# BANK DOMAIN FINANCE PROJECT A white building with columns AI-generated content may be incorrect.

**🔷 Project Title: Bank Loan Analysis & Reporting Automation (SQL + Power BI)**

**Project Overview:**

This project simulates a real-world financial reporting and loan monitoring system used in banking and financial institutions. The primary objective was to design an end-to-end reporting solution that extracts, validates, and visualizes loan-related data using **SQL Server** and **Power BI**. The focus was to enable data-driven decision-making, improve transparency, and reduce manual workload by automating parts of the reporting pipeline.

**Project Description:**

The dataset included thousands of loan applications, customer information, repayment history, and loan statuses. I began by importing and preparing the data within a **SQL Server** environment. This included data validation, normalization, and creation of calculated fields such as loan tenure, interest rates, and payment progress. The structured data was then connected to Power BI to create dynamic dashboards that reflect real-time metrics such as:

* Total loan applications
* Monthly growth (MTD / MoM)
* Funded vs. received amounts
* Loan performance segmentation (by state, purpose, term, grade, etc.)
* Good vs. Bad loan ratio
* Geographic distribution of loan portfolios

The dashboard was built following a **star schema** model and includes drill-through capabilities, slicers, and interactive filters to allow users to explore insights in multiple dimensions. Additionally, DAX was used for all key financial metrics, including performance comparisons, variance analysis, and advanced KPIs.

**Key Tools & Technologies:**

* **SQL Server:** Data import, cleaning, validation, joins, aggregation, view creation
* **Power BI:** Dashboard creation, DAX calculations, report design, drill-through & filtering
* **DAX:** MTD/MoM calculations, KPI metrics, dynamic visuals
* *(Future Scope: Python + SQLAlchemy for data automation and ML forecasting)*

**Business Relevance & Alignment:**

This project closely aligns with the **controlling and reporting functions** at Toyota Kreditbank GmbH. It demonstrates a practical solution for monitoring loan performance, ensuring financial accuracy, and generating management-ready insights. It also reflects the automation mindset needed to support interdepartmental reporting (e.g., finance, risk, marketing) by replacing manual Excel handling with real-time, SQL-powered dashboards.

## IMPORTED DATA

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## TOTAL LOAN APPLICATIONS

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## TOTAL LOAN APPLICATIONS

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## TOTAL Funded AMOUNT

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## MONTH TO DATE total funded amount

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Previous Month to date loan funded

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Total amount received data

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PMTD total amount received

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AVG Interest Rate

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AVG DTI

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GOOD LOAN Provided

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Good Loan Applications

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GOOd loan funded amount

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Good loan Received is more than funded :Profitable

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BAD LOAN PERCHANTAGE

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BAD LOAN FUNDED AMOUNT

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BAD LOAN FUNDED AMOUNT

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LOAN STATUS

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BANK LOAN ISSUE TIME , DATE (DETAILS)

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Regional Loan Analysis

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Employee length analysis

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## Purpose of providing loan

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DASHBOARD

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💬  
**"This is a complete Bank Loan Analysis project I designed to simulate how real financial institutions like Toyota Kreditbank manage loan portfolios and make data-driven decisions. I built the backend in SQL Server for data cleaning and logic, and visualized the KPIs in Power BI. This project reflects exactly what Miss Amandine shared — using dashboards and SQL automation to support controlling and reporting tasks."**

**🔹 Part 1: SQL-Based Data Validation & Structuring (1–1.5 min)**

💬  
**"The raw data I worked with includes customer profiles, loan application details, payments, statuses, etc. I used SQL to:**

* Create relational tables (customers, loans, transactions)
* Perform **data validation** (e.g., match loan IDs with customer IDs)
* Clean the data: removed NULLs, duplicates, inconsistent date formats
* Created derived fields like **loan tenure, total interest paid**, etc.
* Built **views** for dashboard use: total funded, interest rate, monthly loan applications, and good vs bad loans."\*\*

📌 *This reflects what Toyota Kreditbank does before feeding data into Power BI — ensuring clean, trusted, validated datasets.*

**🔹 Part 2: Power BI Dashboards & Features (2 mins)**

💬  
**"I connected the SQL Server directly to Power BI and built three main dashboards:"**

**1. Summary Page**

* KPIs: Total Loan Applications, Funded Amount, Amount Received, Interest Rate
* **Good vs Bad Loans Breakdown** using donut charts
* Loan status overview (e.g., fully paid, defaulted, current)

**2. Overview Dashboard**

* Line Chart: **Monthly loan applications**
* Map: Applications by region
* Donut Chart: Loan terms (36M vs 60M)
* Bar Charts: Applications by employment length, loan purpose
* Tree Map: Loan distribution by home ownership (Rent vs Mortgage)

**3. Details Page**

* A **table with drill-down capability** to view individual loan performance
* Slicers for dynamic filtering by **state, grade, purpose**, and **good/bad loan** status

📌 *This dashboard setup gives a complete 360° view of loan performance — similar to how your team supports Marketing or Finance through insights.*

**🔹 Key Functional Highlights (30–45 sec)**

✔ Connected directly to SQL Server (real-time data access)  
✔ Used **DAX** to calculate custom KPIs like MTD, MoM, and loan performance  
✔ Drill-through, filters, and slicers for dynamic reporting  
✔ Prepared data model using **star schema**  
✔ Developed **MTD/MoM logic** for financial indicators

**🔹 Future Scope / Alignment with Toyota Kreditbank (30–45 sec)**

💬  
**"In the future, this system can be enhanced further by adding:**

* A **Python automation pipeline** to extract data from Excel and push it into SQL (eliminating manual entry)
* Loan default prediction using **scikit-learn**
* Email alerts and dynamic PDF reporting
* Integration of external sources like credit scoring APIs or CRM data"\*\*

📌 *This direction aligns exactly with your controlling team’s current goals of automation and multi-source reporting, as discussed in the earlier interview.*

**💬 Possible Questions They Might Ask (with Smart Answers)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **Question** | **Short Answer** | | **What data model did you use?** | I used a **star schema** with dimension tables like date, customer, loan status, and a central fact table for transactions. | | **How did you connect Power BI to SQL?** | Through the **SQL Server connector**, using views I created in SSMS for each dashboard section. | | **What DAX measures did you create?** | MTD Loan Applications, MoM Growth %, Total Interest, and filters like Good vs Bad Loan with conditional logic. | | **How can this be automated?** | With **Python + SQLAlchemy**, I can create a pipeline that pulls new data from Excel or other systems into SQL automatically. | | **What challenges did you face?** | Making the KPI calculations dynamic across slicers and building responsive layouts — which I solved using ALLSELECTED() and bookmarks. | | **How is this relevant to our work?** | It’s a direct simulation of how a **controlling team reports financial KPIs**, supports departments, and reduces Excel dependency with **automation and visualization**. | |

# Future Scope of WORK

A diagram of a workflow

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💬 \*\*"During my first interview, Miss Amandine shared some valuable insights into the current workflow of the controlling team — specifically how a lot of manual Excel entry is still required before transferring data into Power BI. She also mentioned that SQL queries are already being used but automation is something the team wants to expand using Python and streamlined data pipelines.

Based on her input, I started researching how this process can be enhanced and automated end-to-end. I created a visual workflow and explored tools that would support this — like Python for automation, SQL for structured data access, and Power BI for interactive dashboards.

This research helped me understand how I could actually contribute — not just by building dashboards, but also by proposing practical automation steps that align with your current needs and team direction."\*\*

**Presenting a Diagram or Poster:**

💬 **"The diagram I created reflects that research. It breaks down each stage — from data extraction and cleaning to storage and visualization — and shows how the process can be fully automated using tools the team is already familiar with, plus a few additional Python libraries. It’s just a concept, but it’s designed based on what Miss Amandine shared and how I see the opportunity to support your work."**

EXTRA

**BANK LOAN REPORT**

**DOMAIN KNOWLEDGE**

Bank loans are a crucial financial tool that enables individuals and businesses to achieve their goals and manage financial needs. However, it's essential for borrowers to understand the terms, costs, and responsibilities associated with loans to make informed financial decisions.

Banks collect loan data through various channels and processes, including:

**Loan Applications:** When individuals or businesses apply for loans, they submit detailed applications that include personal and financial information. 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. These reports contain information about a person's credit history, existing loans, and payment behaviour.

**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.

**Application Review:**

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

**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.

**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.

**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.

**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.

**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.

**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.

**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.

**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:**

Banks analyse loan data for several critical reasons:

**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.

**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.