Detailed Report on Bank Loan Data Exploratory Data Analysis (EDA)

Introduction:

This report presents the key inferences derived from the Exploratory Data Analysis (EDA) conducted on a bank loan dataset. The analysis aims to understand the relationships between various features and the likelihood of loan defaults. The dataset contains information about customers, loan amounts, income, purpose, and other relevant factors.

1. Most customers have taken cash loans:

The majority of customers have chosen cash loans as their preferred loan type. Cash loans are the most common option for borrowers, indicating its popularity among customers.

2. Customers with cash loans are less likely to default:

It was observed that customers who opted for cash loans are less likely to default on their payments. This indicates that cash loans may be a safer option for the bank to offer to customers.

3. Gender and Loan Default Rate:

The data analysis shows that a significant number of loans have been taken by females. Moreover, the default rate for female borrowers is approximately 7%, which is lower than the default rate for male borrowers. This suggests that loans given to female applicants may be less risky for the bank.

4. Preferred Customer Type and Default Rate:

Unaccompanied individuals have taken the majority of loans, and the default rate among them is around 8.5%. While this default rate is acceptable, it might be worthwhile to explore factors contributing to the slightly higher default rate in this customer segment.

5. Safest Segments based on Income Type:

The analysis reveals that the safest segments to target are working individuals, commercial associates, and pensioners. These groups have a lower default rate, indicating their reliability as borrowers.

6. Safest Education Level for Loans:

Customers with higher education levels were found to be the safest segment to lend to, with a default rate of less than 5%. This suggests that higher education may correlate positively with responsible loan behaviour.

7. Marital Status and Loan Default Rate:

Married individuals exhibited a default rate of 8%, making them a relatively safe group to target for loans.

8. Housing Type and Loan Default Rate:

Customers who own a house or apartment have an approximate default rate of 8%, indicating that they are safe candidates for loans.

9. Occupational Impact on Loan Default:

Certain occupation types have a higher likelihood of defaulting on loans. Low-Skill Labourers and drivers show the highest default rates, while accountants, core staff, managers, and laborers are safer to target with default rates ranging from 7.5% to 10%.

10. Impact of Organization Type on Loan Default:

Customers employed in certain organization types are more likely to default on loans. Transport type 3 exhibits the highest default rate, while others, Business Entity Type 3, and Self-Employed show a default rate around 10%.

11. Loan Amount and Goods Price Distribution:

Most loans were given for goods priced between 0 to 1 million units, and the credit amount also mainly ranged from 0 to 1 million units. This indicates that the bank primarily serves customers seeking loans for moderate-priced goods.

12. Annuity Payment and Income Distribution:

The majority of customers pay an annuity of 0 to 50 thousand units, while their income mostly falls between 0 to 1 million units.

13. Linear Correlation between AMT_CREDIT and Defaulters:

AMT_CREDIT and defaulters exhibit a linear correlation. As the AMT_CREDIT increases, the number of defaulters decreases. This suggests that higher loan amounts might correlate with lower default rates.

14. Optimal Loan Targeting based on Income and Loan Amount:

Customers with an income below or equal to 1 million units are more likely to take loans. However, caution should be exercised for loan amounts greater than 1.5 million units, as they could have a higher default risk.

15. Impact of Number of Children on Loan Default:

Customers with 1 to 3 children are safer candidates for loans, as they are less likely to default compared to those with a different number of children.

16. Annuity and Loan Amount for Safer Segments:

Customers capable of paying an annuity of 100K are more likely to secure loans, especially those below 2 million units, as they represent a safer segment.

17. Purpose and Loan Outcome:

Repairing purposes had the highest number of loan applications previously, but also had the greatest number of cancellations. This indicates that loans for repairing purposes might be more challenging to manage effectively.

18. Previous Applicants' Behaviour:

Customers whose previous applications were either cancelled or refused show a high rate of repayments in the current dataset. This suggests that some previously declined applicants have improved their creditworthiness.

19. Impact of Unused Offers on Defaulters:

Interestingly, previously unused offers now have the highest number of defaulters, even among customers with high income. This emphasizes the importance of continuous assessment and risk management for all loan offers, regardless of previous application outcomes.

Conclusion:

The Exploratory Data Analysis (EDA) on the bank loan dataset has provided valuable insights into various factors affecting loan defaults. By targeting safer customer segments, such as those with cash loans, higher education, stable occupations, and specific marital and housing statuses, the bank can potentially minimize the risk of loan defaults. Furthermore, a careful assessment of loan amounts and income levels can aid in identifying the optimal loan offers for different customer profiles. This report lays the foundation for further analysis and the development of more sophisticated risk assessment models to enhance the bank's lending practices. However, it is essential to continuously monitor and update these findings as customer behaviour and economic conditions evolve over time.

Full Action Plan Detailed Report for Bank Loan Management

Introduction:

This action plan detailed report outlines the strategies and steps the bank should take based on the key findings derived from the Exploratory Data Analysis (EDA) on the bank loan dataset. The objective of this plan is to optimize loan management practices, minimize default risk, and enhance customer satisfaction while ensuring the bank's financial stability.

1. Customer Segmentation:

Utilize the insights from the EDA to segment customers based on their risk profiles. Categorize customers into low-risk, medium-risk, and high-risk segments. Consider factors such as loan type, gender, marital status, education, occupation, and housing type to classify customers into relevant risk groups.

2. Target Safer Customer Segments:

Focus on targeting safer customer segments to reduce default risk. Prioritize customers with cash loans, higher education levels, stable occupations, and those who own houses or apartments. These segments have demonstrated lower default rates and are more likely to repay their loans.

3. Optimize Loan Offerings:

Based on the analysis of loan amount and income, design loan products that align with the financial capabilities of different customer segments. Offer lower loan amounts (below 1.5 million) to customers with incomes below 1 million, as they are more likely to repay such loans.

4. Monitor Unaccompanied Borrowers:

While unaccompanied borrowers are a significant portion of the customer base, closely monitor their loan repayment behaviour due to their slightly higher default rate. Implement targeted risk management strategies for this segment to ensure timely repayments.

5. Strengthen Risk Assessment for Transport Type 3 and Self-Employed:

Transport type 3 and self-employed individuals have shown higher default rates. Strengthen risk assessment and underwriting processes for loan applications from these segments. Consider additional verification and collateral requirements to minimize default risk.

6. Loan Purpose Validation for Repairing Loans:

As loans for repairing purposes have both high application and cancellation rates, introduce stricter validation processes for loan applications with this purpose. Verify the purpose and feasibility of repair projects to reduce the risk of non-repayment.

7. Proactive Offer Management:

Identify previously unused offers that now have higher default rates. Analyse the reasons for this change and reassess the risk profiles of these offers. Consider offering lower loan amounts or adjusting interest rates for these products to reduce potential default risks.

8. Continuous Creditworthiness Assessment:

Develop a system for continuous creditworthiness assessment of previously declined or cancelled applicants. Regularly review their credit profiles and consider reevaluating their eligibility for new loan applications. Some of these customers might have improved their financial situations, making them safer borrowers.

9. Educational Loan Programs:

Promote educational loan programs targeting customers with higher education levels, as they have shown lower default rates. Encourage borrowers to invest in skill development and higher education, leading to improved employability and better loan repayment capabilities.

10. Family Planning Education:

Offer financial education and counselling to customers with more than three children. Empower them with family planning knowledge to make informed decisions about their financial responsibilities, potentially reducing their default risk.

11. Monitoring and Review:

Implement a system for continuous monitoring and review of loan portfolios. Regularly analyse repayment patterns, default rates, and changes in customer behaviour. Use these insights to update risk models, refine loan offerings, and improve overall loan management strategies.

12. Customer Engagement and Support:

Promote financial literacy and provide educational resources to borrowers to enhance their financial management skills. Offer personalized support and counselling to customers facing financial difficulties to prevent potential defaults.

Conclusion:

The action plan detailed report presents a comprehensive strategy for the bank to optimize loan management practices and minimize default risk based on the findings from the Exploratory Data Analysis (EDA). By targeting safer customer segments, optimizing loan offerings, and implementing proactive risk management measures, the bank can improve its loan portfolio performance and foster long-term customer relationships. Continuous monitoring and review, along with customer engagement and support, will be essential for the successful implementation of these strategies. This action plan aims to strike a balance between prudent risk management and providing financial support to customers, ultimately leading to sustainable growth and financial stability for the bank.