Sri Lanka Institute of Information Technology

Retail Transactional Dataset
Insights into Consumer Behaviour and Operations

Submitted on: 2025 05 01

Program: **BSc (Hons) in Information Technology**
Specialization: **Data Science**
Module: **IT3021 – Data Warehousing and Business Intelligence**
Assignment **1 – Year 3 Semester 2, 2025**

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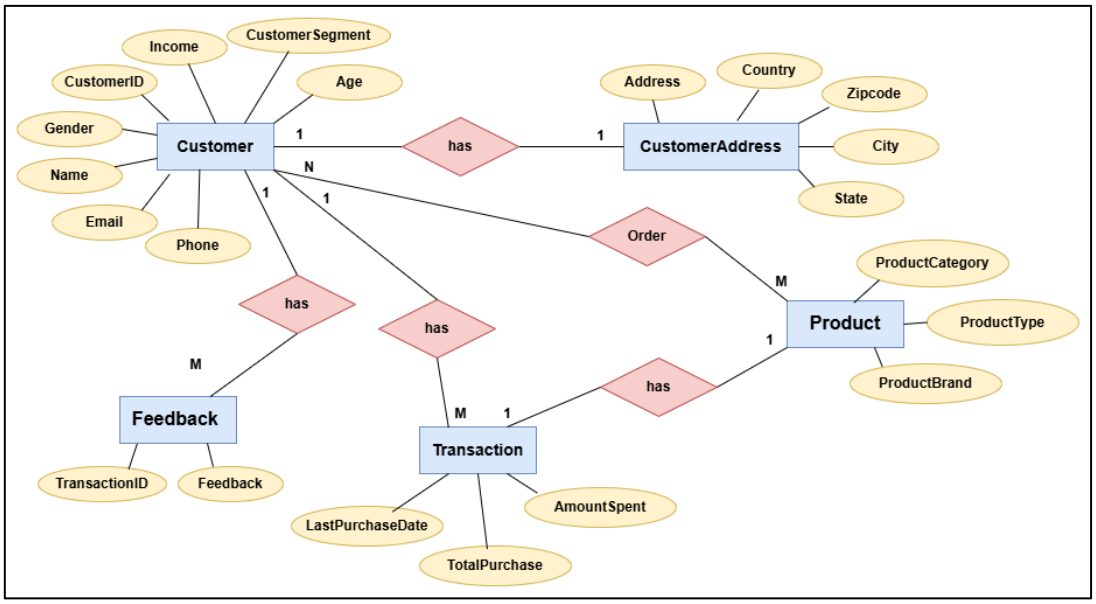
Description of the Data Warehouse

The implemented and loaded retail transaction data from Assignment 1 serves as the foundation for this project. The SSAS cube utilization and OLAP operations draw their data from this data warehouse. The data warehouse employs numerous fact and dimension tables that address customer transaction activities.

ER-Diagram



The warehouse operates through a star schema format which positions the fact table at the center while dimension tables surround it. A fact table holds transactional values including SalesAmount and Quantity alongside TransactionDate but dimension tables offer Customer and Product data plus TransactionLogistics and ProductCategory entries. The following ER diagram shows the establishment of relationships between tables.

FactTables:

- FactTransaction

DimensionTables:

- DimCustomer
- DimProduct
- DimProductCategory
- DimTransactionLogistics
-

Foreign keys between the fact table and its dimension tables create the linkage that enables multidimensional analysis.

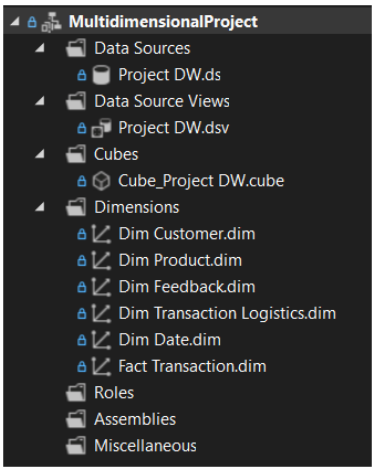
SSAS Cube Implementation

Steps for Creating the SSAS Cube

1. Create SSAS Project:
   - Within SQL Server Data Tools (SSDT) users must initiate a new Analysis Services Multidimensional and Data Mining Project.
2. Define Data Source:
   - The SSAS project needs to establish connectivity with the SQL Server database which contains the data warehouse database.
3. Define Data Source View (DSV):
   - Choose the needed tables from the data warehouse including fact and dimension tables to construct the DSV.
4. Create a Cube:
   - Launch the New Cube option by using a right-click operation on the Cubes folder inside the project.
5. Create Hierarchy:
   - The Date dimension must contain a hierarchical structure that analyses information based on Year, followed by Quarter, then Month.
6. Deploy Cube:
   - The designed cube requires deployment to the SQL Server Analysis Services instance once completion of the development steps.
7. Process Cube:
   - Processing the cube becomes necessary after deployment to load data into it.

Documentation of Cube Creation

The SQL Server Data Tools functioned for executing all the described steps. The design of the cube included essential measures along with required dimensions and proper hierarchical elements.



Demonstration of OLAP Operations

Steps for OLAP Operations in Excel

Connect Excel to SSAS Cube:

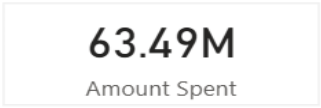
1. Create Pivot Table:
   - The Pivot Table creation starts with selecting the SSAS cube connection.
   - The pivot table should present ProductCategory and Customer and TransactionLogistics as its dimensional components and include SalesAmount as its measurement component.

2. Perform OLAP Operations:
   - As part of roll-up action the system transitions between Month-based details to Year-based summaries.
   - The procedure initially displays Year as the summary level but transitions to Month as the detailed level.
   - Dice: Select specific dimensions for analysis
   - Users can modify the position of Pivot Table dimensions to obtain multiple analytical viewpoints.

Power BI Reports

Report 1: Matrix Visual with Detailed Tabular Data

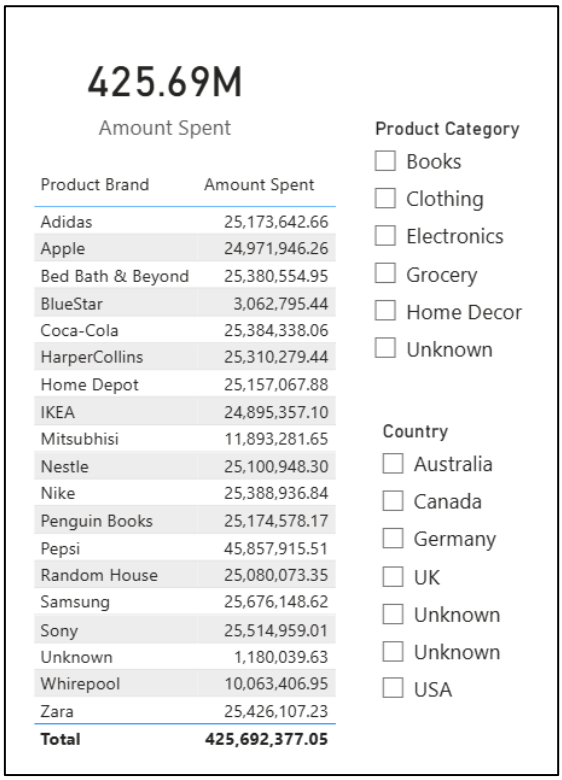
- Display detailed sales data grouped by **Product Brand** and **Amount Spent**, with monthly sales figures.



Product Brand	Amount Spent
Adidas	3,881,974.54
Apple	3,643,482.59
Bed Bath & Beyond	3,761,512.06
BlueStar	462,233.61
Coca-Cola	3,935,636.89
HarperCollins	3,656,782.90
Home Depot	3,783,011.61
IKEA	3,817,320.23
Mitsubhisi	1,860,012.69
Nestle	3,570,117.75
Nike	3,860,862.25
Penguin Books	3,659,274.64
Pepsi	6,447,368.70
Random House	3,752,847.67
Samsung	3,854,813.61
Sony	3,807,915.82
Unknown	292,752.70
Whirepool	1,645,974.34
Zara	3,800,445.98
Total	**63,494,340.58**

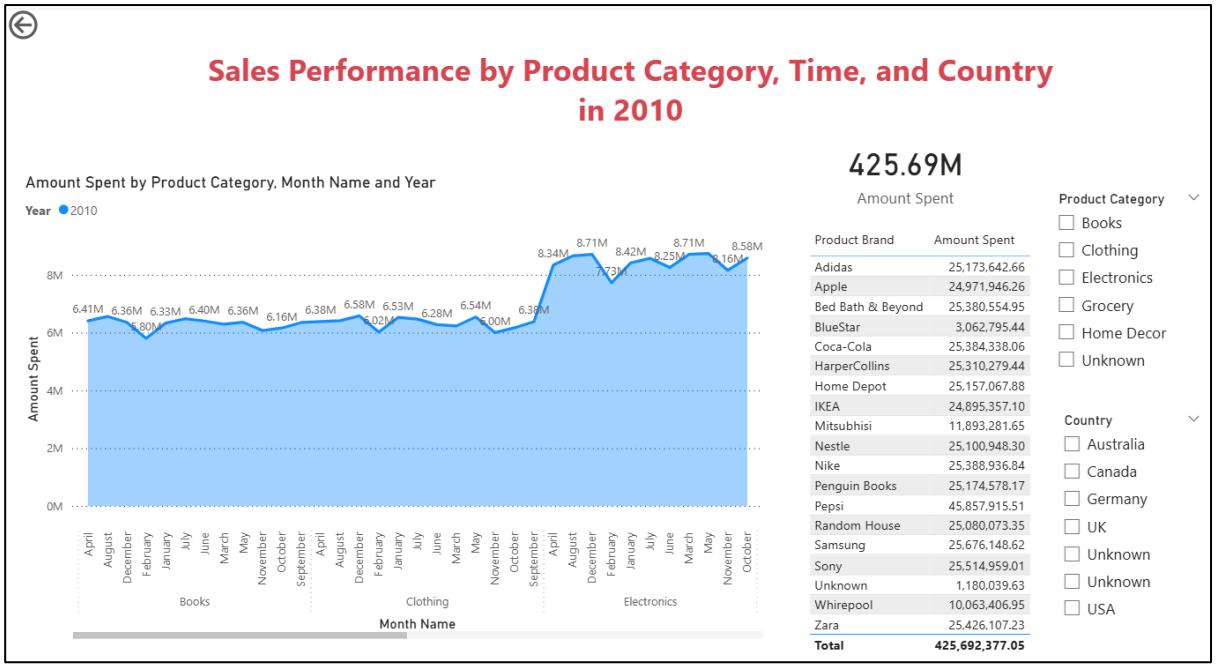
Report 2: Slicers with Cascading Filters

- Provide interactive filtering using cascading slicers.



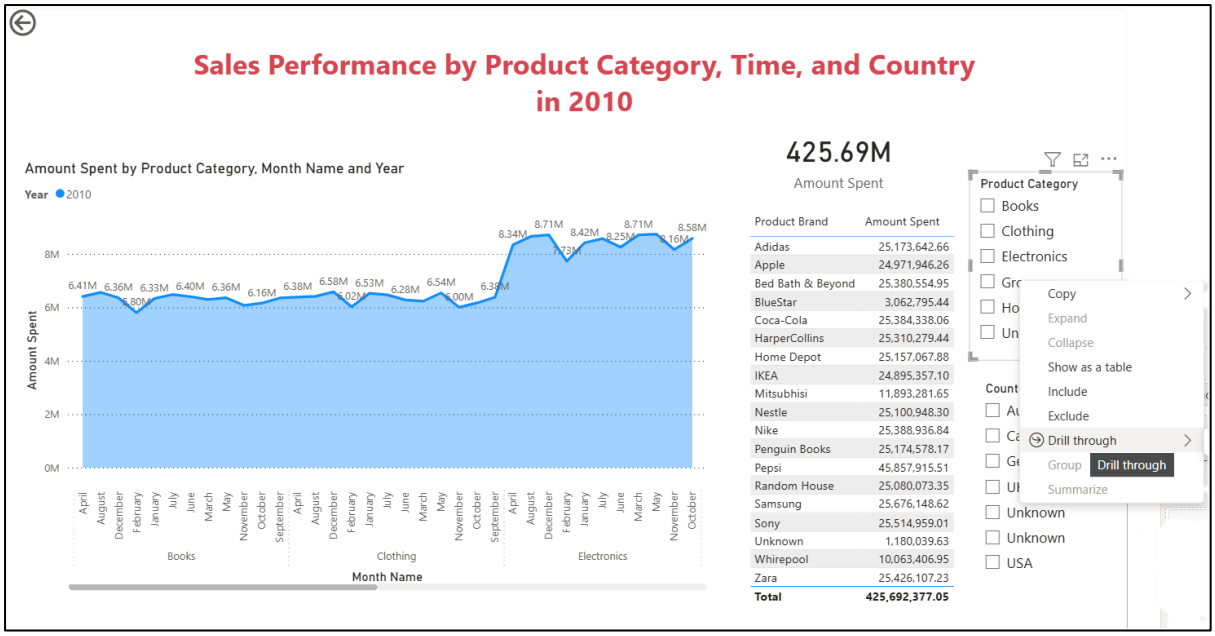
Report 3: Drill-Down Report

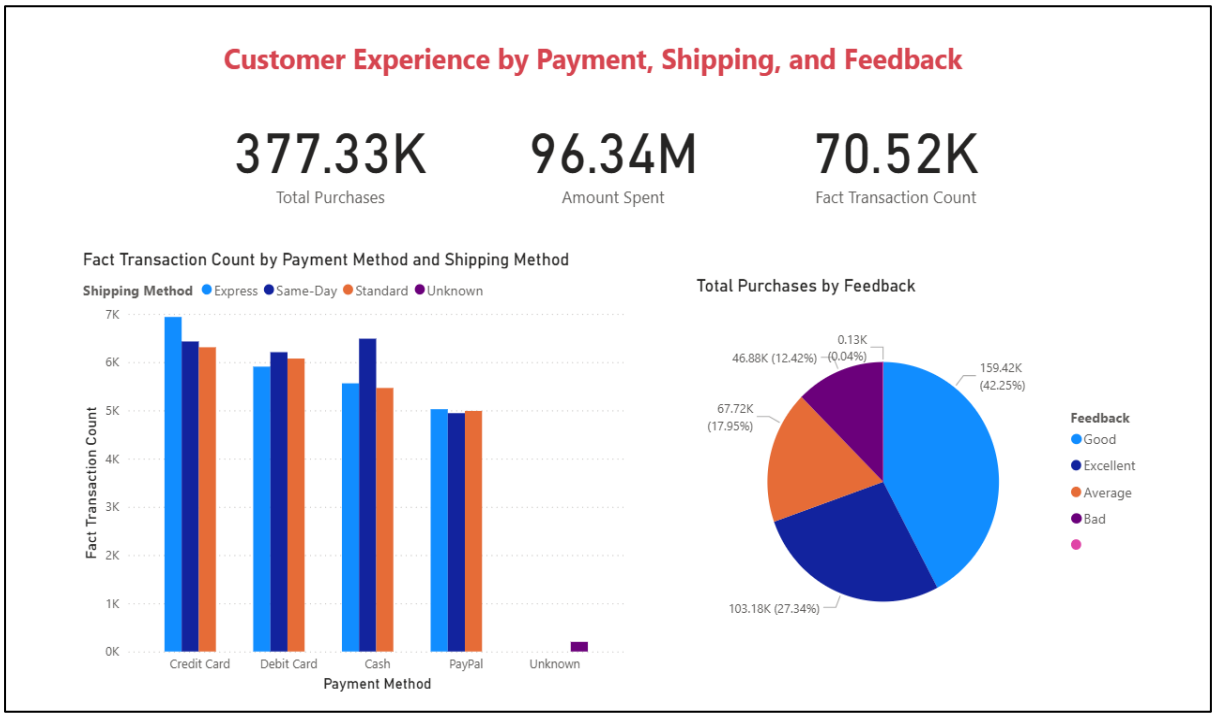
- Enable users to analyse **Customer Experience by Payment, Shipping, and Feedback**



Report 4: Drill-Through Report

Objective: Allow users to navigate to detailed information from a summary visual.





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