

# BANK LOAN ANALYTICS

PRESENTED BY NAVEENA N



# INTRODUCTION

This report provides an in-depth analysis of a lending loan dataset to understand how borrower details and loan characteristics affect loan performance. The project explores the relationship between key borrower attributes—such as employment length, income, and debt-to-income ratio—and loan characteristics, including loan amount, term, interest rate, and purpose. The objective is to uncover insights that can assist banking institutions in optimizing their loan-lending strategies, mitigating credit risk, and enhancing portfolio performance.



TOOL USED

POWER BI

# DATASETS

**BORROWER DETAILS AND  
LOAN DETAILS ARE THE TWO  
DATASETS USED FOR  
ANALYSIS**

MEMBER_ID	LOAN_ID	EMP_LENGTH	HOME_OWNERSHIP	ANNUAL_INCRE	VERIFICATION_STATUS	DTI	DELING_2YRS	LAST_PAYMENT_DATE	OUT_PNR
1888349	1616143	4 years	MORTGAGE	101000	Source Verified	8.85	3	01-10-15	
1887459	1615663	1 year	MORTGAGE	45000	Source Verified	33.11	3	01-02-21	
1882237	1610606	0 years	MORTGAGE	31000	Source Verified	27.17	3	01-09-15	
1907593	1635401	1 year	MORTGAGE	139560	Source Verified	10.78	3	01-04-20	
2129665	1827274	< 1 year	MORTGAGE	125000	Source Verified	13.99	3	01-03-20	
2158275	1855997	5 years	MORTGAGE	100000	Source Verified	7.32	3	01-11-21	
1963109	1680583	3 years	MORTGAGE	250000	Source Verified	14.36	3	01-03-21	
2743905	2311284	2 years	MORTGAGE	92000	Source Verified	15.58	3	01-08-21	
2839560	2377212	0 years	MORTGAGE	95000	Source Verified	6.8	3	01-12-15	
2835391	2372570	1 year	MORTGAGE	85000	Source Verified	11.36	3	01-01-16	
2978995	2486679	5 years	MORTGAGE	63500	Source Verified	17.01	3	01-12-15	
3127279	2605093	2 years	MORTGAGE	40000	Source Verified	24.39	3	01-09-21	
2967185	2474997	0 years	MORTGAGE	59000	Source Verified	23.44	3	01-02-15	
3628756	3016393	< 1 year	MORTGAGE	155000	Source Verified	5.02	3	01-01-16	
3768888	3096496	9 years	MORTGAGE	155000	Source Verified	9.56	3	01-10-21	
3769079	3096675	8 years	MORTGAGE	95854	Source Verified	28.96	3	01-02-21	
3930937	3198010	8 years	MORTGAGE	85000	Source Verified	18.7	3	01-07-15	
3980801	3238192	9 years	MORTGAGE	98000	Source Verified	11.01	3	01-06-15	
3956893	3214725	6 years	MORTGAGE	123000	Source Verified	11.54	3	01-09-21	
6027471	4765281	2 years	MORTGAGE	41600	Source Verified	16.88	3	01-11-15	
3872605	3160082	2 years	MORTGAGE	90000	Source Verified	12.59	3	01-05-21	
6806733	5454579	8 years	MORTGAGE	120000	Source Verified	29.78	3	01-10-15	

ID	LOAN_AMOUNT	TERM	INTEREST_RATE	INSTALMENT	GRADE	SUB_GRADE	ISSUE_DATE	LOAN_STATUS	PURPOSE	FUNDED_AMNT	MONTH_YEAR
15429392	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
18044127	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
25336268	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
26289151	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27530597	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27532700	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27540609	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27561743	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27582341	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
27672229	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28052742	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28072494	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28142074	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28192548	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28212220	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28242559	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28402419	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28564085	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28603956	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28673102	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28682802	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28684037	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021
28692882	10000	36 months	12.49	334.49	B	B5	01-10-21	Current	Debt Consolidation	10000	Oct 2021

# DATA CLEANING

- Handling Missing Values and Duplicates:
  - ➤ **Missing values** (null) : 'emp\_length', 'last\_pymnt\_d' and 'delinq\_2yrs' columns..
  - ➤ **Duplicate rows:** 'id' column of the "LoanDetails" table as it affects the data.
- Dealing with Inconsistencies:
  - ➤ **formatting:** 'Purpose' column formatted using space not by underscore, and home ownership column to capitalizing the first word .

These data cleaning steps were crucial to ensure relevance of data and give accurate results for further analysis.

# DATA TRANSFORMATION

- **Column Transformation:**

- ➤ **Data type** : 'total\_pymnt' 'whole number type' to 'Fixed decimal number'.
- ➤ **Decimal places**: Rounding off the numbers in the 'funded\_amnt' column to 2 decimal places.

- **Column Renaming:**

- **Rename** : 'issue\_d' to 'issue\_date', 'last\_pay\_d' to 'last\_payment\_date'

- **Creating New Columns:**

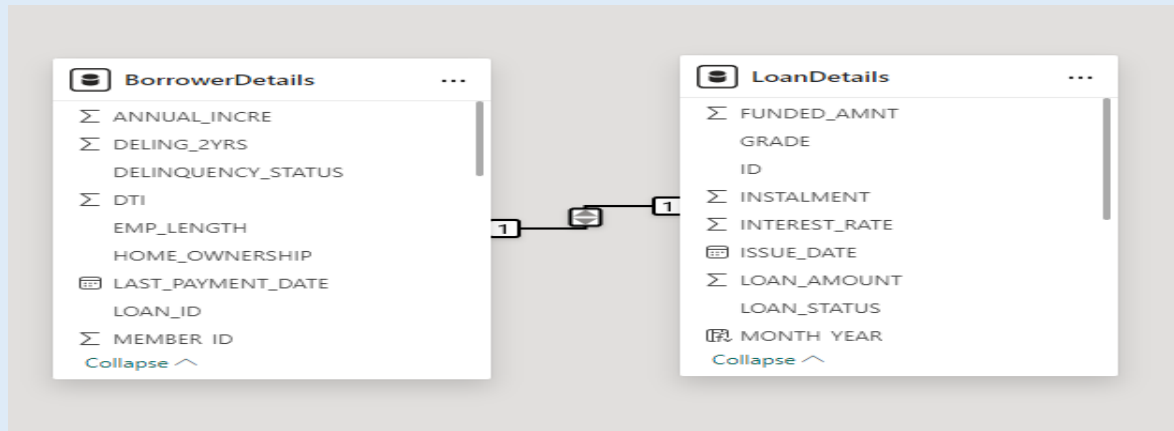
- ➤ **New custom column**- 'total\_amount\_paid' which calculates the total amount paid by each borrower by subtracting 'out\_prncp' from 'total\_pymnt' columns.
- ➤ **New conditional column** : 'delinquency\_status' to categorize the customer as delinquent and non delinquent

- **Column Dropping:**

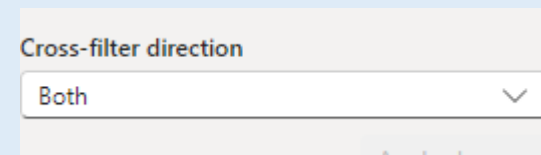
- ➤ sub\_grade column removed as it not contributed to the analysis.

# DATA MODELING

➤ Establish relationships between the two tables using the common column id from each table.



- And setting up the cross filter as "Both".



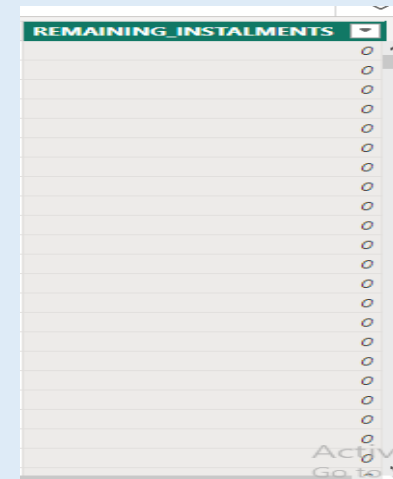
This step is crucial for enabling cross-table analysis and ensuring data integrity within the table.



## CREATING MEASURES AND CALCULATED COLUMNS USING DAX

➤ New calculated column as 'remaining\_installments' using DAX in the "BorrowerDetails" table to calculate the number of remaining installments by dividing the remaining principal amount ('out\_prncp') by the monthly installment amount ('installment') and rounded the result using the CEILING() function to account for any partial payments.

- **REMAINING\_INSTALLMENTS = CEILING(BorrowerDetails[OUT\_PNRCP] / RELATED(LoanDetails[INSTALLMENT]),1)**



A screenshot of a table in a data visualization tool, likely Power BI. The table is titled 'REMAINING\_INSTALLMENTS' and has a single column. The column contains a list of values, mostly zeros, with some values being slightly greater than zero (e.g., 0.0000000000000001, 0.0000000000000002, etc.). The table is shown in a list view with a search bar at the top and a 'Go to' button at the bottom.



# CREATING MEASURES USING DAX

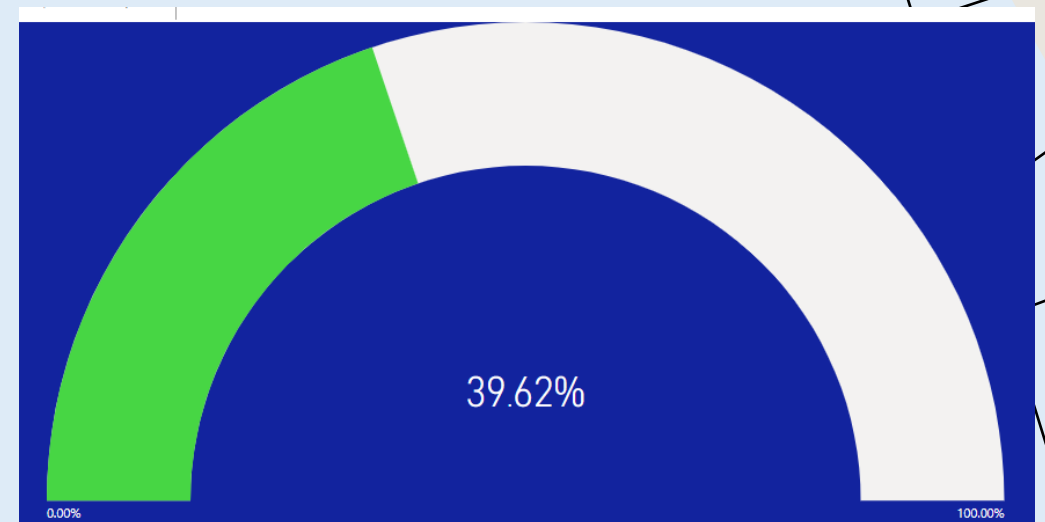
- Measure created as 'Non-Verified Borrowers Count' using DAX to count the number of loans that have been 'Not Verified'.
- `Non_verified_borrowers_count=CALCULATE(COUNTROWS(BorrowerDetails),BorrowerDetails[VERIFICATION_STATUS] = "Not Verified")`



# CREATING MEASURES USING DAX

➤ Measure created as 'Fully Paid Loan Percentage' to calculate the percentage of fully paid loans. By Dividing the number of loans with a "Fully Paid" loan status by the total number of loans and then formatted this measure as Percentage.

```
FULLY_PAID_LOAN_PERCENTAGE=DIVIDE(COUNTROWS(FILTER(LoanDetails,LoanDetails[LOAN_STATUS] = "Fully Paid")),count(LoanDetails[ID]))
```



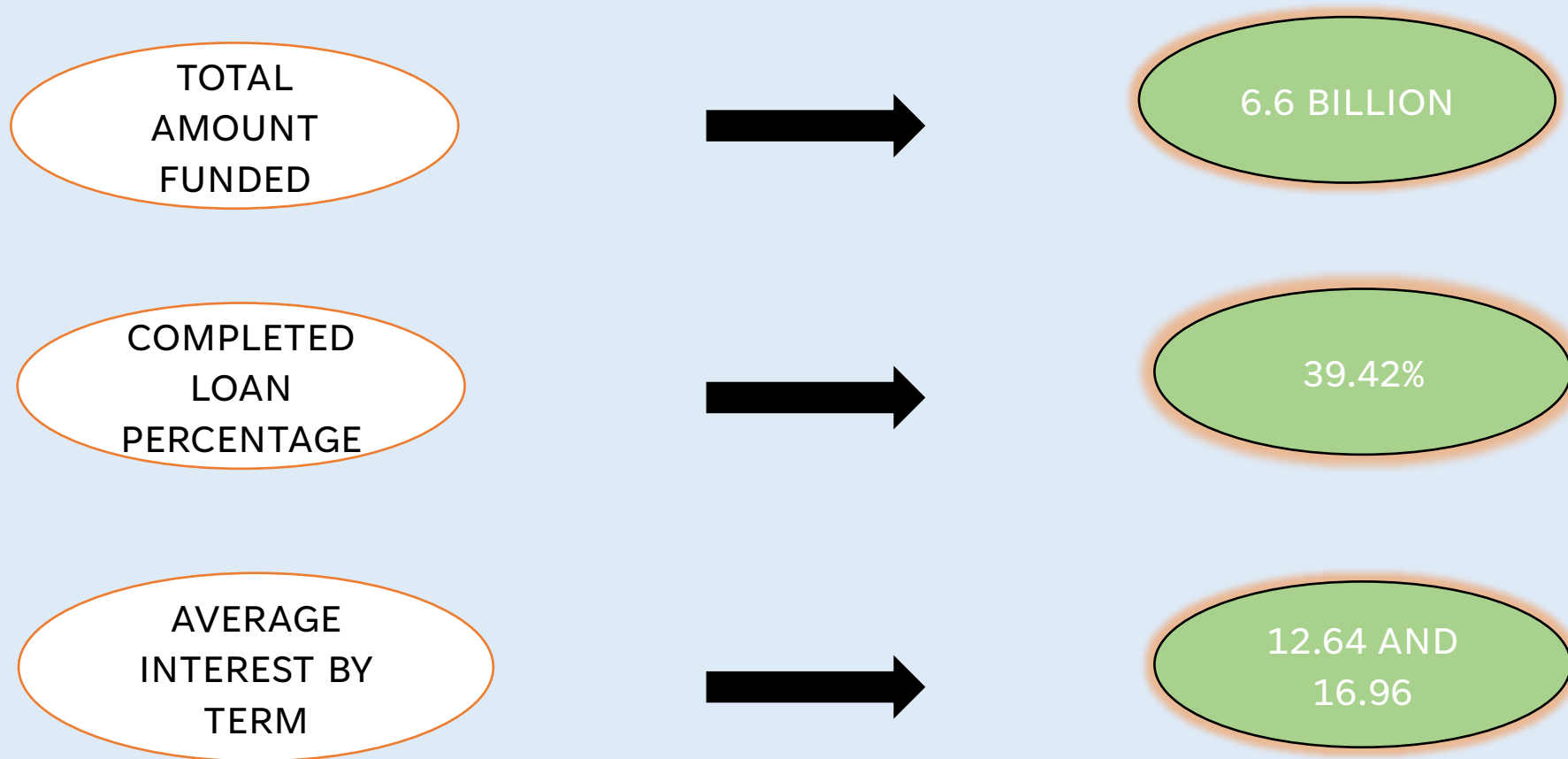
# CREATING COMPREHENSIVE REPORTS

## GENERAL INSTRUCTIONS FOR REPORT:

- Create two insightful reports:
  - ★ Report 1: Loan Performance Analysis
  - ★ Report 2: Borrower Profile Analysis

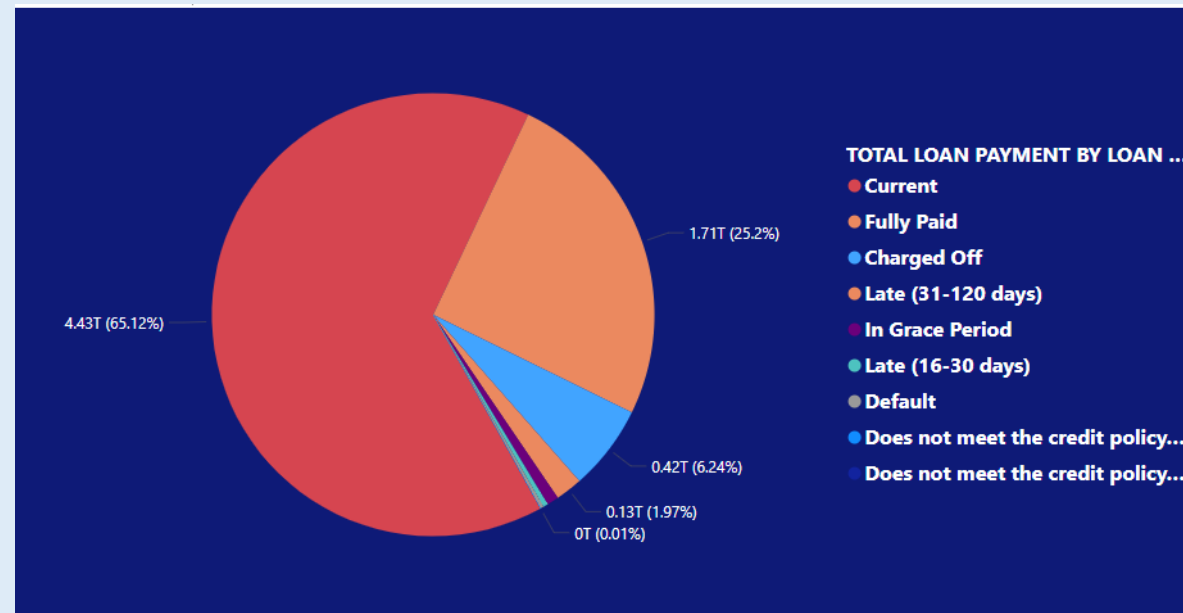
# REPORT 1 : LOAN PERFORMANCE ANALYSIS

## MAJOR FINDINGS



## ➤ LOAN STATUS DISTRIBUTION

- The loan status distribution is a crucial aspect of financial analysis for both lending institutions and investors.
- It provides insights into the health of a loan portfolio(eg-current)versus those are at risk (eg:late,default,or charged off),borrower behaviour,and risk exposure.



# INSTALMENT OVER TIME

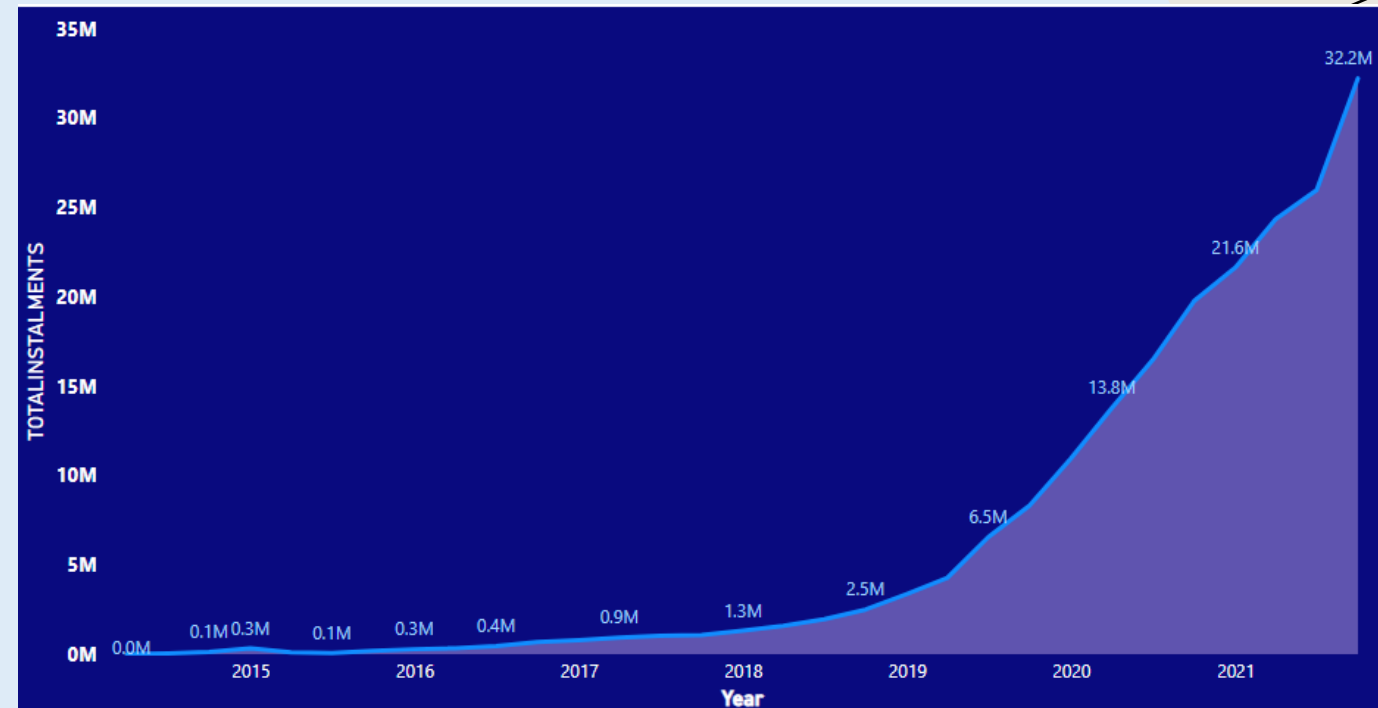
The sum of instalments over time is an important metric for financial analysis, especially in the context of loans and credit management. The key aspects are :

- Cash flow analysis
- Loan performance monitoring
- Delinquency and risk management
- Operational planning

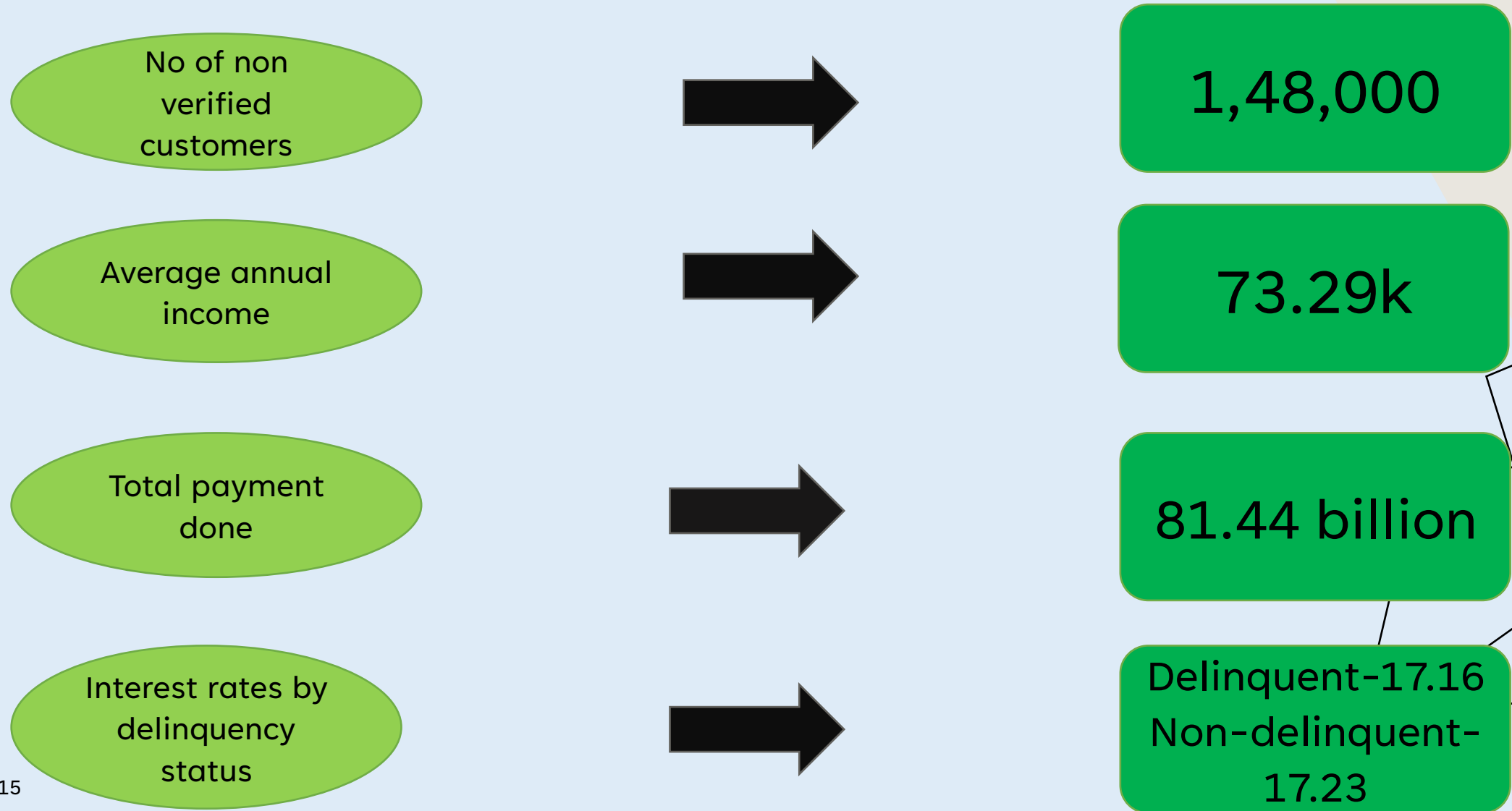
As in here there is a growth in the Instalments lend over a period of time which shows:

- Increase in loan disbursements
- Higher interest rates
- Improved borrower payment

behaviour



## REPORT 2: BORROWER PROFILE ANALYSIS MAJOR FINDINGS

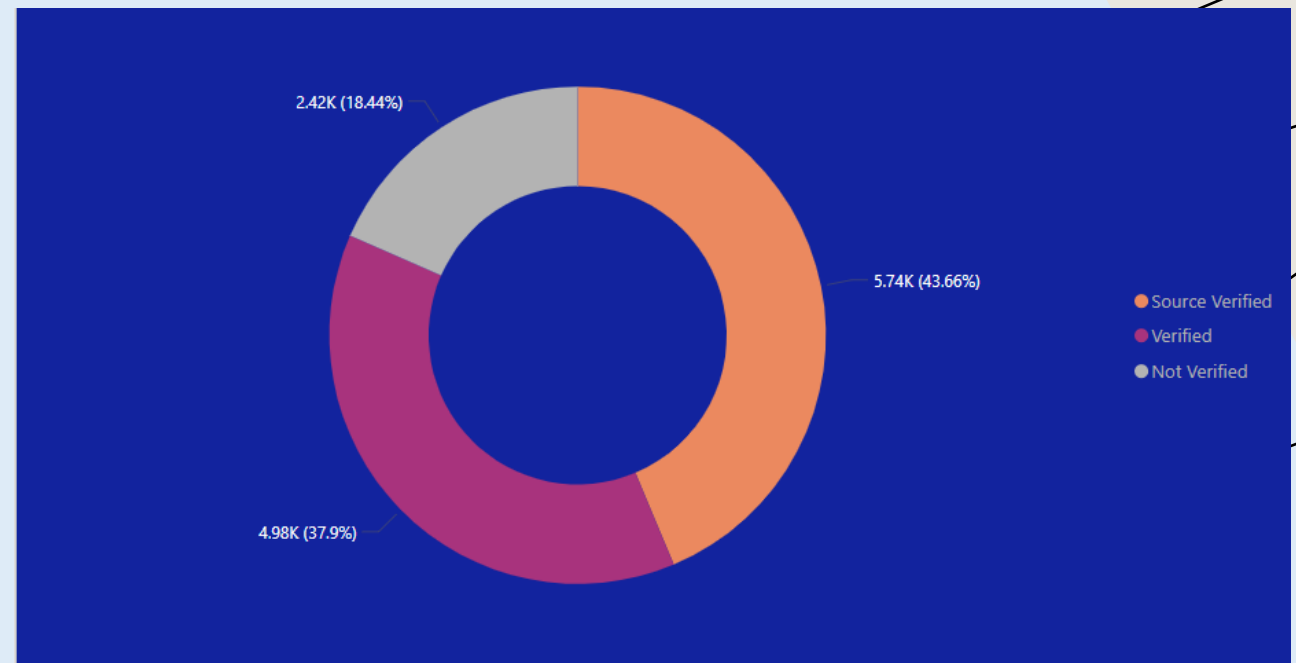




## OTHER MAJOR FINDINGS

**1.Outstanding principal:** The outstanding principal is the remaining balance of a loan that a borrower has not paid back. Understanding its significance when analyzed by verification status(verified, not verified and source verified) provides key insights for financial institutions and stakeholders.

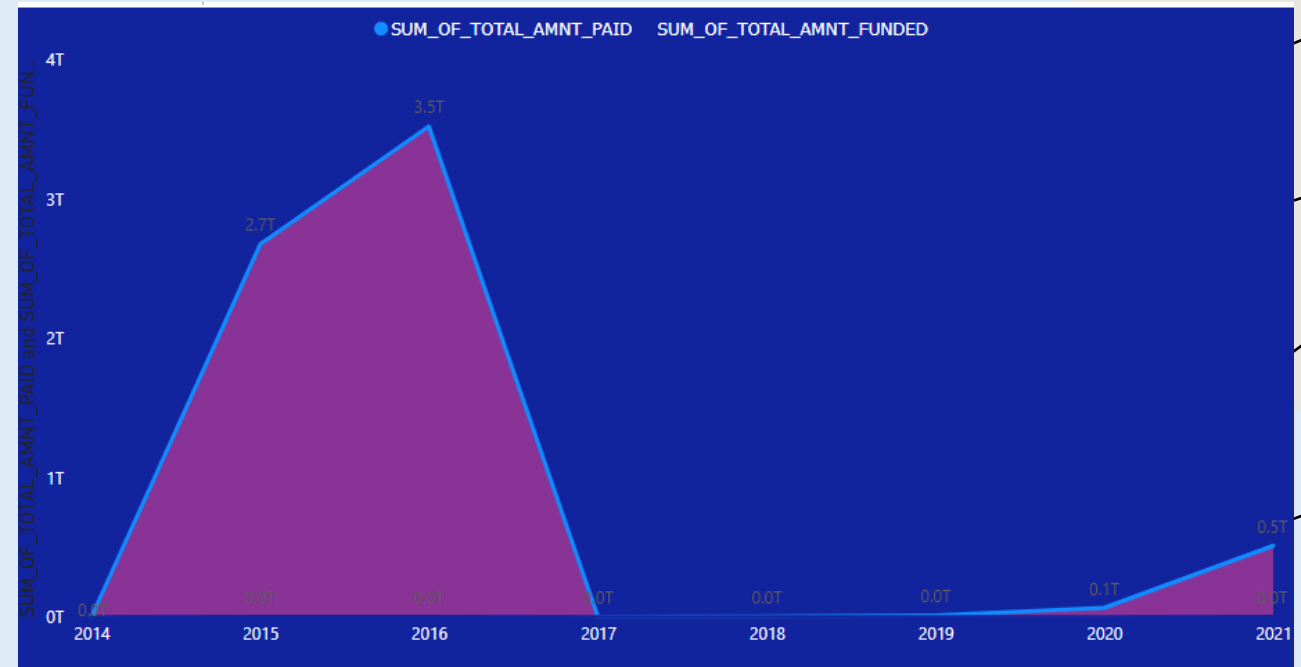
- **Verified status:** These are typically less risky as the borrower's income and assets have been confirmed.
- **Not verified-** high outstanding principals pose a greater risk of default since their financial information hasn't been confirmed.



## 2. TOTAL AMOUNT FUNDED VS TOTAL AMOUNT PAID

- **Total amount funded**: the total amount funded is the total amount given to the borrower by the lender.
- **Importance: Loan portfolio analysis** – helps lenders analyse the size and structure of their loan portfolio
- **Total amount paid**: It is the cumulative amount paid by the borrower to the lender.
- **Importance: Risk default assessment**:

If total paid is significantly less than Funded, it may signal delinquencies Or potential defaults.



# LOAN PERFORMANCE ANALYSIS REPORT DASHBOARD

## BANK LOAN REPORT SUMMARY



TOTAL FUNDED  
AMOUNT

6.6bn

COMPLETED LOAN  
PERCENTAGE



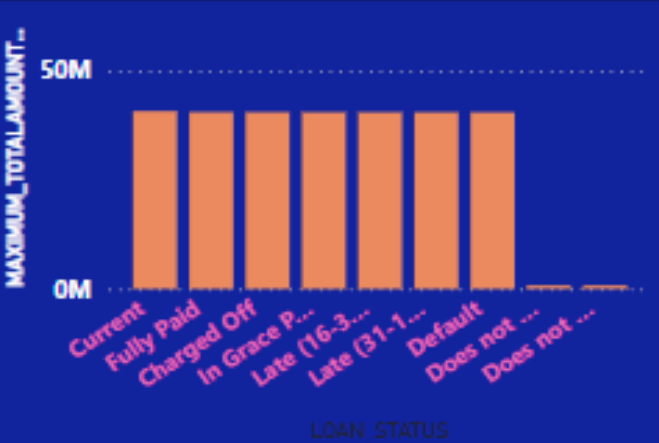
INTEREST RATES

36 months

12.64

60 months

MAXIMUM TOTAL AMOUNT



PURPOSE

All

MONTH AND YEAR

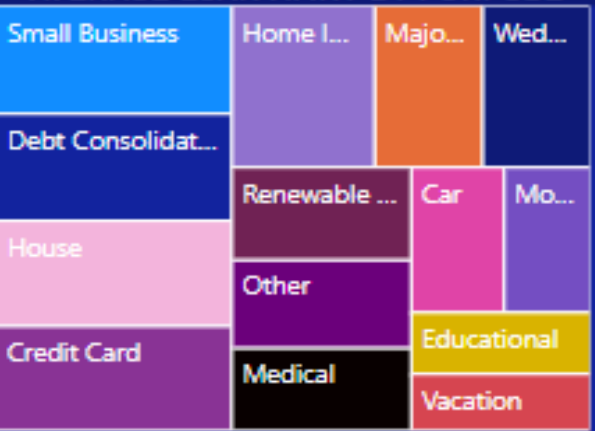
All

GRADE

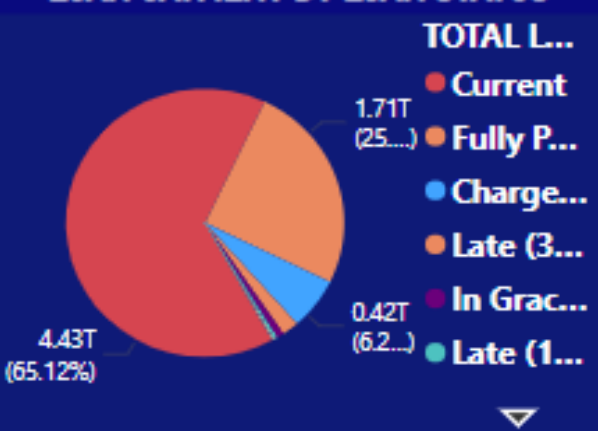
GRADE

All

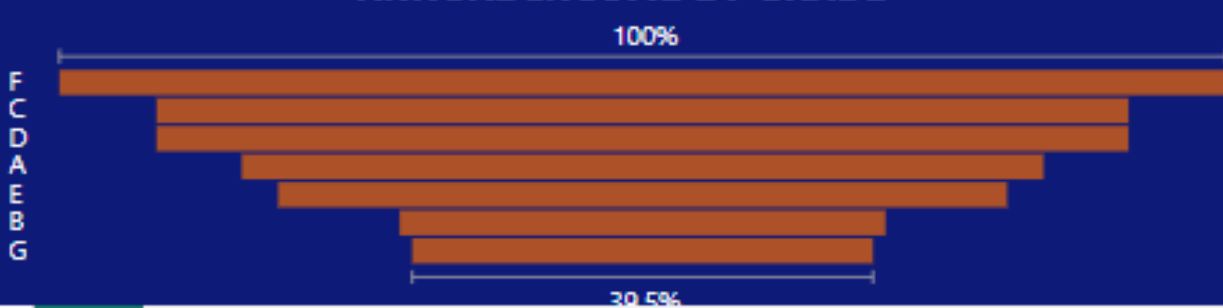
AVERAGE LOAN AMNT BY PURPOSE



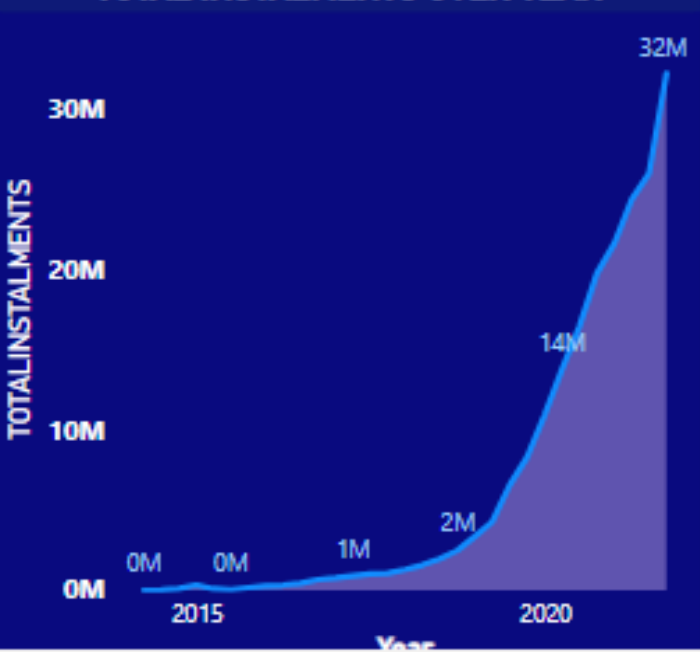
LOAN OAYMENT BY LOAN STATUS



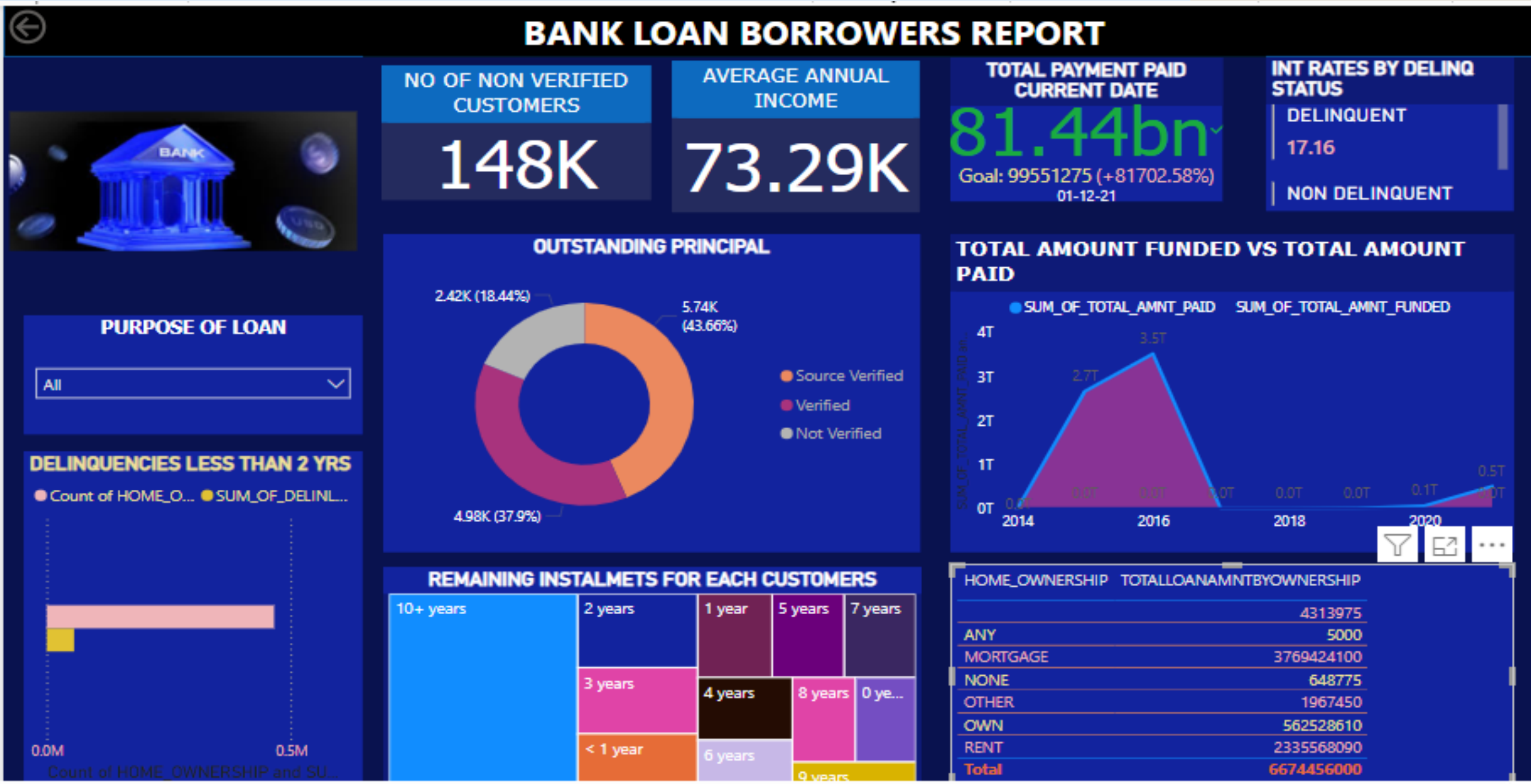
ANNUAL INCOME BY GRADE



TOTAL INSTALMENTS OVER YEAR



# REPORT 2: BORROWERS LOAN SUMMARY DASHBOARD



# . RESULTS AND DISCUSSION

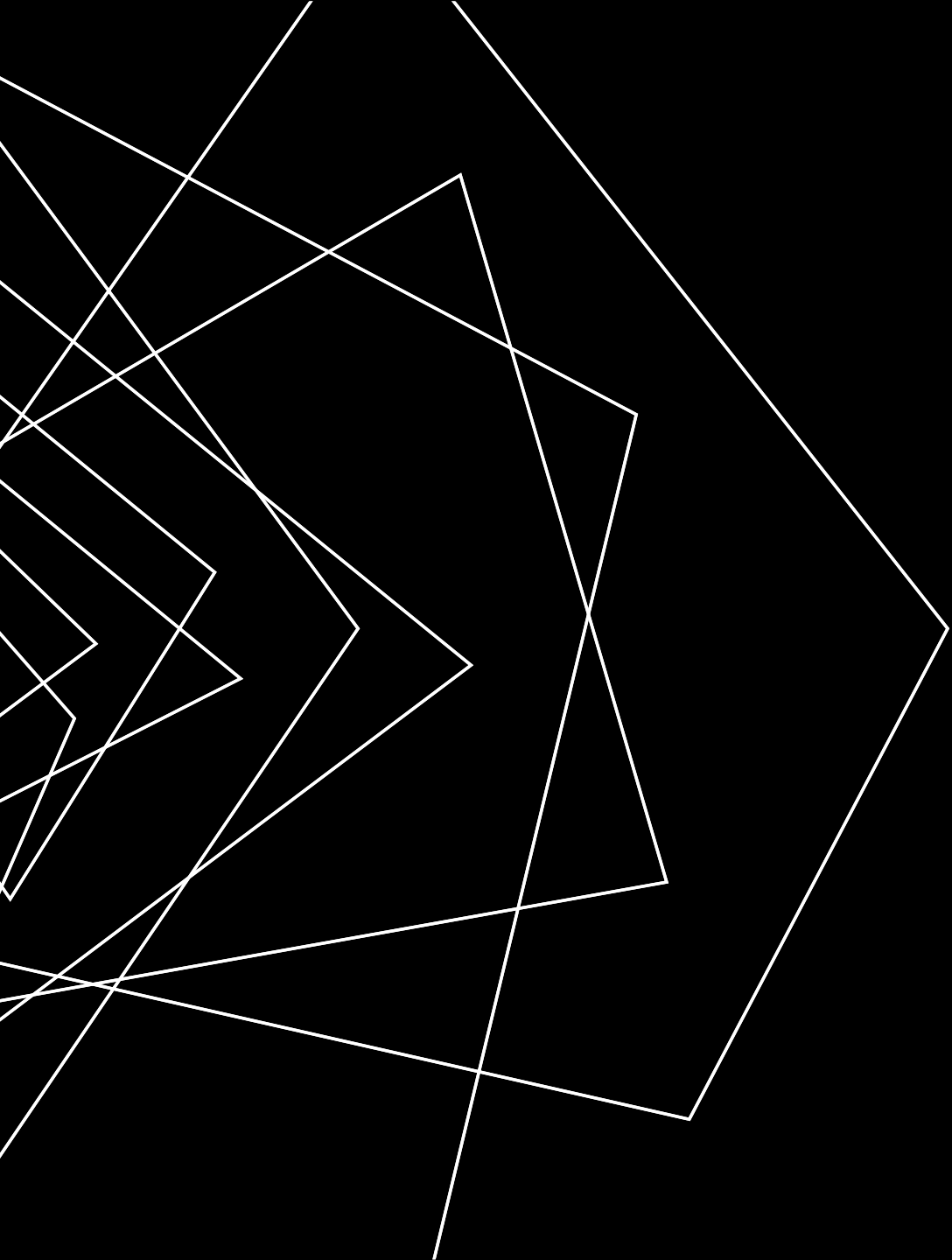
## Key Findings

- **Borrower Behavior:** Income, debt-to-income ratio, and employment length were strong indicators of loan repayment success. Borrowers with higher incomes and stable employment were more likely to repay loans in full.
- **Loan Characteristics:** Larger loan amounts, higher interest rates, and longer loan terms were associated with higher default rates.



## RECOMMENDATIONS FOR BANKING INSTITUTION

- **Optimizing Loan Lending Strategies:** Use borrower characteristics to assess repayment likelihood. Consider implementing stricter criteria for high-risk borrowers.
- **Mitigating Credit Risk:** Offer loans with lower interest rates and shorter terms to reduce risk.
- **Enhancing Portfolio Performance:** Regularly monitor loan performance and adjust strategies accordingly.



THANK YOU

FOR YOUR VALUABLE ATTENTION