

Financial Loan Dashboard

Problem Statement:

Design a Power BI dashboard to analyse and visualize the financial loan. The dashboard should provide insights into the following aspects:

1. **Loan Distribution:** Display the distribution of loan types (e.g., personal loans, home loans, car, business loans ...) by count and amount disbursed.
2. **Loan Performance:** Show the overall performance of loans by visualizing metrics such as total amount disbursed, total amount repaid.
3. **Loan Payment Status:** Analyse the loan status rates across different loan types and customer segments. Good loan vs Bad loan.
4. **Customer Segmentation:** Segment customers based on loan types and demographics (e.g., state, grade, home-ownership, age, income level) to understand the bank's target market and potential growth areas.
5. **Geographical Analysis:** Provide a geographical view of loan distribution and performance using maps and regional insights.
6. **Trends and Forecasts:** Identify trends in loan applications over time and provide forecasts for future loan demand based on historical data. (month wise)
7. **Fraud Detection:** use data analysis to detect fraudulent loan applications and activities. Unusual patterns, inconsistencies, or discrepancies in loan data can trigger fraud alerts.
8. **Key Performance Indicators (KPIs):** Highlight important KPIs such as loan application funded amount, receive amount, interest rate, DTI.

Objective:

The objective of this project is to create an interactive Power BI dashboard that helps to get decisions regarding loan management, customer targeting, risk assessment, and overall business strategy and provide actionable insights through interactive reports and dashboards.

Step-by-Step Project Approach:

Step 1: Data Gathering and Preparation

1. **Data Sources:** Get the data from Kaggle (CSV file)
2. **Extract Data:** Use Power BI to connect to and extract data. (Power BI supports a wide range of data connectors.)
3. **Transform Data:** Clean, transform, data using Power Query Editor to prepare it for Dashboard creation. Tasks may include filtering rows, handling missing values, creating calculated columns (Good vs Bad), calculated table (Date) etc.

Step 2: Data Modelling

1. **Create Relationships:** Define relationships between tables in the data model. (connect the “date” table to “financial_loan (data)” table. One to Many Relationship)
2. **Optimize the Model:** Improve performance by removing unnecessary columns, creating calculated tables or columns, and ensuring data types are appropriate.

Step 3: Report Design

1. **Create Visualizations:** Design various visualizations (charts, graphs, tables, maps, etc.) based on the defined objectives and requirements.
2. **DAX (Data Analysis Expressions):** use DAX measures to calculate key metrics and KPIs that provide insights into your data (Total Loan Application, Total Funded Amount, Total Receive Amount ... etc)
3. **Arrange Visuals:** Organize visuals on report pages to provide a clear and logical flow of information.
4. **Apply Filters and Slicers:** Use filters, slicers, and other interactive elements to allow users to explore the data dynamically.

Step 4: Dashboard Creation

1. **Design Dashboards:** Aggregate key visuals and KPIs from multiple report pages into a single dashboard.
2. **Apply Interactivity:** Ensure the dashboard is interactive and allowing users to filter data based on their needs.

Step 5: Sharing and Collaboration

1. **Publish Reports:** Publish the completed reports and dashboards to the Power BI Service (cloud) or Power BI Report Server (on-premises).
2. **Share with Stakeholders:** Share the reports and dashboards with stakeholders or team members, granting appropriate permissions for viewing or editing.

Visualizations:

1. Monthly Trends by Issue Date (Line Chart):

- This chart shows how lending activities vary month by month over time. It helps spot patterns like seasonal peaks or dips in loan issuance.

2. Home Ownership Analysis (Donut Chart):

- A donut chart visually breaks down loans into categories based on their types, it shows the distribution of loans by home ownership.

3. Loan Term Analysis (Tree Map):

- This hierarchical view uses squares of varying sizes and colors to show how different types of terms impact loan applications and disbursements.

4. Employee Length Analysis (Bar Chart):

- This bar chart compares lending metrics among borrowers with different lengths of employment. It helps understand how employment history influences loan applications.

5. Loan Purpose Breakdown (Bar Chart):

- This bar chart categorically displays loans according to their intended uses, such as education expenses or home improvements. It provides valuable insights into the main motivations driving borrowers to seek financing. It gives insights into the primary reasons borrowers seek loans.

6. Regional Analysis by State (Filled Map):

- Using a map with different shades or colors for each state, this visualization highlights areas where lending activity is high or low. It helps compare lending across regions.

Data Analysis Expressions (DAX):

- KPI

1. Total Amount Received = `SUM('financial_loan (1)'[total_payment])`
2. TOTAL Funded Amount = `SUM('financial_loan (1)'[loan_amount])`
3. Total Loan Application = `COUNT('financial_loan (1)'[id])`
4. AVG DTI = `AVERAGE('financial_loan (1)'[dti])`
5. Avg Interest Rate = `AVERAGE('financial_loan (1)'[int_rate])`
6. MTD TOTAL AMOUNT RECEIVED = `CALCULATE(TOTALMTD([Total Amount Received],'Date Table'[Date]))`
7. MTD LOAN APPLICATION = `CALCULATE(TOTALMTD([Total Loan Application],'Date Table'[Date]))`
8. MTD Funded Amount = `CALCULATE(TOTALMTD([TOTAL Funded Amount],'Date Table'[Date]))`
9. MTD Avg Interest Rate = `CALCULATE(TOTALMTD([Avg Interest Rate],'Date Table'[Date]))`
10. MTD Avg DTI = `CALCULATE(TOTALMTD([AVG DTI],'Date Table'[Date]))`
11. MOM RECEIVED Amount = $([MTD TOTAL AMOUNT RECEIVED] - [PMTD RECEIVED AMOUNT]) / [PMTD RECEIVED AMOUNT]$
12. MOM LOAN APPLICATION = $([MTD LOAN APPLICATION] - [PMTD LOAN APPLICATION]) / [PMTD LOAN APPLICATION]$
13. MOM Funded Amount = $([MTD Funded Amount] - [PMTD Funded Amount]) / [PMTD Funded Amount]$
14. MOM Avg Int Rate = $([MTD Avg Interest Rate] - [PMTD Avg INT Rate]) / [PMTD Avg INT Rate]$
15. MOM Avg DTI = $([MTD Avg DTI] - [PMTD Avg DTI]) / [PMTD Avg DTI]$

16. PMTD Avg DTI = `CALCULATE([AVG DTI],DATESMTD(DATEADD('Date Table'[Date],-1,MONTH)))`

17. PMTD Avg INT Rate = `CALCULATE([Avg Interest Rate],DATESMTD(DATEADD('Date Table'[Date],-1,MONTH)))`

18. PMTD Funded Amount = `CALCULATE([TOTAL Funded Amount],DATESMTD(DATEADD('Date Table'[Date],-1,MONTH)))`

19. PMTD LOAN APPLICATION = `CALCULATE([Total Loan Application],DATESMTD(DATEADD('Date Table'[Date],-1,MONTH)))`

20. PMTD RECEIVED AMOUNT = `CALCULATE([Total Amount Received],DATESMTD(DATEADD('Date Table'[Date],-1,MONTH)))`

- **Summary**

21. Bad Loan Funded Amt = `CALCULATE([TOTAL Funded Amount],'financial_loan (1)'[Good vs Bad Loan] = "Bad Loan")`

22. Bad Loan Received Amt = `CALCULATE([Total Amount Received],'financial_loan (1)'[Good vs Bad Loan] = "Bad Loan")`

23. Bad LoanApplication = `CALCULATE([Total Loan Application],'financial_loan (1)'[Good vs Bad Loan] = "Bad Loan")`

24. BadLoan % = `(CALCULATE([Total Loan Application],'financial_loan (1)'[Good vs Bad Loan] = "Bad Loan"))/[Total Loan Application]`

25. Good Loan Funded Amt = `CALCULATE([TOTAL Funded Amount],'financial_loan (1)'[Good vs Bad Loan] = "Good Loan")`

26. Good Loan Received Amt = `CALCULATE([Total Amount Received],'financial_loan (1)'[Good vs Bad Loan] = "Good Loan")`

27. Good LoanApplication = `CALCULATE([Total Loan Application],'financial_loan (1)'[Good vs Bad Loan] = "Good Loan")`

28. GoodLoan % = (CALCULATE([Total Loan Application], 'financial_loan (1)'[Good vs Bad Loan] = "Good Loan"))/[Total Loan Application]

29. GoodLoan % = (CALCULATE([Total Loan Application], 'financial_loan (1)'[Good vs Bad Loan] = "Good Loan"))/[Total Loan Application]

- **Date**

30. Date Table = CALENDAR(min('financial_loan (1)'[issue_date]), MAX('financial_loan (1)'[issue_date]))

31. Month = FORMAT('Date Table'[Date], "mmm")

32. month no = MONTH('Date Table'[Date])