Enterprise PMO Performance Analytics

🧠 Business Problem & Objectives

Large organizations running multiple projects struggle to answer key PMO-level questions such as:

- Which projects are on track, delayed, or over budget?
- How is the overall portfolio performing across cost, schedule, and risk?
- Are resources being utilized efficiently across locations?
- Which projects or locations require management attention?

This project addresses these questions by building a PMO analytics solution using SQL, Excel, and Power BI, following industry-standard data modeling, ETL, and performance measurement practices.

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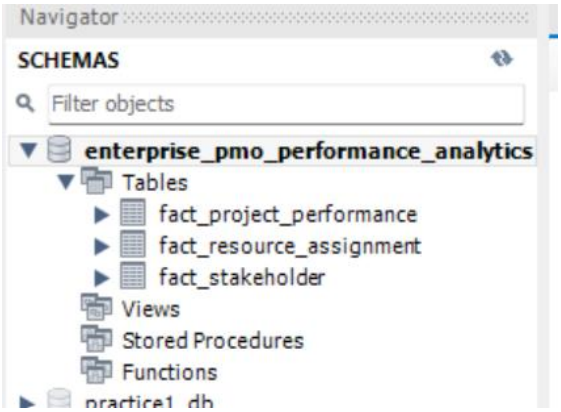
Step 1_ Database Creation & Power BI Integration

For this project, I designed and implemented a **MySQL database** to simulate a real-world **Enterprise PMO (Project Management Office) analytics environment**.

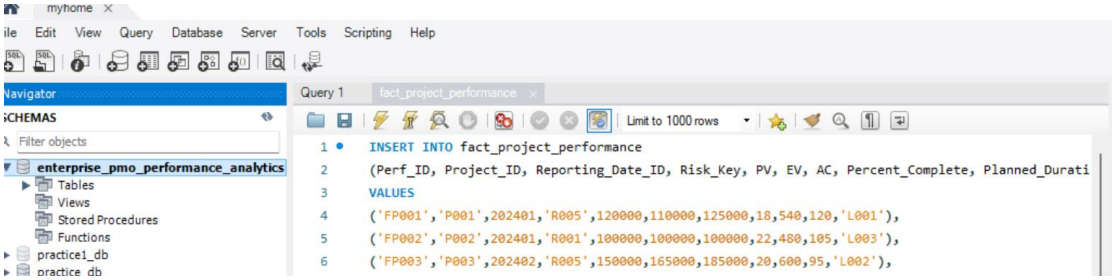
1. Database Design

I created a dedicated MySQL database named **enterprise_pmo_performance_analytics** to centrally store structured project data.
Within this database, I implemented three fact tables, each aligned to a specific PMO analytics domain:

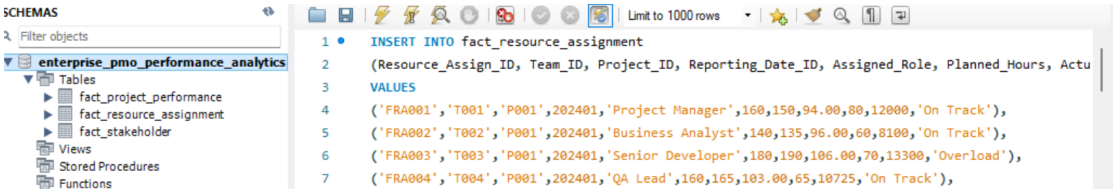


- **fact_Project_Performance**
  Captures project-level cost and schedule performance metrics (PV, EV, AC, planned vs actual

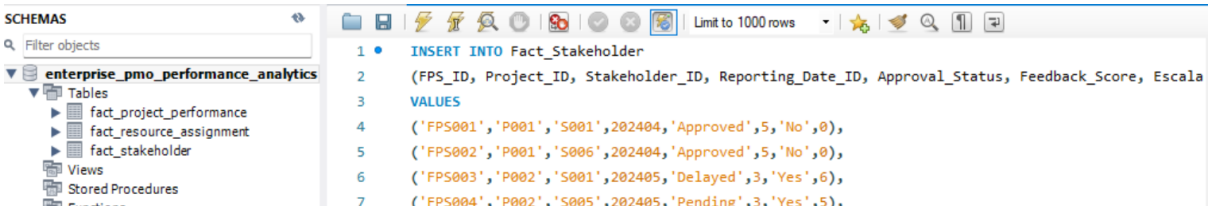
duration), enabling Earned Value Management (EVM) analysis.



- **Fact_Resource_Assignment**
  Stores resource allocation, utilization, and cost data at the project and reporting-period level, supporting workload, utilization, and cost efficiency analysis.



- **Fact_Stakeholder**
  Tracks stakeholder approvals, feedback scores, escalations, and delays, enabling stakeholder engagement and governance monitoring.



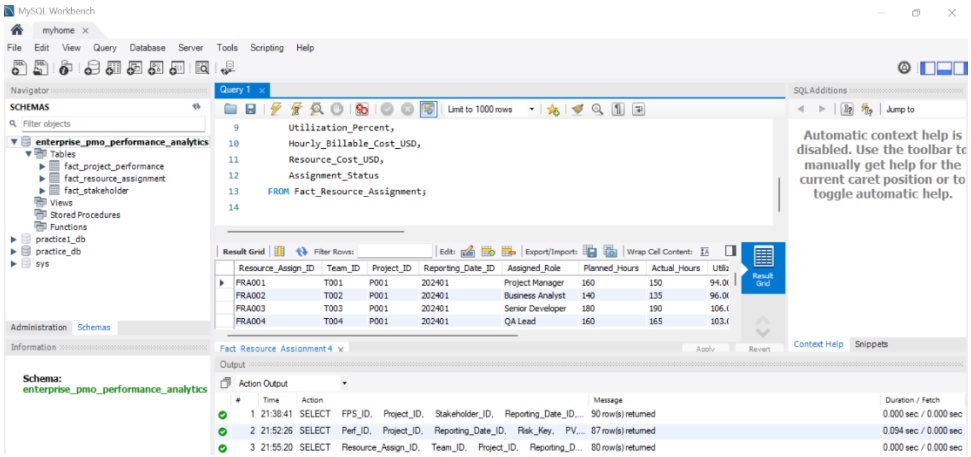
All tables were designed at the fact-grain level, using consistent keys such as Project_ID and Reporting_Date_ID to support a star schema model in Power BI.

2. Power BI Integration

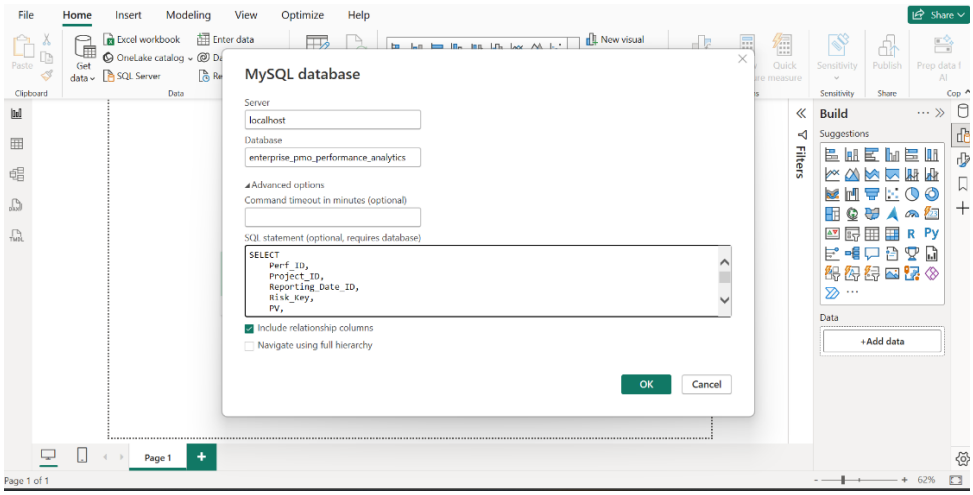
The MySQL database was then connected directly to Power BI Desktop using the MySQL connector. Each fact table was imported using explicit SELECT queries, ensuring:

- Clean and controlled data extraction.
- Easy traceability between SQL and Power BI.
- High compatibility with Power BI's data model and DAX calculations.

Verified the Select STATEMENT in My SQL

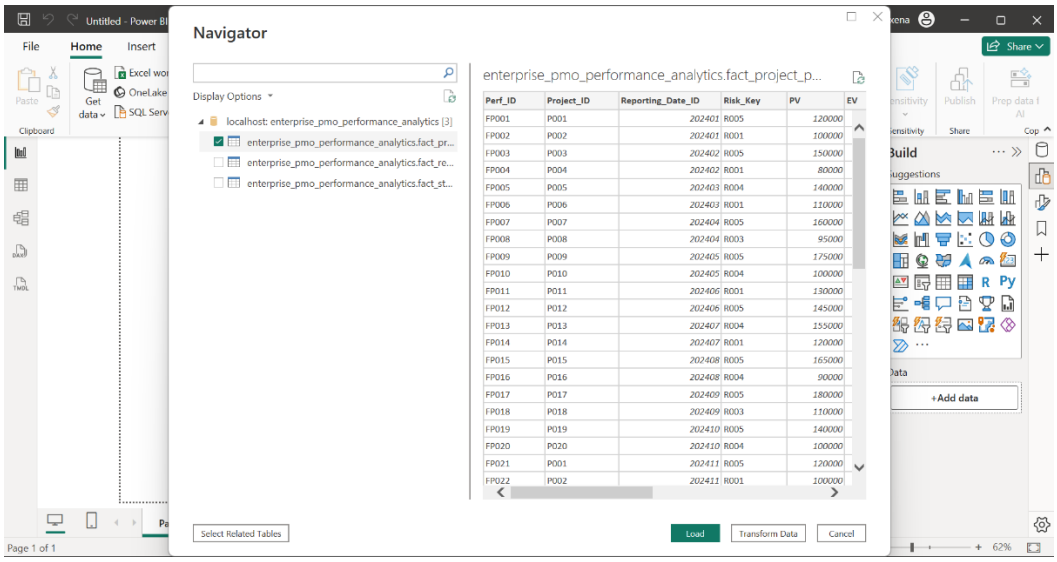


Used SELECT statement directly into connector to extract only required columns

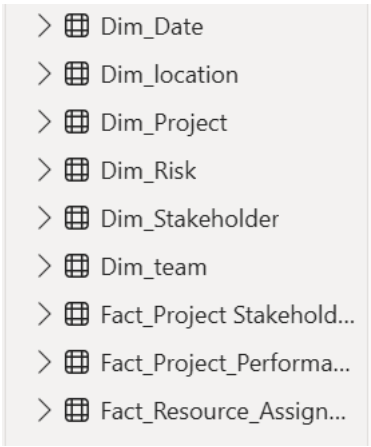


3. Outcome

This approach demonstrates an end-to-end BI workflow, from database creation and SQL data handling to Power BI modeling and visualization, closely reflecting how enterprise PMO analytics systems are built in real organizations.



Connecting with Dimension Tables



NEXT STEP:
Connecting to Power BI and perform ETL operation, create Data model, and perform DAX to create Calculated Coloumns and Calculated measures.

Step 2: ETL, Data Modeling, & DAX Analytical Preparation

After loading the fact tables from MySQL and the dimension tables from Excel, I performed a series of ETL (Extract, Transform, Load) operations within Power BI to prepare the data for analysis.

1. ETL & Data Cleaning

- Removed empty and duplicate rows across fact and dimension tables
- Standardized column names and data types for consistency
- Merged and split columns where required (e.g., status fields, percentage values)
- Applied basic normalization rules to avoid redundancy and improve model clarity

These steps ensured high data quality and reliable downstream analysis.

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2. Data Modeling (Star Schema)

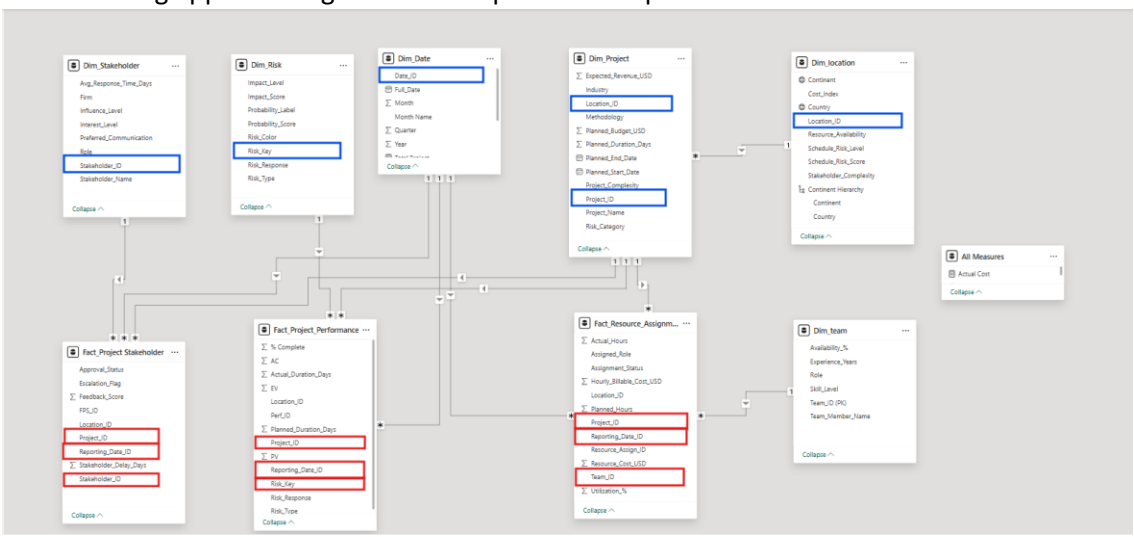
A **star-schema data model** was created to support scalable analytics:

- **3 Fact Tables**
  - Fact_Project_Performance
  - Fact_Resource_Assignment
  - Fact_Stakeholder
- **6 Dimension Tables**
  - Dim_Project
  - Dim_Date
  - Dim_Location
  - Dim_Stakeholder
  - Dim_Team
  - Dim_Risk

Primary keys from each dimension were connected to corresponding foreign keys in the fact tables, ensuring:

- One-to-many relationships
- Single-direction filtering
- No ambiguity or many-to-many relationships

This modeling approach aligns with enterprise BI best practices.



2. DAX – Calculated Columns

Calculated columns were created **inside fact tables** to support row-level analysis:

- **Fact_Project_Performance**
  - Schedule Variance Days (Planned vs Actual Duration)
  - Cost Overrun Flag (AC vs EV)
- **Fact_Resource_Assignment**
  - Resource Over-Utilization Flag (Actual Hours > Planned Hours)

These columns enabled conditional logic and filtering in visuals.

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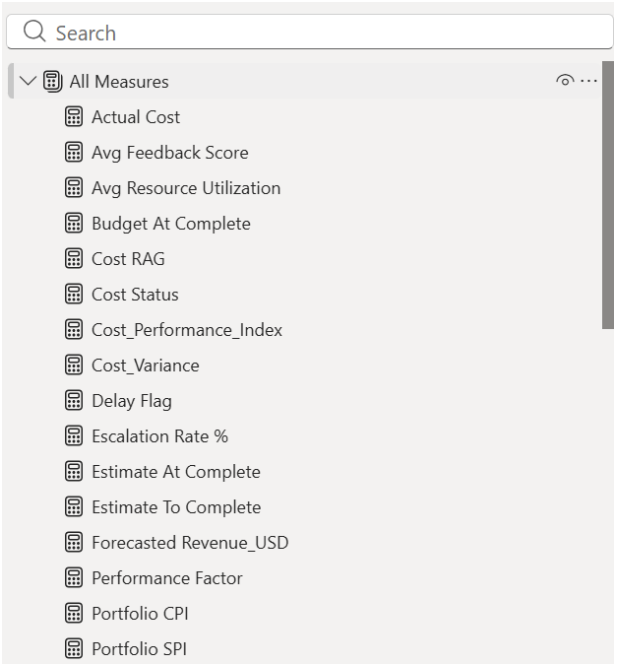
3. DAX – Measures (Aggregations)

Analytical measures were created using DAX aggregation and calculation functions, including:

- SUM() – Planned Value, Earned Value, Actual Cost, Resource Cost
- AVERAGE() – Resource Utilization %, Feedback Score
- COUNT() / COUNTROWS() – Projects, Resources, Stakeholder Records
- DIVIDE() – CPI, SPI, Utilization Rate (safe division)
- CALCULATE() with filters – Approval Rate, Escalation Rate

All KPIs were calculated as measures, not columns, to ensure dynamic filtering and slicer interaction.



Step 3: Visualization & Business Insights

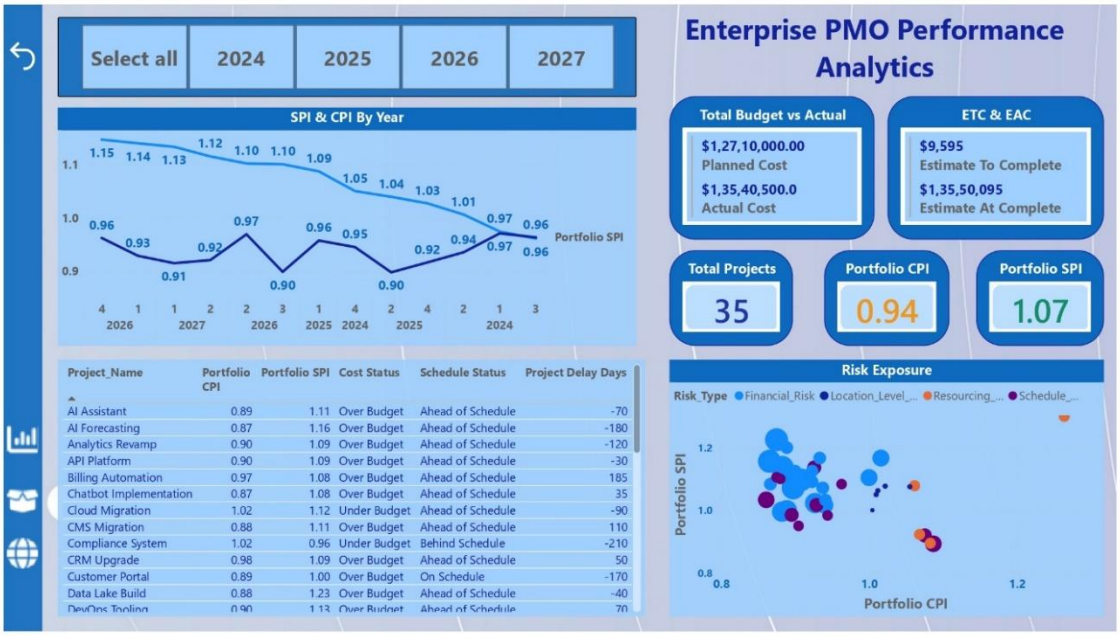
After completing ETL, data modeling, and DAX calculations, the final step focused on building interactive Power BI dashboards to translate data into actionable business insights. These dashboards are designed for PMO leaders, project managers, and senior stakeholders.

📊 Dashboard 1: Executive Portfolio Overview

Purpose: Enable leadership to instantly assess portfolio health

- Provides a high-level view of the entire project portfolio
- KPIs include overall cost health, schedule status, risk exposure, and stakeholder approvals
- Answers key business questions:
  - Which projects are on track, delayed, or over budget?

- What is the overall health of the portfolio?
- Where should leadership prioritize attention or intervention?



📈 Dashboard 2: Project Performance & Earned Value Analysis

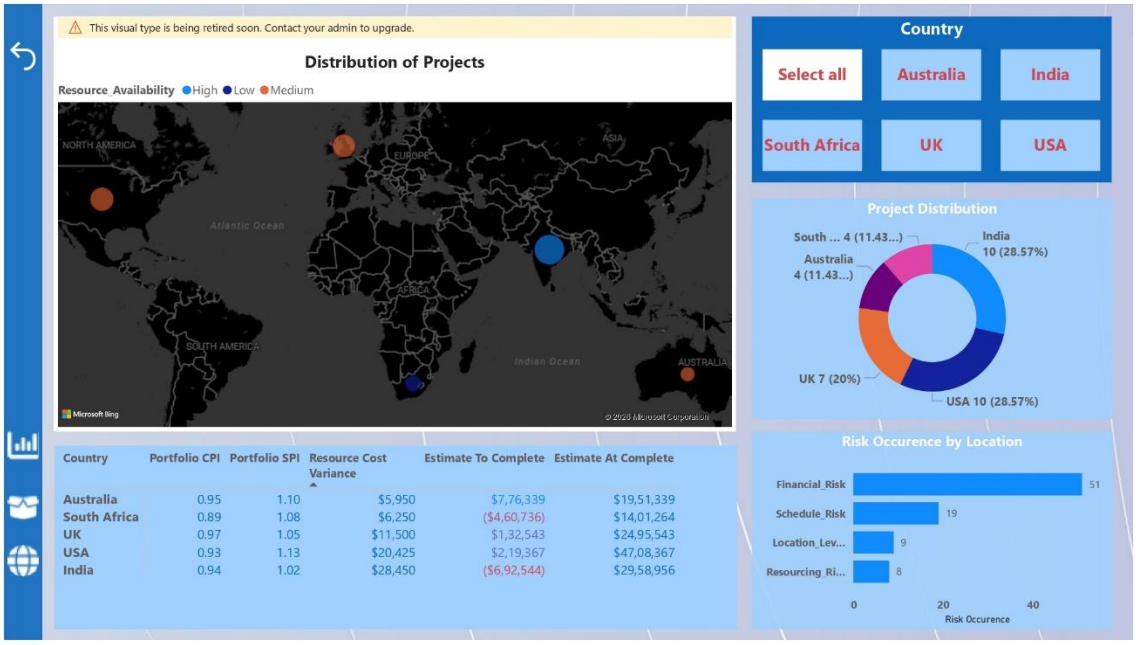
Purpose: Enable PMs and PMO to control execution and forecast outcomes

- Focuses on detailed project-level performance
- Key metrics: PV, EV, AC, Schedule Variance (SV), Cost Variance (CV), CPI, SPI
- Answers key business questions:
  - Are projects performing as per plan?
  - Which projects are ahead or behind schedule?
  - Which projects are overrunning costs?

🌎 Dashboard 3: Location & Resource Efficiency Analysis

Purpose: Enable Regional managers and Stakeholders to look projects and resources perform best

- Analyzes project execution across locations and resource utilization
- KPIs include resource utilization %, planned vs actual effort, cost efficiency, estimate vs forecast revenue across location
- Answers key business questions:
    - Which locations are most efficient in delivering projects?
    - Are resources over-allocated or under-utilized?
    - How can resource distribution and risk type be optimized across locations?



Country	Portfolio CPI	Portfolio SPI	Resource Cost Variance	Estimate To Complete	Estimate At Complete
Australia	0.95	1.10	$5,950	$7,76,339	$19,51,339
South Africa	0.89	1.08	$6,250	($4,60,736)	$14,01,264
UK	0.97	1.05	$11,500	$1,32,543	$24,95,543
USA	0.93	1.13	$20,425	$2,19,367	$47,08,367
India	0.94	1.02	$28,450	($6,92,544)	$29,58,956

Key Outcomes

- Delivered a 360° PMO analytics solution
- Demonstrated end-to-end skills in:
    - SQL
    - Data modeling
    - ETL
    - DAX
    - Power BI visualization
- Enabled data-driven answers to real PMO business questions