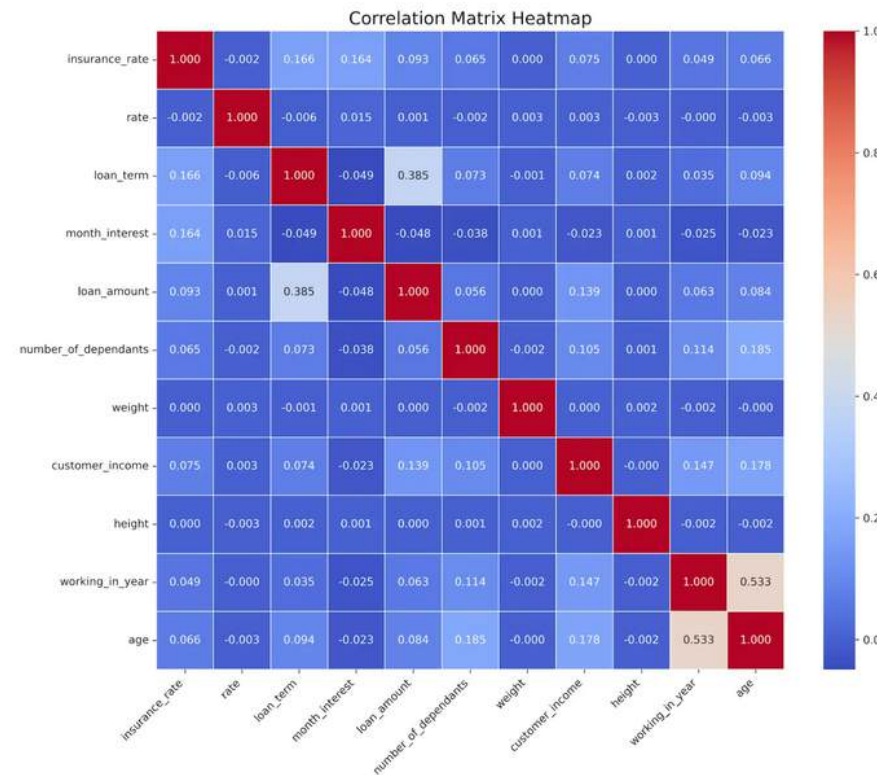
- SHB currently **lacks a clear differentiation** among the **five Credibility groups**, as there is minimal variation in interest rates across these groups



REASON

Factor	Description
Macroeconomic Factors	Inflation and monetary policies have driven overall interest rates higher.
Risk Adjustment for Unsecured or High-Risk Loans	For loans without collateral or with higher risk, such as Personal Loans and Consumer Durable Loans, interest rates were increased to offset potential risks.
Competitive Strategy for Credit Loans	The slight decrease in Credit Loan interest rates may be a strategic move to maintain competitiveness and attract high-quality customers. With a declining percentage of credit loans, SHB may be focusing on customers with strong credit profiles.

To predict and identify customer profile factors that influence different loan types, Machine Learning applications are used, specifically as follows:



Relationships

Larger **Loan Amounts** require longer **Loan Terms**, and **high-income customers** are slightly more likely to accept larger **loan offers**.

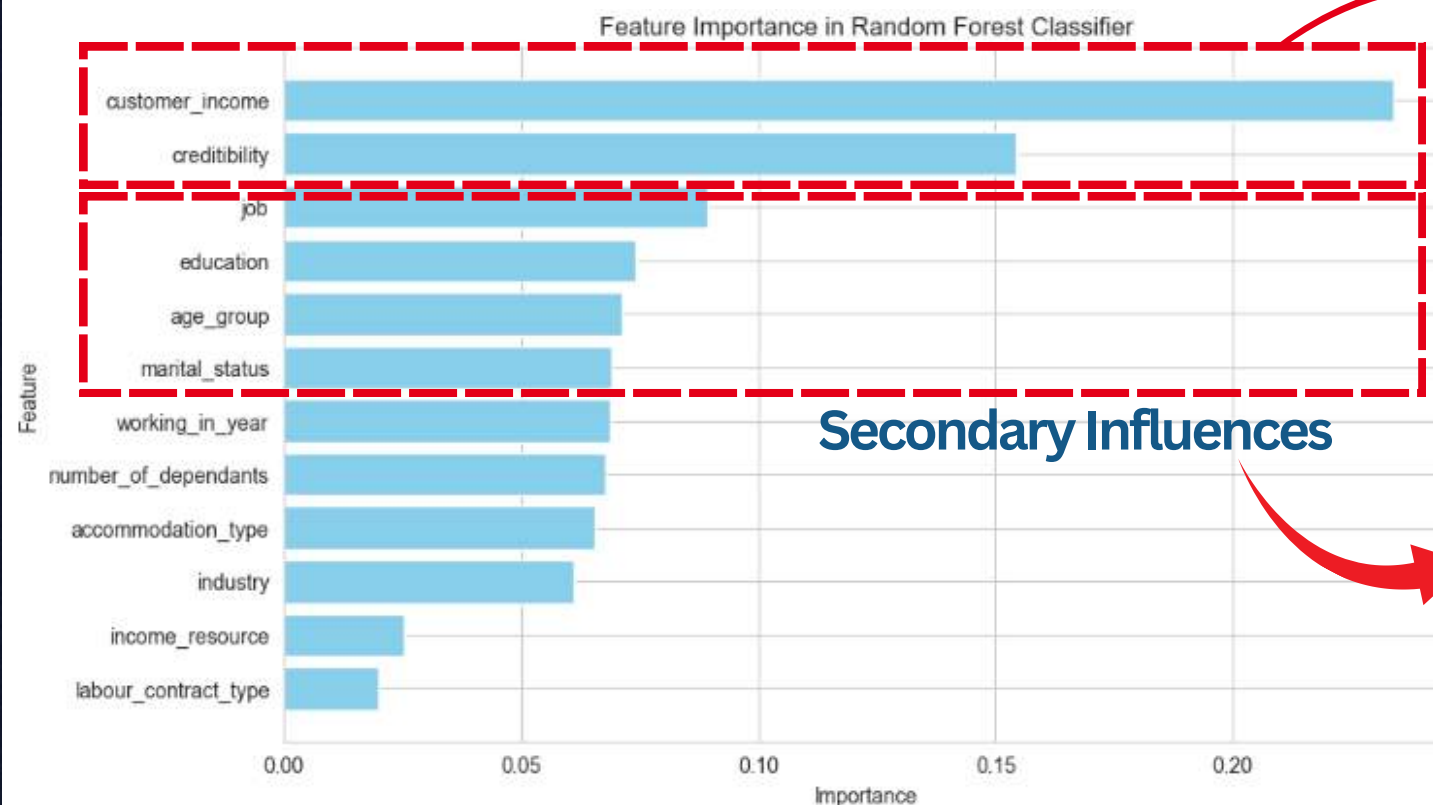
Practical Implications

1 Customer Profiling

- **customer_income** and **credibility** are the **top features**, these likely represent core aspects of **customer profiling** for **product category determination**
- Match **products to customers** based on **financial stability** and **trustworthiness**.

2 Demographic Customization

- Input: **job**, **age_group**, **education** & **marital_status**
- Associations between certain demographics and product preferences.



Relationships

Customer income shows ability to repay, while credibility shows trustworthiness

Secondary Influences

Provide **demographic** context influencing **financial preferences** and **risk assessment**.

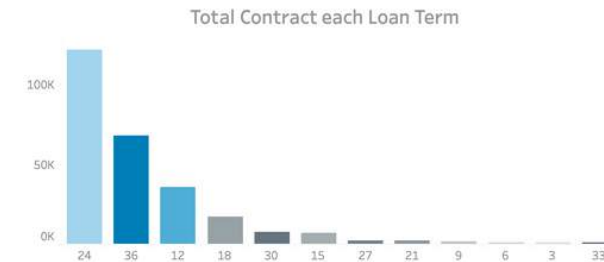
This feature importance analysis can guide feature selection and model refinement by **emphasizing attributes** that have the **most predictive power** for "product_category."

Therefore, SHBFinance have to...

Strategy 1: Focus on 24 and 36-Month Loan Packages

Issue

SHBFinance recognizes **24- and 36-month loan terms as the most popular**. To mitigate interest rate, credit, and capital balancing risks, SHBFinance should strengthen these products and enhance the appeal of longer-term loans.



Our team proposes adopting strategies to **enhance and promote 24 and 36-month loan packages, while gradually building interest in longer-term products.**

Objectives

- **Strengthen customer loyalty** by focusing on high-demand loan terms (24 and 36 months).
- **Reduce risk exposure** by balancing the loan portfolio and avoiding excessive reliance on short-term products.
- **Increase attractiveness of longer-term loans** to manage capital efficiently and mitigate interest rate risks.

Pros

- Focused strategies on medium-term loans **reduce interest rate and credit risks**.
- Offering enhanced benefits and rewards for longer-term loans can **improve customer loyalty**.

Cons

- Managing additional benefits for longer-term loans could **increase operational expenses**.
- Customers may initially be reluctant to consider longer-term loans, **requiring more intensive marketing**.
- **More resources are required** for financial literacy programs and personalized consultation.

Specific Measures

- **Promotional Campaigns for 24 and 36-Month Loans**
- **Enhanced Benefits for Longer-Term Loans: Introduce loyalty rewards (such as cashback or points)** for customers opting for loan terms longer than 36 months to encourage longer commitments.
- **Conduct financial literacy workshops** to **inform customers** about the benefits of long-term financial planning and how longer loan terms can align with their financial goals.
- **Use digital platforms (app and website)** to highlight the benefits of each loan term, helping customers make informed decisions.
- **Provide personalized financial advisory services** to assist customers in choosing the best loan term based on their financial profiles.

Duration: Pilot phase in high-demand urban areas for **6 months**

Workshop Organization

Online



Offline

Major branches of SHB Finance



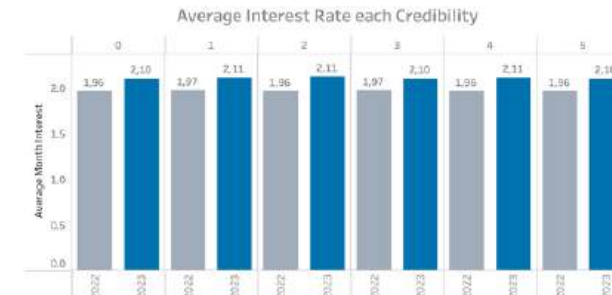
Educate and engage customers

Next, SHB Finance need to clarify...

Strategy 2: Credibility benefits diversification

Issue

SHB Finance includes 6 groups with different credit levels; however, the **benefits for each group have not been clearly defined**. Specifically, the average loan interest rates for these levels show little to no differentiation.



Objectives

- **Establish clear, tiered benefits for each credit level** to encourage customers to improve their credit standing.
- **Differentiate loan interest rates** based on credit level to align with the risk profile of each group.
- **Increase customer loyalty and motivation** to maintain or improve credit levels, leading to lower default rates and better customer segmentation.

Our team proposes implementing a Credibility diversification strategy to **offer differentiated benefits and interest rates for each credit group**, encouraging higher engagement and better risk management.

*Interest rate = Base interest rate + Risk premium

Credit Group	Interest Rate	Product Benefits	Customer Service	Credit Improvement Incentives
Group 5 (Excellent)	Lowest interest rate, 1% below standard rate	Access to premium products such as high credit limits, unsecured loans. Fee waivers for account opening and maintenance.	Priority in approval and disbursement. Dedicated priority customer service line.	Earn reward points for timely payments, redeemable for discounts or preferential rates on future loans.
Group 4 (Very Good)	0,75% below standard rate	High credit limits with easier loan approval. 50% reduction in account opening and online transaction fees.	Faster loan approval and priority phone support.	Free personal finance courses to maintain and improve credit score.
Group 3 (Good)	0,5% below standard rate	Moderate credit limits, access to unsecured credit products with reasonable rates. 25% discount on transaction fees and account maintenance.	Regular financial consulting to help manage finances better.	Reward points for each on-time payment, redeemable for SHB Finance service discounts.
Group 2 (Fair)	0,25% below standard rate	Moderate credit limit with slight collateral requirement. 10% transaction fee discount and some basic service fee waivers.	Access to financial consultation programs for credit improvement.	After six months of on-time payments, eligible for higher credit group or preferential interest rates.
Group 1 (Low)	Standard or slightly higher interest rate	Limited credit limit, collateral required for larger loans. Access to low-limit credit-building products.	Information and guidance on improving credit scores.	Eligible for lower interest rates and potential credit group upgrade after six months of on-time payments.
Group 0 (Poor)	Higher than standard interest rate	Very low credit limit, collateral required for all loans. Access to small loans designed to help rebuild credit.	Regular financial and debt management consulting.	Eligible for credit group upgrade and lower rates after 1 year of consistent on-time payments.

Attract customers with special benefit

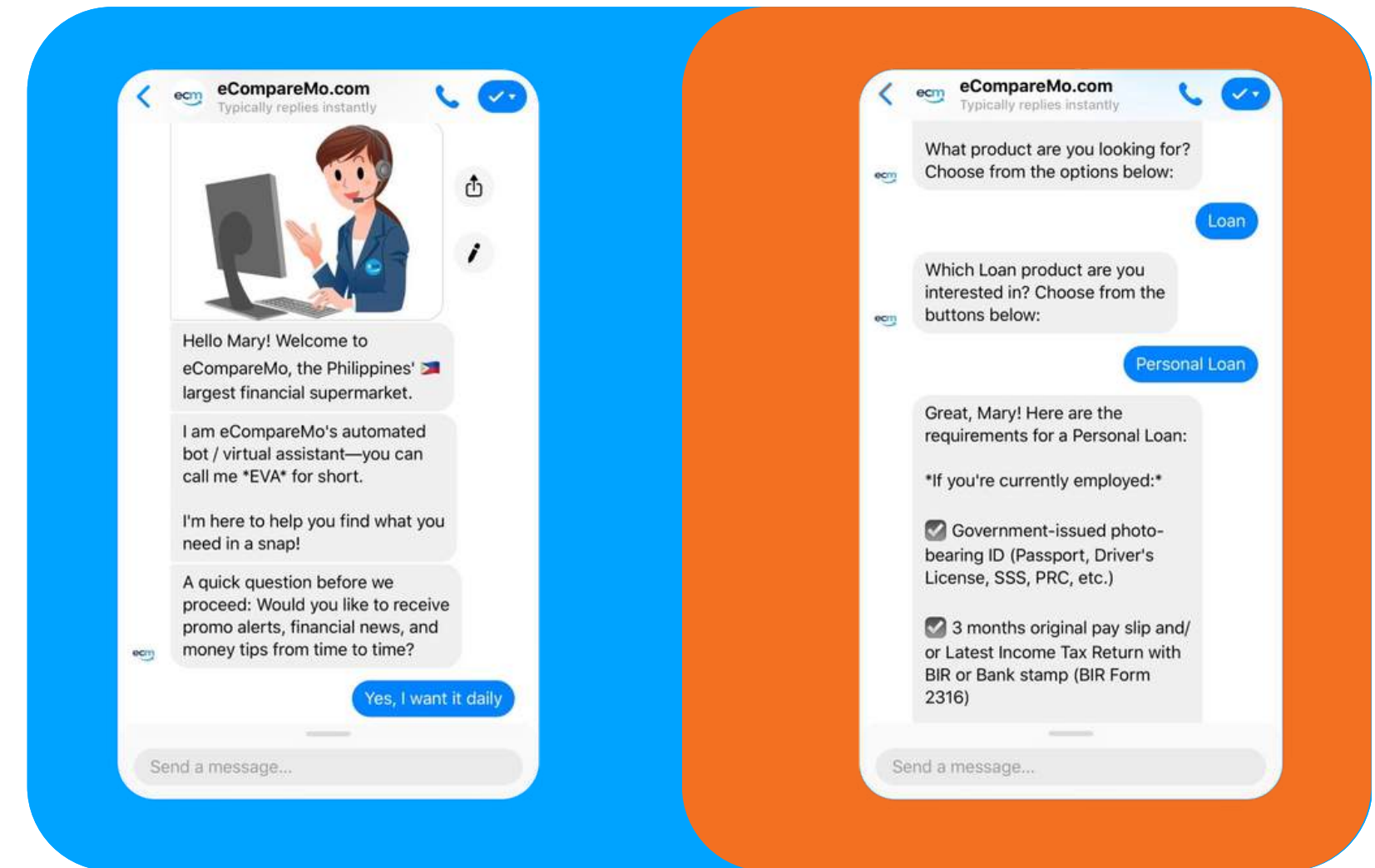
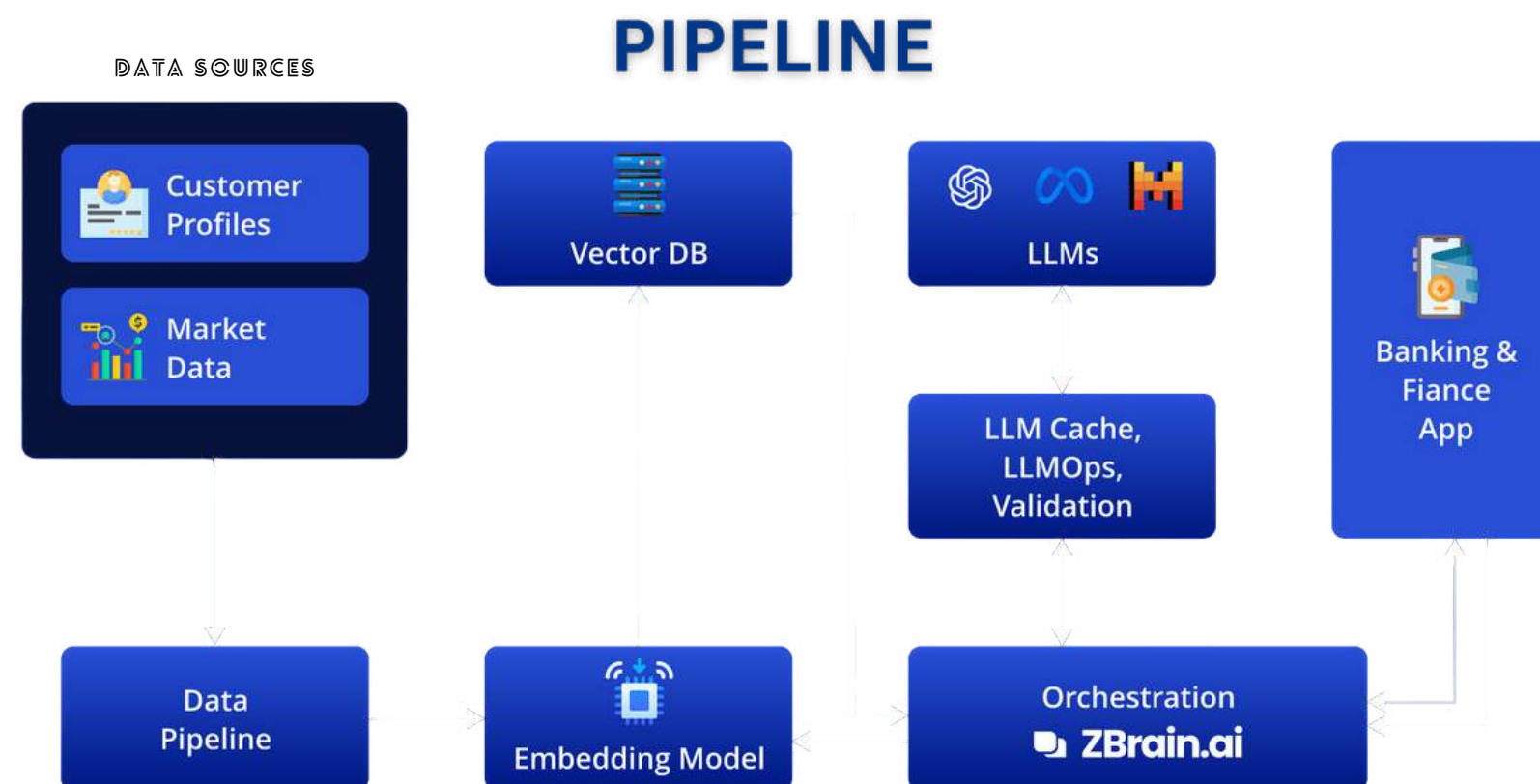
To improve the processing speed of loan applications, SHB Finance need to develop their system...

Strategy 3: System Development: Large Language Model (LLMs)

Issue

SHB Finance currently **faces challenges** in **providing personalized loan package consultations in an automated manner**. The **lack of an efficient, AI-driven recommendation system** results in slower response times and **requires extensive manual input** to analyze customer profiles and suggest suitable loans.

Integrating LLMs (Large Language Models) into the system with the aim is to automatically **suggest suitable loan packages** tailored specifically to each customers based on their unique characteristics, improving customer experience and operational efficiency.



*AI Advisor

In order to address risk issues in lending, we are developing predictive models that assess credit risk, determine loan amounts, and set interest rates.

Objectives

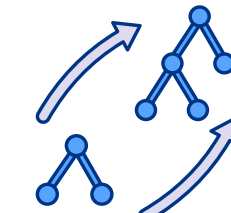
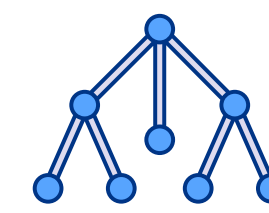
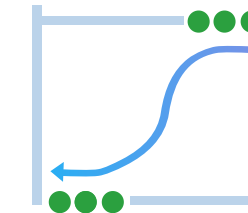
- By leveraging advanced feature engineering, model training, and evaluation techniques, SHB Finance aims to enhance its risk management capabilities and provide tailored financial products to its customers.

Feature Engineering

- Create some new feature like Debt-to-Income Ratio, Age Group Categorization and encode Categorical Features.
- Standardization to ensure consistent scaling across numerical features to prevent any single feature from overly influencing the model.
- Creates interaction feature between variables (e.g., loan term and rate) to capture combined effects for improved prediction accuracy

Model Development

- **Model 1: Risk Prediction (Classification):** Use Logistic Regression to predict the likelihood of default based on the debt-to-income ratio, classifying customers as high or low risk.
- **Model 2: Loan Amount Prediction (Regression):** Use a Random Forest Regressor with hyperparameter tuning to predict loan amounts accurately, leveraging features such as customer income and loan purpose.
- **Model 3: Interest Rate Prediction (Regression):** Use Gradient Boosting with Bayesian Optimization (Optuna) to predict the interest rate, fine-tuning parameters like the number of estimators, max depth, and learning rate for optimal performance.



Model Evaluation

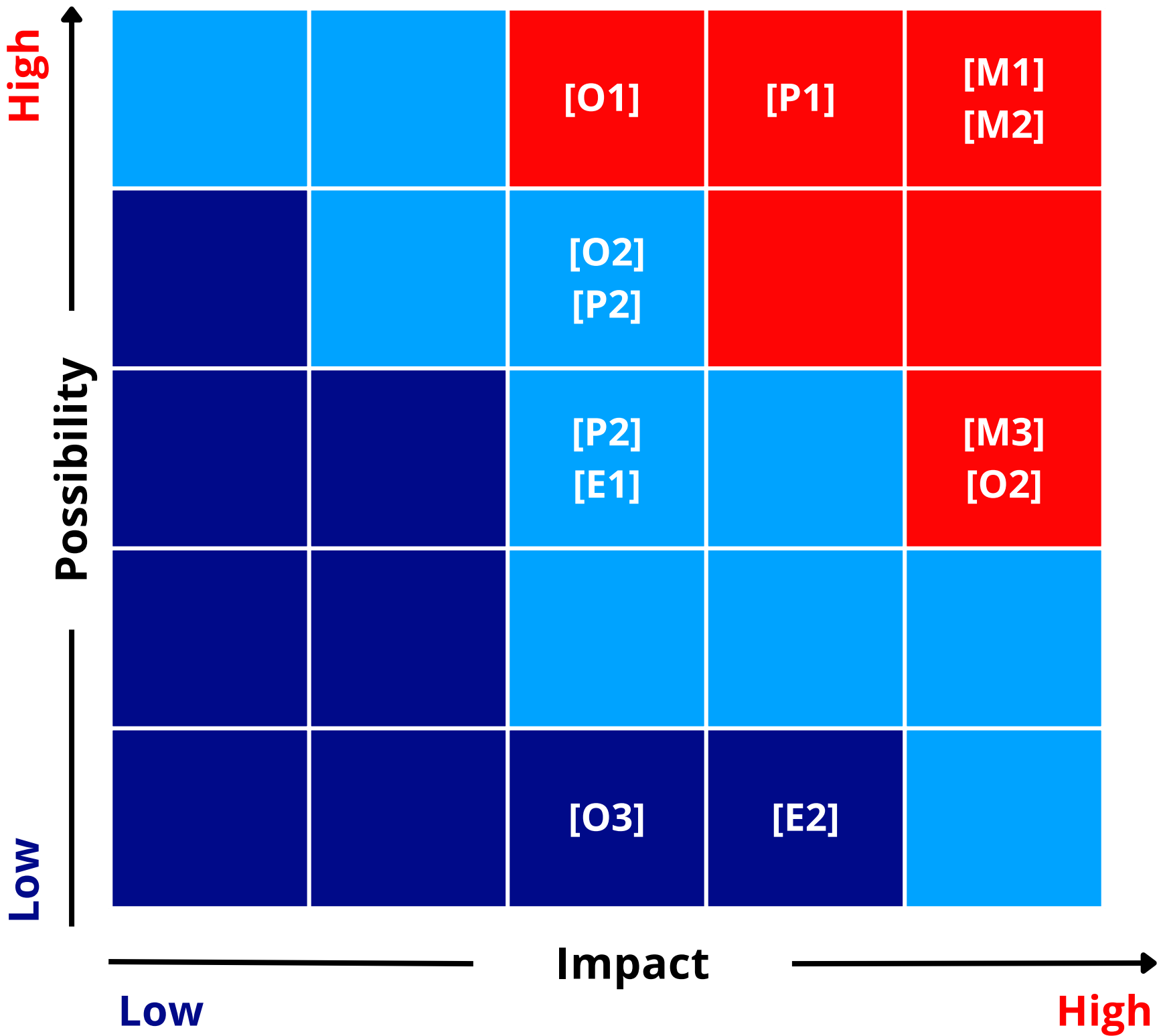
- **Evaluate Risk Model:** Calculate AUC score and accuracy to assess the risk prediction model's performance in distinguishing between high-risk and low-risk customers.
- **Evaluate Loan Amount Model:** Calculate RMSE to measure the accuracy of loan amount predictions.
- **Evaluate Interest Rate Model:** Measure RMSE to evaluate the accuracy of the interest rate predictions.

Feature Importance Analysis

- **Random Forest Feature Importance:** For the loan amount model, analyze feature importance to understand which factors (e.g., customer income, loan purpose) most influence loan size.
- **Gradient Boosting Feature Importance:** For the interest rate model, evaluate the top features impacting interest rate predictions, helping SHB Finance prioritize features in future risk assessments.
- **Model Interpretability with SHAP:** Use SHAP values to interpret the contribution of each feature to individual predictions, helping explain model decisions. This improves transparency and helps SHB Finance understand the factors driving high-risk predictions.

Risk Management

Besides those models, we need to anticipate risks for SHB Finance through the matrix below...



Macroeconomic risk
M1: Economic Downturn Risk
M2: Interest Rate Fluctuation
M3: Inflationary Pressure



Operational risk
O1: Customer Default Risk
O2: Operational Efficiency
O3: Loan Approval Delays



Policy risks
P1: Regulatory Changes
P2: Credit Policy Adjustments



Environmental risk
E1: Market Competition
E2: Digital Risks



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APPENDIX

1. Financial statements archives Ngân hàng SHB. Available at:
<https://www.shb.com.vn/language/en/category/investor/financial-statements/>.
2. SHBFinance - Tài chính tiêu dùng thông minh: <https://www.shbfinance.com.vn/>
3. FiinGroup. (2023). Vietnam Consumer Finance Factsheet 2023. FiinGroup. Available at:
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5. Takyar, A. and Takyar, A. (2024) AI in banking and finance: Use cases, applications, AI agents, and implementation. <https://www.leewayhertz.com/ai-use-cases-in-banking-and-finance/>.