



BANK LOAN ANALYSIS

PERFORMED BY: TRUONG NGOC BAO LINH

FUNCTION I USE IN THIS PROJECT



- **Creating Database**
- **Creating Table**
- **Select**
- **Datename**
- **Datepart**
- **Cast**
- **Decimal**
- **Month**
- **Hour**
- **Quarter**

- **Day**
- **Group by**
- **Order by**
- **Decimal**
- **Limit**
- **Count**
- **Distinct**
- **CTE**
- **Partition**



Power BI

- **Connecting to SQL Server**
- **Data Cleaning**
- **Data Modelling**
- **Data Processing**
- **Power Query**
- **Date Tables**
- **Time Intelligence Func**
- **DAX**
- **Date Function**

- **Text Function**
- **Filter Function**
- **Calculate**
- **SUM/ SUMX**
- **Creating KPI's**
- **New Card Visual**
- **Creating Charts**
- **Formatting visuals**
- **Creating Functions**
- **Navigations**

PROBLEM STATEMENT

DASHBOARD 1: SUMMARY

Key Performance Indicators (KPIs) Requirements:

- **Total Loan Applications:** We need to calculate the total number of loan applications received during a specified period. Additionally, it is essential to monitor the Month-to-Date (MTD) Loan Applications and track changes Month-over-Month (MoM).
- **Total Funded Amount:** Understanding the total amount of funds disbursed as loans is crucial. We also want to keep an eye on the MTD Total Funded Amount and analyse the Month-over-Month (MoM) changes in this metric.
- **Total Amount Received:** Tracking the total amount received from borrowers is essential for assessing the bank's cash flow and loan repayment. We should analyse the Month-to-Date (MTD) Total Amount Received and observe the Month-over-Month (MoM) changes.
- **Average Interest Rate:** Calculating the average interest rate across all loans, MTD, and monitoring the Month-over-Month (MoM) variations in interest rates will provide insights into our lending portfolio's overall cost.
- **Average Debt-to-Income Ratio (DTI):** Evaluating the average DTI for our borrowers helps us gauge their financial health. We need to compute the average DTI for all loans, MTD, and track Month-over-Month (MoM) fluctuations.

BANK LOAN REPORT | SUMMARY

KPI'S

Total Loan Applications

Total Loan Applications = COUNT(bank_loan_dataset[id])

MTD Loan Applications

MTD Loan Applications = CALCULATE(TOTALMTD([Total Loan Applications], 'Date Table'[Date]))

PMTD Loan Applications

PMTD Loan Applications = CALCULATE([Total Loan Applications], DATESMTD(DATEADD('Date Table'[Date], -1, MONTH)))

MoM Loan Applications

MoM Loan Application = ([MTD Loan Applications] - [PMTD Loan Applications])/[PMTD Loan Applications]



BANK LOAN REPORT | SUMMARY

KPI'S

Total Funded Amount

Total Funded Amount = SUM(bank_loan_dataset[loan_amount])

MTD Total Funded Amount

MTD Funded Amount = CALCULATE(TOTALMTD([Total Funded Amount], 'Date Table'[Date]))

PMTD Total Funded Amount

PMTD Total Funded Amount = CALCULATE([Total Funded Amount], DATESMTD(DATEADD('Date Table'[Date], -1, MONTH)))

MoM Total Funded Amount

MoM Total Funded Amount = ([MTD Funded Amount] - [PMTD Total Funded Amount])/[PMTD Total Funded Amount]



BANK LOAN REPORT | SUMMARY

KPI'S

Total Amount Received

Total Amount Received = $\text{SUM}(\text{bank_loan_dataset}[\text{total_payment}])$

MTD Total Amount Received

MTD Total Amount Received = $\text{CALCULATE}(\text{TOTALMTD}([\text{Total Amount Received}], \text{'Date Table'}[\text{Date}]))$

PMTD Total Amount Received

PMTD Total Amount Received = $\text{CALCULATE}([\text{Total Amount Received}], \text{DATESMTD}(\text{DATEADD}(\text{'Date Table'}[\text{Date}], -1, \text{MONTH})))$

MoM Total Amount Received

MoM Total Amount Received = $([\text{MTD Total Amount Received}] - [\text{PMTD Total Amount Received}]) / [\text{PMTD Total Amount Received}]$



BANK LOAN REPORT | SUMMARY

KPI'S

Average Interest Rate

Average Interest Rate = AVERAGE(bank_loan_dataset[int_rate])

MTD Average Interest Rate

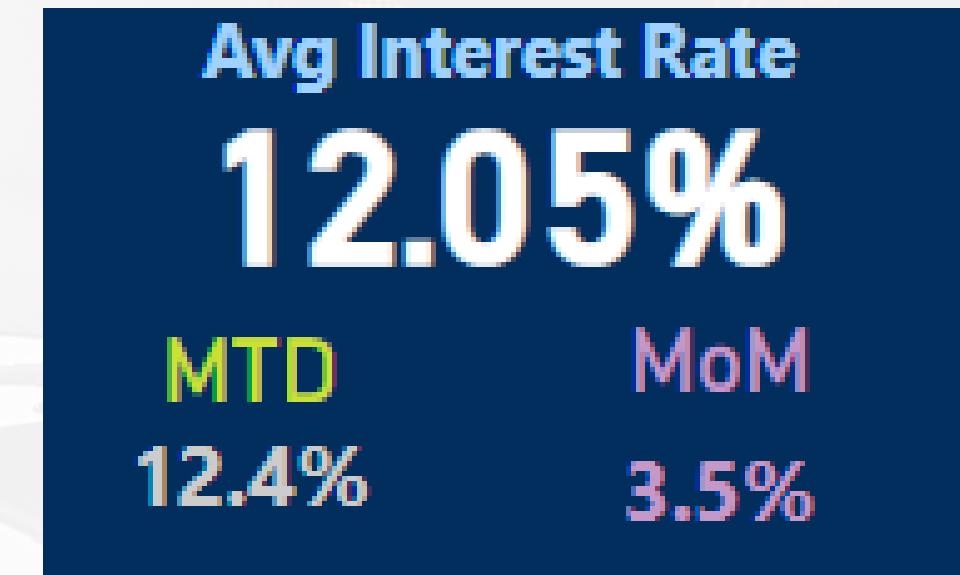
MTD Average Interest = CALCULATE(TOTALMTD([Average Interest Rate], 'Date Table'[Date]))

PMTD Average Interest Rate

PMTD Average Interest = CALCULATE([Average Interest Rate], DATESMTD(DATEADD('Date Table'[Date], -1, MONTH)))

MoM Average Interest Rate

MoM Average Interest = ([MTD Average Interest] - [PMTD Average Interest])/[PMTD Average Interest]



BANK LOAN REPORT | SUMMARY

KPI'S

Average DTI

Average DTI = AVERAGE(bank_loan_dataset[dti])

MTD Average DTI

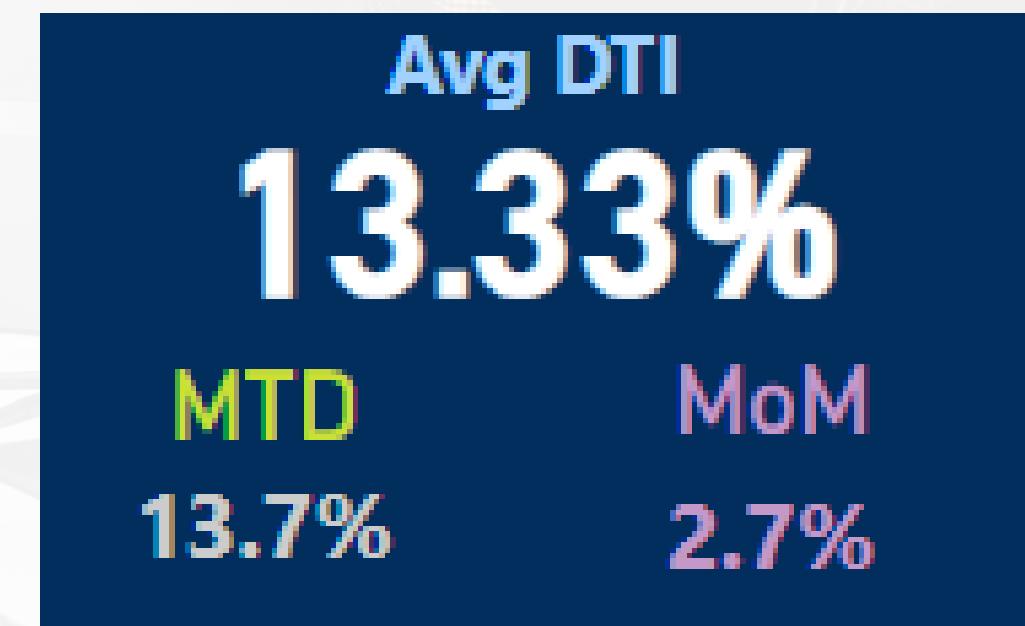
MTD Avarage DTI = CALCULATE(TOTALMTD([Average DTI], 'Date Table'[Date]))

PMTD Average DTI

PMTD Average DTI = CALCULATE([Average DTI], DATESMTD(DATEADD('Date Table'[Date], -1, MONTH)))

MoM Average DTI

MoM Average DTI = ([MTD Avarage DTI] - [PMTD Average DTI])/[PMTD Average DTI]



PROBLEM STATEMENT

DASHBOARD 1: SUMMARY

Good Loan v Bad Loan KPI's

Good Loan:

- Good Loan Application Percentage
- Good Loan Applications
- Good Loan Funded Amount
- Good Loan Total Received Amount

Bad Loan:

- Bad Loan Application Percentage
- Bad Loan Applications
- Bad Loan Funded Amount
- Bad Loan Total Received Amount

Loan Status Grid View

In order to gain a comprehensive overview of my lending operations and monitor the performance of loans, I aim to create a grid view report categorized by 'Loan Status.' By providing insights into metrics such as 'Total Loan Applications,' 'Total Funded Amount,' 'Total Amount Received,' 'Month-to-Date (MTD) Funded Amount,' 'MTD Amount Received,' 'Average Interest Rate,' and 'Average Debt-to-Income Ratio (DTI).'

BANK LOAN REPORT | SUMMARY



Menu

Summary

Overview

Details

Purpose

All

Grade

All

State

All

Total Loan Applications

38.6K

MTD

MoM

4.3K

6.9%

Total Funded Amount

\$435.8M

MTD

MoM

\$54.0M

13.0%

Total Amount Received

\$473.1M

MTD

MoM

\$58.1M

15.8%

Avg Interest Rate

12.05%

MTD

MoM

12.4%

3.5%

Avg DTI

13.33%

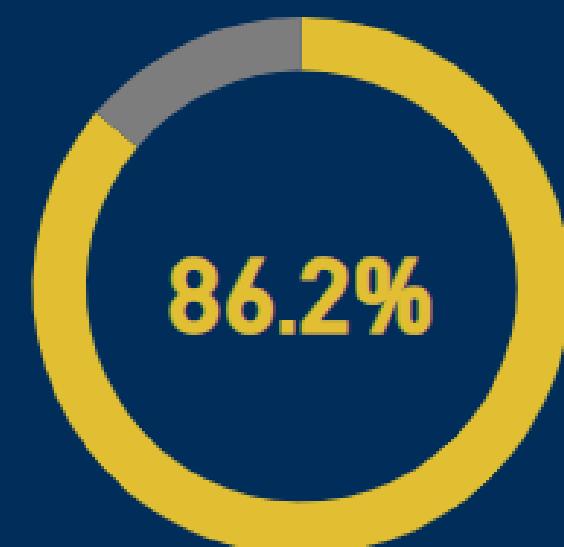
MTD

MoM

13.7%

2.7%

GOOD LOAN ISSUED



Good Loan Applications

33K

Good Loan Funded Amount

\$370.2M

Good Loan Amount Received

\$435.8M

BAD LOAN ISSUED



Bad Loan Applications

5.3K

Bad Loan Funded Amount

\$65.5M

Bad Loan Amount Received

\$37.3M

LOAN STATUS

Loan Status	Total Loan Applications	Total Funded Amount	Total Amount Received	MTD Funded Amount	MTD Total Amount Received	Average Interest Rate	Average DTI
Fully Paid	32145	\$351,358,350	\$411,586,256	\$41,302,025	\$47,815,851	11.64%	13.17%
Current	1098	\$18,866,500	\$24,199,914	\$3,946,625	\$4,934,318	15.10%	14.72%
Charged Off	5333	\$65,532,225	\$37,284,763	\$8,732,775	\$5,324,211	13.88%	14.00%
Grand Total	38576	\$435,757,075	\$473,070,933	\$53,981,425	\$58,074,380	12.05%	13.33%

PROBLEM STATEMENT

DASHBOARD 2: OVERVIEW

CHARTS

- **Monthly Trends by Issue Date (Line Chart):** To identify seasonality and long-term trends in lending activities
- **Regional Analysis by State (Filled Map):** To identify regions with significant lending activity and assess regional disparities
- **Loan Term Analysis (Donut Chart):** To allow the client to understand the distribution of loans across various term lengths.
- **Employee Length Analysis (Bar Chart):** How lending metrics are distributed among borrowers with different employment lengths, helping us assess the impact of employment history on loan applications.
- **Loan Purpose Breakdown (Bar Chart):** Will provide a visual breakdown of loan metrics based on the stated purposes of loans, aiding in the understanding of the primary reasons borrowers seek financing.
- **Home Ownership Analysis (Tree Map):** For a hierarchical view of how home ownership impacts loan applications and disbursements.

(Metrics to be shown: 'Total Loan Applications,' 'Total Funded Amount,' and 'Total Amount Received')

BANK LOAN REPORT | OVERVIEW



Menu

Summary

Overview

Details

Select Measure

Total Loan Application... ▾

Good vs Bad Loan

All ▾

Grade

All ▾

State

All ▾

Total Loan Applications

38.6K

MTD

MoM

4.3K

6.9%

Total Funded Amount

\$435.8M

MTD

MoM

\$54.0M

13.0%

Total Amount Received

\$473.1M

MTD

MoM

\$58.1M

15.8%

Avg Interest Rate

12.05%

MTD

MoM

12.4%

3.5%

Avg DTI

13.33%

MTD

MoM

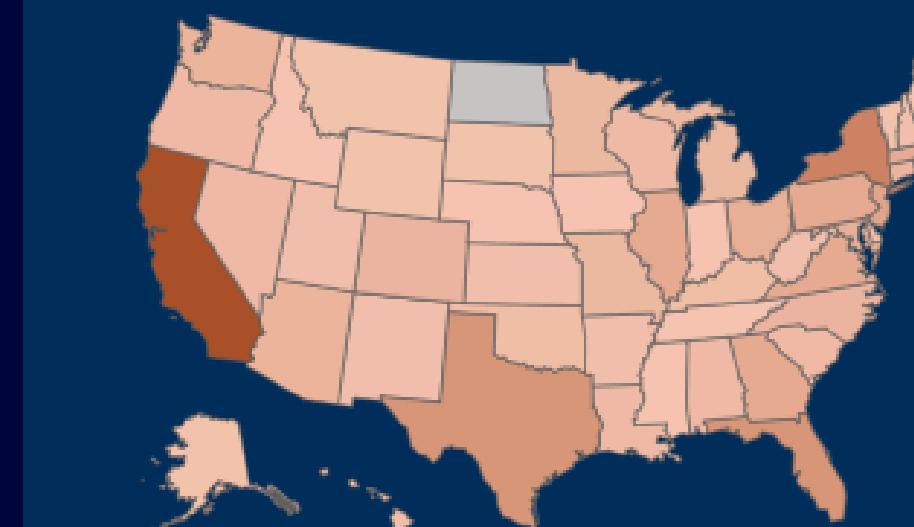
13.7%

2.7%

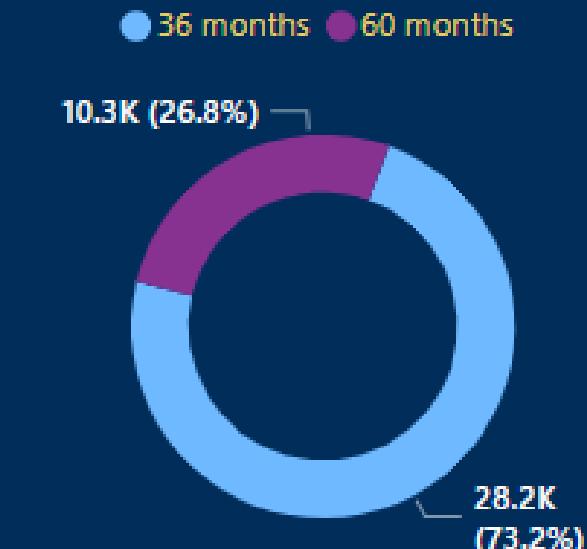
Total Loan Applications by Month



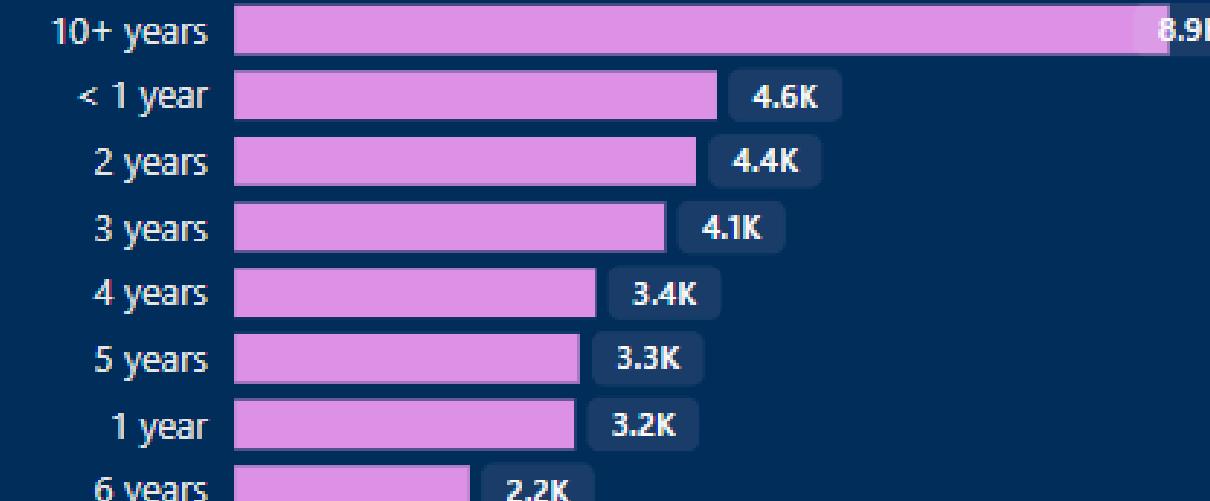
Total Loan Applications by State



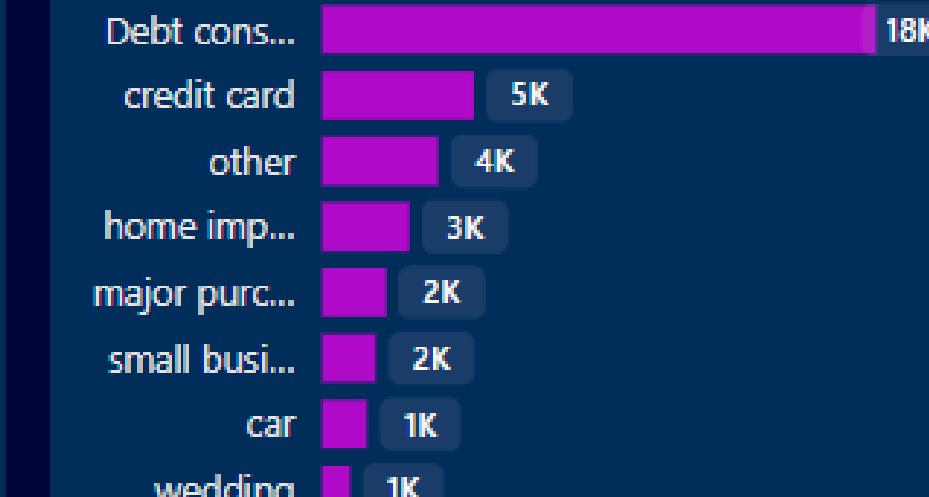
Total Loan Applications by Term



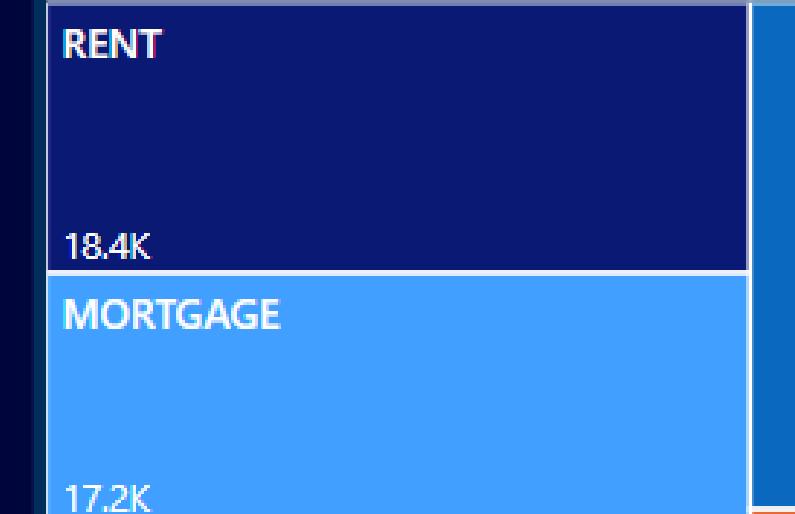
Total Loan Applications by Employee Length



Total Loan Applications by Purpose



Total Loan Applications by Home Ownership



PROBLEM STATEMENT

DASHBOARD 3: DETAILS

GRID

Need for a comprehensive 'Details Dashboard' that provides a consolidated view of all the essential information within our loan data. This Details Dashboard aims to offer a holistic snapshot of key loan-related metrics and data points, enabling users to access critical information efficiently.

Objective:

The primary objective of the Details Dashboard is to provide a comprehensive and user-friendly interface for accessing vital loan data. It will serve as a one-stop solution for users seeking detailed insights into our loan portfolio, borrower profiles, and loan performance.

BANK LOAN REPORT | DETAILS



Menu

Total Loan Applications

38.6K

MTD MoM
4.3K 6.9%

Total Funded Amount

\$435.8M

MTD MoM
\$54.0M 13.0%

Total Amount Received

\$473.1M

MTD MoM
\$58.1M 15.8%

Avg Interest Rate

12.05%

MTD MoM
12.4% 3.5%

Avg DTI

13.33%

MTD MoM
13.7% 2.7%

Summary

Overview

Details

Select Measure

Total Loan Application

Good vs Bad Loan

All

Grade

All

State

All

ID	Purpose	Home Ownership	Grade	Sub Grade	Issue Date	Funded Amount	Int Rate	Sum of Installment	Amount Collection
989285	Debt consolidation	RENT	G	G1	11 October, 2021	\$35,000	0.23	981.45	\$58,564
812976	Debt consolidation	MORTGAGE	G	G2	11 August, 2021	\$35,000	0.22	976.24	\$58,480
972576	credit card	MORTGAGE	F	F5	11 October, 2021	\$35,000	0.22	973.64	\$57,835
874599	Debt consolidation	MORTGAGE	G	G3	11 September, 2021	\$35,000	0.23	983.66	\$56,849
768930	small business	MORTGAGE	F	F3	11 June, 2021	\$35,000	0.21	946.68	\$56,663
674448	Debt consolidation	MORTGAGE	G	G2	11 February, 2021	\$35,000	0.20	936.66	\$56,199
914211	Debt consolidation	MORTGAGE	F	F1	11 October, 2021	\$35,000	0.21	944.71	\$55,907
772157	small business	RENT	G	G1	11 June, 2021	\$35,000	0.22	968.86	\$55,769
1057770	Debt consolidation	MORTGAGE	E	E5	11 December, 2021	\$35,000	0.20	933.14	\$55,139
833224	Debt consolidation	MORTGAGE	F	F2	11 August, 2021	\$35,000	0.21	939.41	\$55,106
698163	home improvement	MORTGAGE	G	G2	11 March, 2021	\$35,000	0.20	936.66	\$54,774
762870	Debt consolidation	OWN	E	E4	11 May, 2021	\$35,000	0.19	913.52	\$54,746
768153	home improvement	MORTGAGE	F	F2	11 June, 2021	\$35,000	0.21	939.41	\$54,715
1057239	Debt consolidation	RENT	E	E3	11 December, 2021	\$35,000	0.19	916.03	\$54,427
1034299	credit card	MORTGAGE	E	E3	11 December, 2021	\$35,000	0.19	916.03	\$54,287
1008529	Debt consolidation	MORTGAGE	E	E5	11 November, 2021	\$35,000	0.20	933.14	\$54,182
733401	credit card	RENT	G	G4	11 April, 2021	\$35,000	0.21	951.21	\$54,132
821705	Debt consolidation	MORTGAGE	E	E4	11 July, 2021	\$35,000	0.19	913.52	\$54,112
970684	Debt consolidation	RENT	E	E4	11 October, 2021	\$35,000	0.20	925.54	\$54,005

DOMAIN KNOWLEDGE

Purpose: Financial tools for individuals and businesses to achieve goals and manage needs.



LOAN APPLICATIONS

- Personal and financial information submitted by borrowers.
- This data is collected electronically or in paper form.



CREDIT REPORTS

- Banks often access credit reports from credit bureaus when assessing a borrower's creditworthiness.
- Credit history and payment behavior from credit bureaus.



INTERNAL RECORDS

- Banks maintain internal records of loan transactions, including disbursements, repayments, and loan status changes.
- These records are generated and stored in the bank's database.



ONLINE PORTALS

- Many banks offer online platforms where borrowers can apply for loans, make payments, and access account information.
- Data from these portals is collected and stored for analysis.



THIRD-PARTY DATA SOURCES

- Some banks may use external data sources, such as income verification services, to gather additional information about borrowers.

PROCESS OF GRANTING A LOAN



Loan Application

The process begins when a customer submits a loan application to a bank or lending institution. This application can be submitted in person, online, or through other channels.



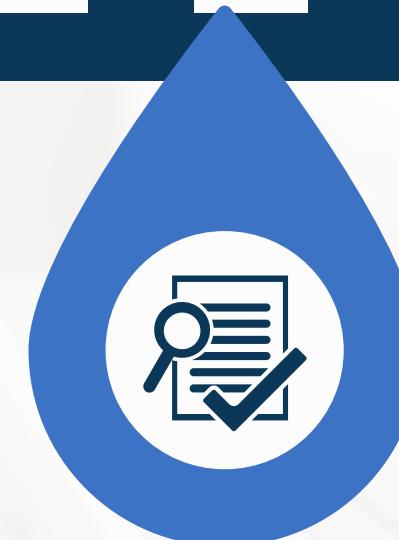
Identity Verification

One of the initial checks is to verify the applicant's identity. This helps ensure that the applicant is who they claim to be and prevents identity theft.



Income Verification

Lenders assess the applicant's ability to repay the loan by verifying their income. This may involve reviewing pay stubs, tax returns, or other income documentation.



Application Review

The lending institution reviews the loan application and collects necessary documentation, such as income statements, credit reports, and identification documents.



Credit Check

A crucial step is to perform a credit check on the applicant. This involves accessing their credit report from credit bureaus. Lenders evaluate the applicant's credit history, credit score, and any past delinquencies or defaults.



PROCESS OF GRANTING A LOAN



Debt-to-Income Ratio (DTI) Check

Lenders calculate the applicant's DTI, which is the ratio of their monthly debt payments to their monthly income. A lower DTI indicates better repayment capacity.



Employment Verification

Lenders may contact the applicant's employer to verify their employment status and length of employment. Stable employment history is often seen as a positive factor.



Collateral Assessment (if applicable)

If the loan is secured by collateral, such as a home or a car, the lender evaluates the value and condition of the collateral.



Risk Assessment

Lenders assess the overall risk associated with the loan. This includes considering the applicant's credit risk, income stability, and the purpose of the loan.



Loan Approval or Denial

Based on the information gathered and the risk assessment, the lender makes a decision to approve or deny the loan application. If approved, the lender determines the loan amount, interest rate, and terms.



PROCESS OF GRANTING A LOAN

Loan Agreement



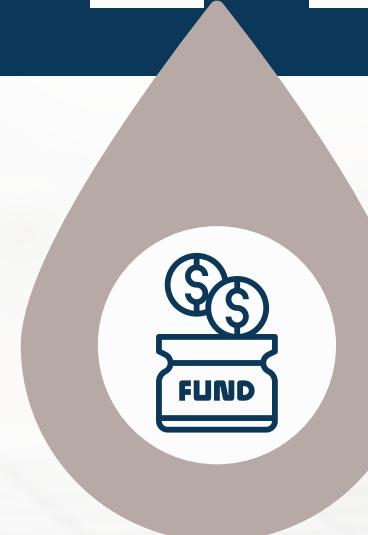
If the loan is approved, the lender provides the applicant with a loan agreement that outlines the terms and conditions, including the interest rate, repayment schedule, and any fees.

Repayment



The borrower is responsible for making regular loan payments as specified in the loan agreement. This includes repaying the principal amount along with interest.

Disbursement of Funds



Once the loan agreement is signed by both parties, the lender disburses the funds to the borrower. The borrower can use the funds for the specified purpose.

Ongoing Monitoring



Lenders continue to monitor the loan throughout its term, including tracking payments, assessing the borrower's financial health, and managing any delinquencies or defaults.

REASONS FOR ANALYSING BANK LOAN DATA



RISK ASSESSMENT

- One of the primary purposes of analysing loan data is to assess the risk associated with lending to a particular individual or business.
- Banks use data to evaluate the creditworthiness of borrowers, predict default probabilities, and determine interest rates and lending terms.



DECISION-MAKING

- Loan data analysis supports the decision-making process when evaluating loan applications.
- Banks use data-driven models and algorithms to make informed lending decisions, such as approving or denying loan requests.



PORTFOLIO MANAGEMENT

- Banks manage portfolios of loans, including mortgages, personal loans, and business loans.
- Data analysis helps banks monitor the health of these portfolios, identify underperforming loans, and optimize loan terms and pricing.



FRAUD DETECTION

- Banks use data analysis to detect fraudulent loan applications and activities.
- Unusual patterns, inconsistencies, or discrepancies in loan data can trigger fraud alerts.



REGULATORY COMPLIANCE

- Banks are subject to regulatory requirements that mandate the collection and reporting of loan data. Compliance with regulations such as the Home Mortgage Disclosure Act (HMDA) and the Know Your Customer (KYC) regulations requires data analysis and reporting.



CUSTOMER INSIGHTS

- Analysing loan data provides insights into customer behaviour, preferences, and needs.
- Banks can use these insights to tailor loan products and marketing strategies to specific customer segments.

REASONS FOR ANALYSING BANK LOAN DATA



PROFITABILITY ANALYSIS

Banks assess the profitability of their loan portfolios by analysing data related to interest income, loan origination costs, default rates, and collection efforts.



MARKET RESEARCH

Data analysis helps banks understand market trends, competitive landscape, and customer demand. This information guides product development and market expansion strategies.



CREDIT RISK MANAGEMENT

Banks continuously monitor and manage credit risk associated with their loans. Data analysis helps in setting risk management strategies, provisioning for potential losses, and stress testing loan portfolios.



CUSTOMER RETENTION

Banks use data analysis to identify opportunities for retaining existing customers, such as offering loan refinancing options or additional financial products.