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Design and Evaluation of an Interactive Power BI-Based Financial Mis Dashboard

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Abstract- Managing financial information from multiple sales channels requires the analysis of revenue, taxes, refunds, cancellations, cost of goods sold, and profit margins. When these metrics are maintained across different sources, preparing consolidated reports and comparing financial performance can become time-consuming. This paper presents an interactive financial Management Information System (MIS) dashboard developed using Microsoft Power BI to support multichannel financial reporting and profitability analysis. The dashboard provides monthly profit-and-loss summaries, channel-wise comparisons, date-based filtering, and dynamic visualizations that allow users to examine selected financial measures. Because real financial records are confidential, the study also presents a validation framework that uses independently generated synthetic data to verify calculation accuracy, aggregation consistency, and filter behavior without disclosing sensitive business information. The work demonstrates how interactive business intelligence can support consistent and flexible financial reporting for multichannel businesses.

Keywords— Business Intelligence, Financial MIS, Microsoft Power BI, DAX, Financial Reporting, Profitability Analysis, Data Visualization, Synthetic Data Validation.

I. INTRODUCTION

The increasing use of digital technologies in business operations has created a growing need for effective financial reporting and data analysis. Organizations operating across multiple sales channels generate financial information related to revenue, taxes, discounts, cancellations, refunds, returns, cost of goods sold (COGS), and profit margins. Analyzing these indicators is important for understanding business performance and supporting informed managerial decisions. However, when financial information is maintained in multiple Excel files or other data sources, consolidating and analyzing the data can involve repetitive manual work. Differences in data formats, reporting periods, and calculation methods may also create challenges in maintaining consistent financial reports.

Business Intelligence (BI) technologies provide methods for transforming raw data into structured information through data preparation, calculations, reports, and interactive visualizations **[1]**. Microsoft Power BI is a BI platform that supports data integration, data transformation, calculated measures, and interactive dashboard development **[2]**. Its Power Query functionality supports data preparation **[3]**, while Data Analysis Expressions (DAX) enables the creation of calculations and financial measures **[4]**. These capabilities can be used to develop financial Management Information System (MIS) dashboards that present key performance indicators in a consolidated and interactive format.

Traditional static financial reports may provide limited flexibility when users need to compare different reporting periods, sales channels, or financial indicators **[5]**. An interactive dashboard can address this limitation by allowing users to filter information, change the selected metric, and explore financial data through different visualization types. Such functionality can support financial analysis by presenting relevant information within a unified interface. Nevertheless, the reliability of a dashboard depends on the accuracy of its calculations, the consistency of aggregated values, and the correct operation of its interactive features. These aspects must be evaluated before conclusions can be drawn about its practical usefulness.

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Motivated by these requirements, this paper presents the design and functional evaluation framework of an interactive Power BI-based financial MIS dashboard for multichannel revenue and profitability analysis. The dashboard organizes monthly financial indicators, including revenue, taxes, coupons, returns to origin (RTO), cancellations, refunds, net revenue, COGS, and gross margin. It incorporates channel-wise comparisons, date-based filtering, dynamic metric selection, and multiple visualization options to support the exploration of financial information. The primary objective of this study is to describe the dashboard implementation and define a method for evaluating its calculation consistency, aggregation accuracy, and interactive filtering behavior using an independently generated synthetic dataset.

The main contributions of this paper are as follows:

- A multichannel financial data model and a set of DAX measures for computing net revenue, cost of goods sold, gross margin, and related indicators across sales channels and reporting periods.
- An interactive dashboard design that allows users to change the displayed financial metric, reporting dimension, and chart type through dynamic selection controls.
- A reproducible validation framework that uses synthetic financial data to verify calculation accuracy, aggregation consistency, and filter behavior, which can be applied without access to confidential business records.

Since real business financial records are typically confidential and cannot be published, the evaluation framework uses synthetic financial records rather than actual business data. The synthetic dataset is designed to reflect the structure of multichannel financial records so that the reporting logic and dashboard functionality can be tested under defined conditions. This approach allows the correctness and consistency of the financial reporting features to be examined and reproduced without disclosing sensitive data.

The remainder of this paper is organized as follows. Section II reviews related work on business intelligence, financial reporting, and interactive dashboards. Section III describes the system design and methodology, including the system architecture, data preparation, data model, financial measures, dashboard design, and validation approach. Section IV presents the dashboard implementation and discusses its capabilities and limitations. Section V concludes the paper and outlines directions for future work.

II. RELATED WORK

Business intelligence (BI) refers to the processes and tools that convert operational data into information that managers can use for decision-making. Watson and Wixom **[1]** describe BI as having two broad activities: getting data into a central repository, typically a data warehouse, and getting data out through reports, queries, and analytical tools. They note that most of the business value is realised in the second stage, when users actually interact with the data. Chaudhuri et al. **[6]** give a more technical view of the same pipeline, describing a stack that moves from operational data sources through extract–transform–load (ETL) processes and a data warehouse to OLAP engines and front-end applications such as reports and dashboards. Chen et al.

[7] trace how BI and analytics have evolved from database-centred reporting towards web-based and large-scale data analytics, and argue that the field has become central to how organisations measure and manage performance. Together, these studies show that the usefulness of a BI system depends not only on its visual layer but also on how reliably data is prepared and calculated before it reaches the user, an aspect this study examines for a financial MIS dashboard.

The structure of the underlying data has a direct effect on the accuracy and flexibility of BI reports. Codd **[8]** introduced the relational model, in which data is organised into tables linked through keys, forming the basis of most modern reporting systems. Building on this foundation, Kimball and Ross **[9]** propose dimensional modelling for analytical applications, separating numeric measurements stored in fact tables from descriptive attributes such as date, product, or region stored in dimension tables.

Arranging these tables in a star schema simplifies aggregation and allows the same measures to be filtered consistently across different dimensions. This

approach is widely adopted in self-service BI tools, including Microsoft Power BI, where relationships between tables determine how filters propagate through calculated measures **[10]**. For financial reporting, a well-designed model ensures that totals for a selected month or sales channel remain consistent with the underlying records, which is a key requirement examined in this study.

Dashboards are one of the most common ways of presenting BI outputs to managers. Few **[11]** defines a dashboard as a visual display of the most important information needed to achieve one or more objectives, arranged on a single screen so that it can be monitored at a glance, and stresses that clarity and the removal of unnecessary visual elements are essential to effective design. Pauwels et al. **[12]** examine why organisations adopt dashboards, what they typically contain, and how they are developed, arguing that dashboards are most useful when the metrics they display are clearly linked to business performance.

In a review of dashboards in performance management, Yigitbasioglu and Velcu **[13]** identify four main purposes, namely monitoring, consistency, planning, and communication, and discuss how design features such as drill-down and interactive filtering support these purposes. They also note that empirical research on dashboard effectiveness remained limited. These studies indicate that a financial dashboard should present key indicators clearly, allow users to explore the data interactively, and maintain consistent measures across different views. Several studies have examined the use of BI tools for dashboard development. Khatuwal and Puri **[14]** reviewed commonly used tools, including Tableau, Power BI, and SpagoBI, and demonstrated dashboard creation using a public dataset from the UCI repository. Oey et al. **[15]** conducted a case study in a medium-sized metal manufacturer, modelling performance measurement requirements with IDEF0 diagrams and converting the company's existing Excel worksheets into integrated Power BI dashboards. Phang et al. **[5]** designed an interactive business dashboard combined with a content-based recommender system and evaluated it through user testing and performance analysis. In the area of finance, Aurobind et al. **[16]** developed a personal finance dashboard in Power BI that tracks income, expenses, and savings, using row-level security to protect user data. In healthcare, Hung et al.**[17]** built a Power BI dashboard for monitoring antibiotic utilisation from electronic health record data and evaluated it using the User Experience Questionnaire.

These studies demonstrate the flexibility of interactive dashboards across domains; however, three gaps remain. First, existing evaluations focus mainly on usability, responsiveness, or the accuracy of added analytical components, rather than on verifying that the financial measures and aggregated totals displayed in a dashboard are calculated correctly. Second, the financial dashboard in **[16]** addresses personal finance, and none of the reviewed studies consider the multichannel business indicators typical of direct-to-consumer retail, such as returns to origin, cancellations, refunds, and channel-wise gross margin.

Third, where organisational data is confidential, few studies describe a reproducible way to evaluate a dashboard without disclosing it. This study addresses these gaps by presenting a Power BI-based financial MIS dashboard for multichannel reporting and validating its calculations, aggregations, and filters using an independently generated synthetic dataset.

III. SYSTEM DESIGN AND METHODOLOGY

The proposed financial MIS dashboard was developed in Microsoft Power BI, and a validation framework based on independently generated synthetic data was defined for its evaluation. This section describes the system architecture, data preparation, data model, financial measures, dashboard design, and validation method.

1. System Architecture

The system consists of four layers: a data source layer, a data preparation layer, a calculation layer, and a visualization layer, supported by a validation process, as shown in Fig. 1. Financial records flow from the source files through Power Query transformations into a data model, where DAX measures compute the financial indicators that are displayed in the interactive dashboard.

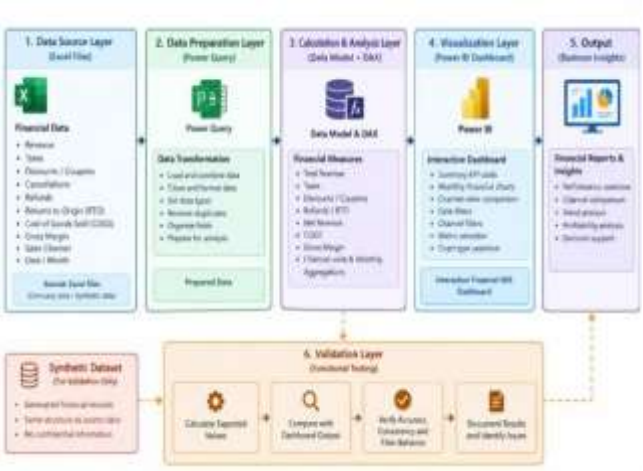


Fig. 1. System architecture of the proposed Power BI-based financial MIS dashboard.

2. Data Source And Preparation

Excel files serve as the primary data source. The records contain financial information on revenue, taxes, coupons, cancellations, returns to origin (RTO), refunds, and cost of goods sold (COGS), organised by reporting period and sales channel. Power Query [3] was used to prepare the data for analysis, including setting appropriate data types, removing blank and duplicate rows, renaming columns to consistent names, and combining the channel-wise records into a single table for analysis.

3. Data Model

The prepared data was organised as a star schema [9], with a fact table containing the financial values and dimension tables for date and sales channel. One-to-many relationships connect each dimension table to the fact table, so that date and channel selections propagate to all measures in the report [10]. This structure ensures that totals displayed for a selected month or channel are calculated from the same set of underlying records.

4. Financial Measures

Financial measures were defined in DAX [4] so that they recalculate automatically for the selected month and sales channel. Table I lists the main measures.

TABLE I FINANCIAL MEASURES

Measure	Definition
Product Revenue	Gross Revenue − Taxes − Coupons − RTO − Cancellations − Refunds
Net Revenue	Product Revenue + Shipping Income
Gross Margin	Net Revenue − COGS
Gross Margin %	(Gross Margin ÷ Net Revenue) × 100

As an example, the gross margin percentage measure is defined as follows:

Gross Margin % = VAR NetRevenue =

5. Sum (Factfinance[Grossrevenue])

- SUM (FactFinance[Taxes])
- SUM (FactFinance[Coupons])
- SUM (FactFinance[RTO])
- SUM (FactFinance[Cancellations])
- SUM (FactFinance[Refunds])
- + SUM (FactFinance[ShippingIncome]) VAR GrossMargin =
- NetRevenue - SUM (FactFinance[GrossCOGS]) RETURN

6. Divide (Grossmargin, Netrevenue, 0)

The DIVIDE function returns zero instead of an error when net revenue is zero, which prevents invalid values from appearing when a filter selects a period or channel with no sales.

IV. DASHBOARD DESIGN

The dashboard combines a channel-wise financial summary table with an interactive chart. The table presents each financial indicator by sales channel with a total column, filtered by month and date range. The chart component allows users to select the financial measure, the reporting dimension, and the chart type (column, line, bar, or pie) through selection controls. These controls were implemented using Power BI bookmarks [18], where each bookmark stores a specific visual configuration and is activated through buttons, allowing the displayed chart to change without navigating to a separate page. This approach allows different comparisons to be made within a single dashboard rather than through separate static reports.

V. VALIDATION METHOD

Because real financial records are confidential, the validation framework uses a synthetic dataset with the same structure as the source data, containing records for multiple sales channels and reporting months with values generated within realistic ranges. Expected results are calculated independently in a spreadsheet and compared with the dashboard output. Table II summarises the five types of tests defined in the framework. The synthetic dataset, calculation rules, and test cases are documented so that the evaluation can be repeated.

TABLE II VALIDATION TEST TYPES

Test type	What is checked	Example
Calculation	Individual measures match expected values	Net revenue for one channel in one month
Aggregation	Totals equal the sum of underlying records	Total column equals the sum of all channels
Filter	Date and channel filters select the correct records	Selecting one month shows only that month's values
Visualization	The selected metric displays correctly in each chart type	Gross sales by month in column and line charts
Consistency	Table and chart show the same values under the same filters	Monthly gross sales in the chart equal the table value

VI. RESULTS

The proposed Power BI-based financial Management Information System (MIS) dashboard presents financial information through a consolidated table and interactive visualizations. The dashboard is designed to support monthly financial reporting, channel-wise comparisons, and analysis of revenue and profitability indicators. The implementation includes financial summaries, date-based filtering, metric selection, and multiple chart types to facilitate the exploration of financial data.

1. Financial Mis Dashboard

Fig. 2 presents the financial MIS dashboard, which organizes financial indicators into a tabular format and compares values across sales channels. The displayed indicators include gross revenue, taxes on sales, coupons, returns to origin (RTO), cancellations, refunds, product revenue, shipping income, net revenue, gross cost of goods sold (COGS), and gross margin.

The table includes separate columns for sales channels and a total column that summarizes the displayed financial measures. This arrangement allows users to compare financial values across channels and examine the contribution of individual channels to the overall totals. Monthly selection and date filters provide additional flexibility when reviewing financial information for a specific reporting period.

The dashboard also presents gross margin and gross margin percentage, enabling users to examine profitability alongside revenue and cost indicators. Grouping these measures within a single interface provides a consolidated view of the selected financial information.



Fig. 2. Financial MIS dashboard showing financial indicators and channel-wise comparisons using illustrative data.

2. Interactive Financial Data Visualization

Fig. 3 illustrates the interactive visualization component of the dashboard. It includes controls for selecting the financial measure displayed on the Y-axis and the

reporting dimension used on the X-axis. In the illustrated configuration, gross sales are displayed by month using a column chart.

The dashboard provides options for column, line, bar, and pie charts. These options allow users to examine selected financial measures through different visual representations, depending on the analysis required. The chart displays monthly values, making it possible to observe variations in gross sales across the months represented in the visualization.

The bookmark-based selection controls allow the displayed metric and chart type to be changed without requiring a separate static chart for each selection. This functionality supports the exploration of financial trends and comparisons within the same dashboard interface.



Fig. 3. Interactive financial visualization with dynamic metric, reporting dimension, and chart-type selection using illustrative data.

3. Discussion And Limitations

The dashboard implementation brings tabular financial reporting and interactive chart-based analysis together within Microsoft Power BI. The table supports detailed comparisons of financial indicators across sales channels, while the visualization component provides a graphical view of monthly financial trends. Date filters, channel selection, and dynamic visualization controls further support interactive data exploration, showing how a single Power BI report can replace multiple static spreadsheets for routine financial review.

The present study has some limitations. It focuses on the design of the dashboard and its validation framework; applying the framework to a full synthetic dataset and measuring reporting time against a manual spreadsheet process are left for future work. In addition, the bookmark-based controls require a separate visual configuration for each combination of metric and chart type, which may become difficult to maintain as more measures are added.

V. CONCLUSION AND FUTURE WORK

This paper presents an interactive financial Management Information System (MIS) dashboard developed using Microsoft Power BI for multichannel financial reporting and profitability analysis. The dashboard integrates key financial indicators, including gross revenue, taxes, discounts, refunds, net revenue, cost of goods sold (COGS), and gross margin, into a unified reporting interface.

The dashboard incorporates monthly financial summaries, channel-wise comparisons, date-based filtering, dynamic metric selection, and multiple chart types, supported by a star-schema data model and DAX measures that recalculate for each selected period and channel. The study also defines a reproducible validation framework that uses synthetic data to check calculation accuracy, aggregation consistency, filter behavior, and consistency between tabular and chart views without requiring access to confidential business records.

Future work will apply the proposed validation framework to a complete synthetic dataset and compare the time required to prepare monthly reports using the dashboard and a manual spreadsheet process. Further improvements may include automating data retrieval, introducing additional financial performance indicators, replacing bookmark-based controls with field parameters for easier maintenance, and evaluating dashboard usability with end users.

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