CREATING DASHBOARD USING POWER BI

TITLE

BANK CUSTOMERS CHURN ANALYSIS

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Bank Customer Churn Analysis

Problem Statement

Banks often fail to spot which customers are at risk of leaving until it's too late. With growing competition, this results in revenue loss and poor customer loyalty. This project builds a Power BI dashboard that helps banking teams see who's leaving, why they're leaving, and how to prevent it using real customer data and smart, interactive visuals.

Abstract

This project presents an interactive Power BI dashboard to analyze customer churn in a bank dataset. The primary objective is to identify patterns in customer behaviour, credit scores, account balances, and product ownership that contribute to customer attrition. The visualized insights enable stakeholders to design effective retention strategies and personalize engagement efforts.

Using Power BI's dynamic visual capabilities, the dashboard provides an intuitive interface to interact with and explore different dimensions such as gender, age, credit score, and geographical location. The outcome of this project highlights the importance of business intelligence tools in uncovering hidden patterns, driving strategic decisions, and preventing potential revenue loss due to churn.

Introduction

Understanding why customers leave (churn) is crucial for any service-based business. Banks face increasing competition and must retain valuable customers to remain profitable. This project leverages Power BI to analyze 10,000 bank customer records and visualize key churn indicators including age group, credit score, gender, account balance, and product preferences. The interactive dashboard helps reveal patterns and high-risk segments, providing actionable insights for customer success teams.

Tools and Technologies used:

- Power BI: Used for dashboard development, enabling interactive, individual visuals.
- DAX (Data Analysis Expressions): Used for creating KPIs like churn rate, gender ratio, and segment-based metrics.
- Excel: Used for data cleaning and initial exploratory analysis.
- CSV Dataset: 10K bank customer records were sourced and structured.

Methodology:

The methodology follows a structured approach using CRISP-DM principles (Cross Industry Standard Process for Data Mining). The following steps were carried out to build the dashboard:

- Data Collection from CSV files
  - The dataset was sourced from open-source bank records containing 10,000 customers with features such as customer ID, credit score, gender, age, tenure, balance, number of products, and churn status.
- Data Cleaning and Pre-processing using Excel and Power BI
  - Initial cleaning was done in Excel to remove duplicates, fill missing values, and correct data types. Power Query in Power BI was then used to further normalize fields and remove anomalies.
- Data Transformation
  - Using Power Query Editor, transformations were applied including:
    - Conversion of text columns to proper case
    - Derived columns for age groups and balance ranges
    - Filtering out non-relevant attributes like RowNumber and CustomerId
- Data Modeling in Power BI
  - A single-table model was used for this dataset, with calculated columns for Age Group, Balance Category, and Credit Score Band to support advanced filtering and comparison.
- DAX Formulas for custom measures
- Visual Design and User Interaction setup
    - Donut Chart: Gender Distribution
    - Bar Charts: Churn by Age Group and Credit Score
    - KPI Cards: Total Customers, Active Members, Churned Customers
    - Slicers: Churn Rate

Dashboard Analysis:

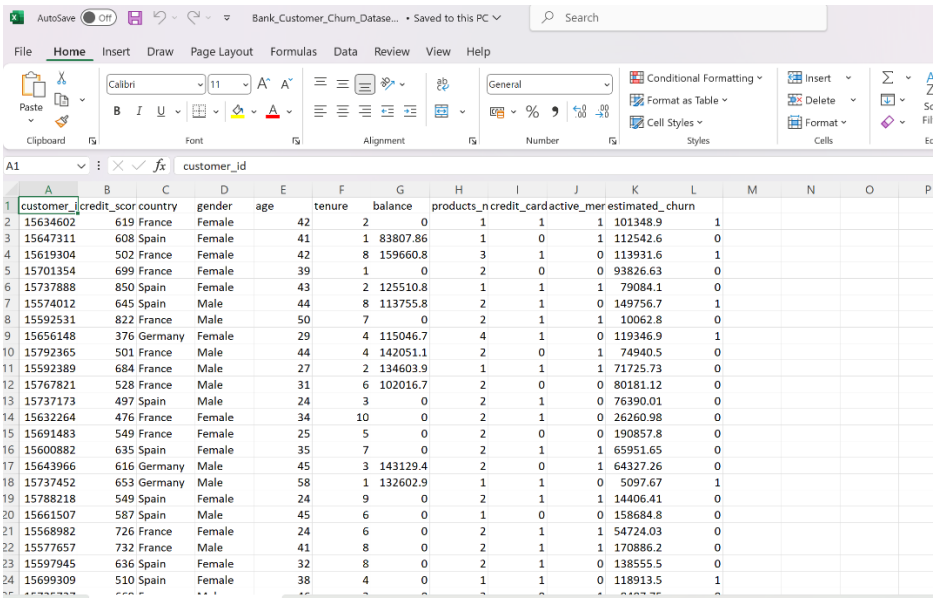
The dashboard visually reveals that:

- Customers in the 51–60 age group have the highest churn rate.
- Low credit scores (<400) are highly correlated with churn.
- France has the largest customer base, but Germany shows a higher churn percentage.
- Females slightly dominate the dataset population, and both genders have nearly equal churn risk.
- High churn observed in accounts with zero or mid-tier balances.

Implementation:

Development Phases:

- Download and open the dataset:
  - The dataset was sourced from open-source bank records containing 10,000 customers with features such as customer ID, credit score, gender, geography, age, tenure, balance, number of products, and churn status.
- Remove duplicates:
  - Go to the Data tab in Excel and select Remove Duplicates.
- Handling missing data
- Normalize column data
- Data Formatting
- Save cleaned data

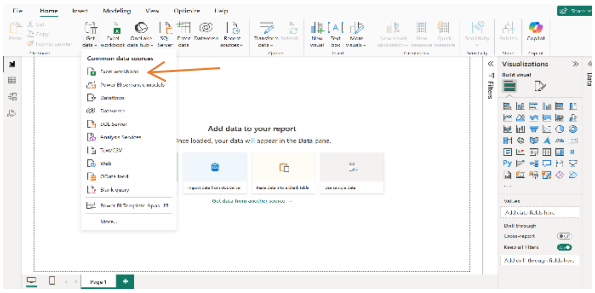


customer_i	credit_scor	country	gender	age	tenure	balance	products_n	credit_card	active_mer	estimated_churn
15634602	619	France	Female	42	2	0	1	1	1	101348.9	1
15647311	608	Spain	Female	41	1	83807.86	1	0	1	112542.6	0
15619304	502	France	Female	42	8	159660.8	3	1	0	113931.6	1
15701354	699	France	Female	39	1	0	2	0	0	93826.63	0
15737888	850	Spain	Female	43	2	125510.8	1	1	1	79084.1	0
15574012	645	Spain	Male	44	8	113755.8	2	1	0	149756.7	1
15592531	822	France	Male	50	7	0	2	1	1	10062.8	0
15656148	376	Germany	Female	29	4	115046.7	4	1	0	119346.9	1
15792365	501	France	Male	44	4	142051.1	2	0	1	74940.5	0
15592389	684	France	Male	27	2	134603.9	1	1	1	71725.73	0
15767821	528	France	Male	31	6	102016.7	2	0	0	80181.12	0
15737173	497	Spain	Male	24	3	0	2	1	0	76390.01	0
15632264	476	France	Female	34	10	0	2	1	0	26260.98	0
15691483	549	France	Female	25	5	0	2	0	0	190857.8	0
15600882	635	Spain	Female	35	7	0	2	1	1	65951.65	0
15643966	616	Germany	Male	45	3	143129.4	2	0	1	64327.26	0
15737452	653	Germany	Male	58	1	132602.9	1	1	0	5097.67	1
15788218	549	Spain	Female	24	9	0	2	1	1	14406.41	0
15661507	587	Spain	Male	45	6	0	1	0	0	158684.8	0
15568982	726	France	Female	24	6	0	2	1	1	54724.03	0
15577657	732	France	Male	41	8	0	2	1	1	170886.2	0
15597945	636	Spain	Female	32	8	0	2	1	0	138555.5	0
15699309	510	Spain	Female	38	4	0	1	1	0	118913.5	1

Data Preparation Using Excel

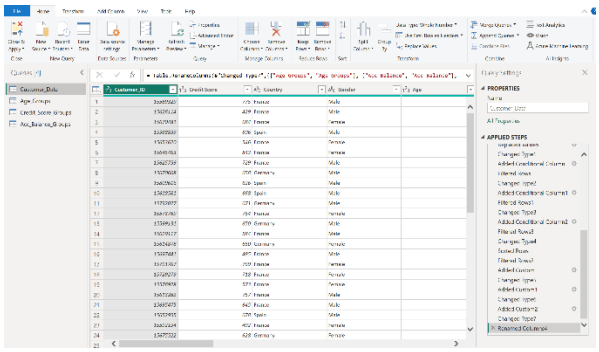
Data import and model building in Power BI:

- Import cleaned excel files



Import Excel File to Power BI

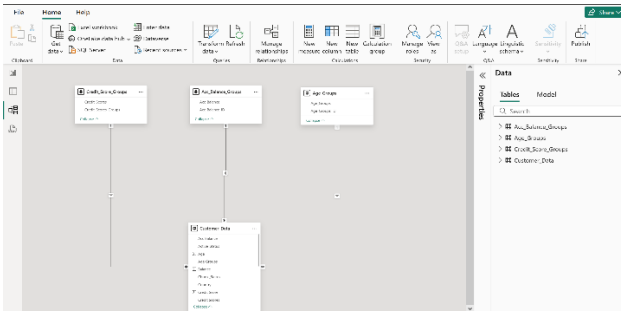
- Transform data in power query



Power Query Editor

  - Add extra columns For Age_Groups, Credit_Score, Account_Balance, %Min.Churn_Rate, %Max_Churn_Rate, % Target_Churn_Rate.

- Define relationships



Relationship

Creating Visuals:

- Customers By Gender – Donut chart
  - Select Donut Chart From the visualization pane

- Drag Columns of Gender into Legends, Customer into Values

- Customers By Active Status – Donut Chart
  - Select Donut Chart From the visualization pane
  - Drag Columns of Active Status into Legends, Customer into Values

- Customer By Credit Card Status – Donut Chart
  - Select Donut Chart From the visualization pane
  - Drag Columns of Credit Card Status into Legends, Customer into Values
- Customers By Country – Donut Chart
  - Select Donut Chart From the visualization pane
  - Drag Columns of Country into Legends, Customer into Values
- Customers By Products – Donut Chart
  - Select Donut Chart From the visualization pane
  - Drag Columns of Products into Legends, Customer into Values
- Customer And Churn Rate by Age_Groups – Line and Stacked Column Chart
  - Select Line and Stacked Column Chart From the visualization pane
  - Drag Columns of Age_Groups into X-Axis, Customers into Column Y-Axis, Churn Rate into Line Y-Axis
- Customer And Churn Rate by Credit Score – Line and Stacked Column Chart
  - Select Line and Stacked Column Chart From the visualization pane
  - Drag Columns of Credit Score into X-Axis, Customers into Column Y-Axis, Churn Rate into Line Y-Axis
- Customer And Churn Rate by Account Balance – Line and Stacked Column Chart
  - Select Line and Stacked Column Chart From the visualization pane
  - Drag Columns of Account Balance into X-Axis, Customers into Column Y-Axis, Churn Rate into Line Y-Axis
- Churn Status – Slicer
  - Select Slicer Visual from Visualization pane
  - Drag Churn Status Column into fields
- No.of Customers – Rank Card
  - Select Rank Card from Visualization pane
  - Drag Customers Column into Fields

Creating Calculated Measures to achieve more Insights:

- Churn Rate:

  Churn Rate = Customer_Data[Customers_Lost]/Customer_Data[Customers]

- Customers:

  Customers = COUNT(Customer_Data[Customer_ID])
- Customers_Lost:

  Customers_Lost = CALCULATE(COUNT(Customer_Data[Churn _Status]),'Customer_Data'[Churn _Status] = "Churned")

Added Filters for every Visuals in Dashboard and adjusted sizes, colours, labels, fonts, legends, Titles etc for better Understanding.

Save the dashboard after completion in .pbix format.

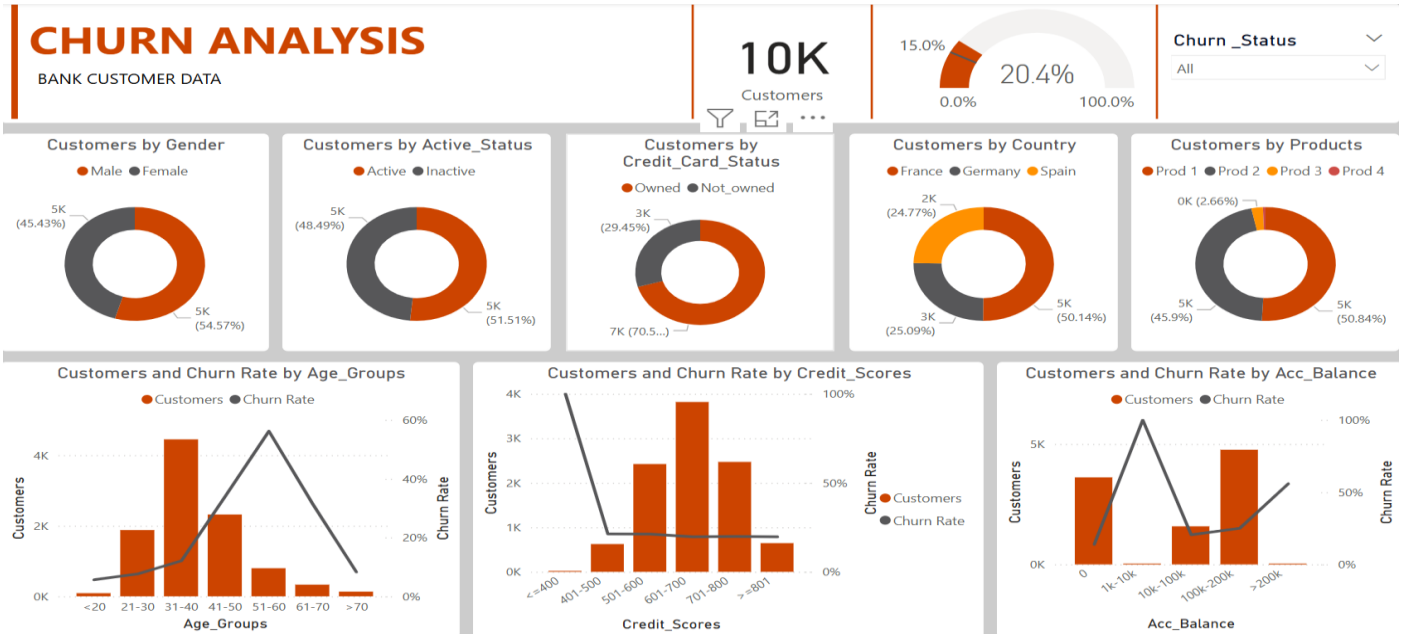
Results and Discussion:

The final dashboard allowed dynamic slicing and deep dives into key churn influencers. With a churn rate of 20.4%, bank leadership can now target specific groups like inactive credit card holders or older customers with medium balances.

Conclusion & Future scope:

This project effectively utilized Power BI to deliver a decision-support tool that reveals hidden trends in customer churn. Future extensions could involve integrating machine learning churn prediction, adding NPS feedback, or setting up real-time alerts for risky segments.

Output:



Bank Customer Churn Analysis Dashboard