American Journal of Scholarly Research and Innovation
Volume 03, Issue 02 (2024)
Page No: 52-79
eISSN: 3067-2163
Doi: 10.63125/fy4w7w04

Article

BUSINESS INTELLIGENCE SYSTEMS IN FINANCE AND ACCOUNTING: A REVIEW OF REAL-TIME DASHBOARDING USING POWER BI & TABLEAU

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ABSTRACT

This paper presents a comprehensive review and critical analysis of project impact assessment frameworks utilized by nonprofit development organizations operating across South Asia. Focusing on empirical insights from countries such as India, Bangladesh, Nepal, and Sri Lanka, the study explores how diverse contextual variables—social, economic, political, and cultural—shape the formulation, application, and effectiveness of evaluation methodologies. Drawing on a systematic review of 41 peer-reviewed empirical studies published between 2000 and 2024, the analysis highlights recurring patterns, innovative practices, and persistent limitations in current impact assessment models. The dominance of externally designed evaluation mechanisms—primarily influenced by donor requirements—has entrenched hierarchical power dynamics, thereby marginalizing grassroots knowledge systems and curtailing meaningful community participation in the evaluation process. The study further reveals that although participatory, utilization-focused, and feminist evaluation approaches are frequently cited in strategic documents and theoretical discussions, their practical implementation remains inconsistent. Constraints such as limited institutional capacity, inflexible donor mandates, time pressures, and insufficient technical expertise often prevent nonprofit organizations—especially small and community-based entities—from operationalizing inclusive and context-sensitive evaluations. Mixed-methods approaches are widely preferred for balancing methodological rigor with qualitative depth; however, the widespread reliance on external consultants and a lack of internal capacity-building mechanisms often limit the institutional learning that should accompany these evaluations. Moreover, impact assessments are frequently treated as compliance exercises rather than as opportunities for adaptive learning, programmatic reflection, or long-term development strategy enhancement. This review underscores the need for reimagining nonprofit evaluation in South Asia by promoting co-creation with local stakeholders, embedding learning-driven practices into organizational cultures, and aligning evaluation design with the principles of equity, sustainability, and context sensitivity. In doing so, the study calls for a shift away from rigid donor-centric models toward more participatory, iterative, and transformative frameworks that reflect the lived realities and aspirations of the communities they intend to serve.

KEYWORDS

Nonprofit Evaluation; Impact Assessment; South Asia Development; Donor Accountability; Institutional Capacity;

Citation:
Zamil, M. H., Mohiuddin, M., & Mamun, M. N. H. (2024). *Business intelligence systems in finance and accounting: A review of real-time dashboarding using Power BI & Tableau*. *American Journal of Scholarly Research and Innovation*, *3*(2), 52–79. https://doi.org/10.63125/fy4w7w04

Received:
September 19, 2024

Revised:
October 17, 2024

Accepted:
November 26, 2024

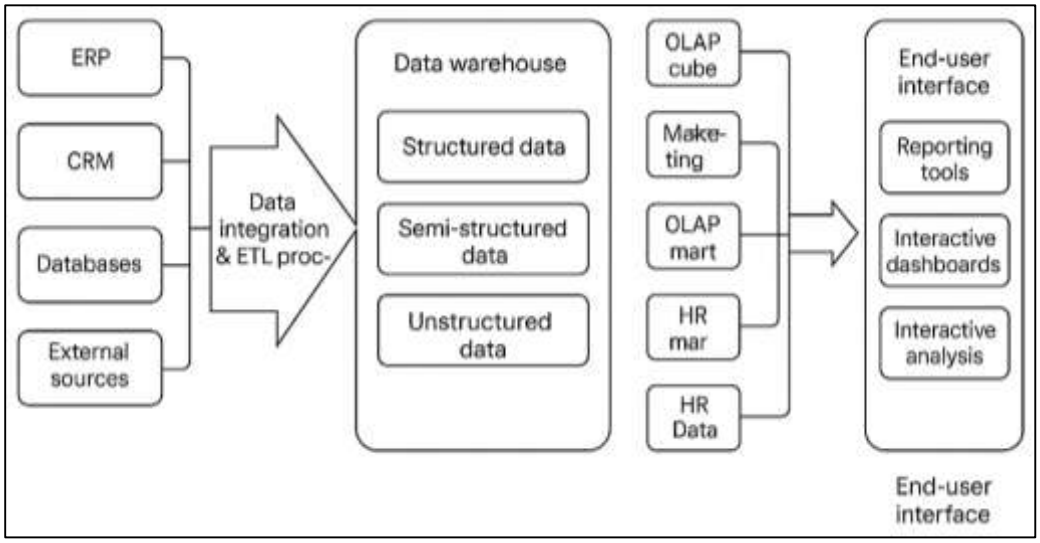
Published:
December 28, 2024

American Journal of Scholarly Research and Innovation
Volume 01, Issue 01 (2025)
Page No: 249-274
eISSN: 3067-2163
Doi: 10.63125/fy4w7w04

INTRODUCTION

Business Intelligence (BI) is a technology-driven process for analyzing data and presenting actionable information to help executives, managers, and other corporate end-users make informed business decisions. In the domain of finance and accounting, BI is crucial for interpreting complex datasets related to budgets, forecasts, and key performance indicators (KPIs). The fundamental purpose of BI is to convert raw data into meaningful and useful insights, facilitating enhanced decision-making and strategic financial planning. Within international business landscapes, BI tools are increasingly integrated into accounting systems for real-time financial monitoring, risk assessment, and performance evaluation. As organizations grow globally and face mounting regulatory pressures, the need for timely and accurate financial data becomes critical. This has heightened the strategic value of BI systems in multinational corporations and public financial institutions alike (Theodorakopoulos et al., 2024). In particular, the financial services industry—including banking, investment management, and insurance—has emerged as one of the primary sectors leveraging BI capabilities to maintain operational efficiency and regulatory compliance. BI allows these institutions to manage risks proactively, track customer profitability, and optimize investment portfolios. Similarly, public sector accounting bodies employ BI to ensure transparency and accountability in budget execution and fund allocation. The adoption of BI in these contexts supports the broader global goal of financial stability and fiscal discipline, particularly in post-crisis economies that require rapid and data-driven financial interventions (Kaufmann, 2019). Moreover, Leading global firms have recognized that BI applications provide a significant return on investment when aligned with financial and operational metrics. According to Alabi et al. (2019), well-executed BI strategies in finance enhance profitability and reduce uncertainty by aligning tactical financial actions with overarching corporate strategies. The relevance of BI in contemporary financial management is reinforced by its integration into enterprise resource planning (ERP) systems and its influence on strategic planning and capital structure decisions. Thus, understanding the core definitions and business motivations behind BI serves as the foundational step toward evaluating specific tools like Power BI and Tableau in financial dashboards.

Figure 1: Hybrid BI Infrastructure for Financial Analytics



Dashboarding is a core component of modern BI systems, designed to visualize complex financial data in an intuitive and dynamic manner. It provides an interface through which real-time data, KPIs, and financial metrics can be monitored and acted upon instantly (Xu et al., 2020). Traditionally, financial reporting was a retrospective and manual process, often prone to delays and inaccuracies. With the evolution of BI platforms and advancements in data processing, dashboarding has transformed financial analytics into a real-time endeavor. Furhtermore, financial dashboards consolidate multiple data sources and present them through interactive charts, graphs, and indicators that enhance decision-making across various financial tiers—ranging from CFOs to operational accountants (Mishan et al., 2023).

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Microsoft's Power BI is among the most widely adopted BI tools for real-time dashboarding in finance and accounting. Launched in 2015, Power BI integrates data transformation, visualization, and AI-driven insights into a single platform that aligns seamlessly with Microsoft's ecosystem. From a financial standpoint, Power BI supports financial statement analysis, variance reporting, budget forecasting, and cost center analytics through its DAX (Data Analysis Expressions) engine. The tool is highly customizable, allowing for interactive dashboards tailored to cash flow, profitability margins, and tax computations (Aldoseri et al., 2024).

Globally, Power BI's popularity has surged due to its cost-effectiveness and compatibility with Excel—a staple in financial operations. Organizations such as EY, Deloitte, and PwC have adopted Power BI for internal financial management and for client advisory services, highlighting its global relevance and enterprise-grade capabilities. Power BI supports advanced analytics through features like natural language query (Q&A), drill-through capabilities, and KPI cards that facilitate quick decision-making for financial managers. Additionally, it integrates seamlessly with ERP and CRM systems like SAP, Oracle, and Dynamics 365, thereby enhancing its utility in consolidated financial reporting. In public institutions, Power BI has been used for treasury management, fraud detection, and capital expenditure monitoring (Kulkov et al., 2024). Studies also indicate that Power BI contributes to financial literacy among non-technical stakeholders through its user-friendly visuals and accessible web portals. For example, in the banking sector, it aids in visualizing loan default patterns, liquidity ratios, and branch performance comparisons across geographical regions. As BI continues to permeate international finance, Power BI represents a scalable, cloud-enabled solution that satisfies the speed, accuracy, and compliance demands of the modern financial ecosystem. The tool's democratization of analytics in finance makes it a central pillar in this review of BI systems and dashboarding platforms (Kochhar et al., 2020).

Tableau, a product of Salesforce, is another widely adopted business intelligence platform with a strong reputation for robust data visualization and ease of integration with various data sources. In finance and accounting, Tableau has emerged as a powerful tool for transforming structured and semi-structured data into interactive and real-time dashboards, enabling users to monitor KPIs such as operating margins, return on assets, and working capital ratios with unparalleled granularity (Keshavarz et al., 2021). Unlike many traditional BI tools that require substantial coding, Tableau's drag-and-drop interface allows financial analysts to build dashboards intuitively, which facilitates rapid insights and shorter decision cycles. Its ability to visualize large datasets from ERP, CRM, and data lakes such as Amazon Redshift and Google BigQuery enhances its value proposition across finance departments globally. Moreover, one distinguishing strength of Tableau lies in its advanced visual analytics functions such as clustering, forecasting, and trend line analysis, which are particularly useful in revenue cycle management and cost behavior modeling. In corporate finance environments, Tableau is used to build interactive income statements, monitor capital budgeting decisions, and conduct scenario analysis using visual storytelling. In addition, Tableau dashboards are increasingly being used in audit and internal control environments for visualizing exception reports, compliance metrics, and financial reconciliations. On the international front, Tableau has gained traction in European, North American, and Asia-Pacific markets due to its data governance capabilities and seamless embedding options for web-based reporting. Several studies have confirmed that Tableau contributes to financial transparency and regulatory compliance, especially in organizations governed by strict standards like Sarbanes-Oxley and MiFID II. The platform's ability to provide granular insights in real-time is particularly useful for financial institutions managing multi-currency operations or subsidiaries in different jurisdictions. Thus, Tableau's growing ecosystem and visualization-first approach make it an indispensable tool in the evolving landscape of BI-assisted finance.

Business Intelligence adoption in finance and accounting has become a global norm rather than a trend, with multinational corporations, governments, and non-profits embracing BI systems to enhance financial reporting, strategic planning, and compliance monitoring. According to a 2023 Deloitte survey, over 78% of global CFOs reported using at least one form of BI dashboard for real-time financial oversight, a figure that has been rising consistently. In countries with strong regulatory regimes like the United States, United Kingdom, and Germany, BI tools are used to ensure Sarbanes-Oxley, GDPR, and MiFID II compliance respectively (Gonçalves et al., 2023). In developing economies, governments and donor-funded institutions use BI platforms to track fund utilization, reduce fraud, and ensure fiscal discipline. The globalization of financial operations has also

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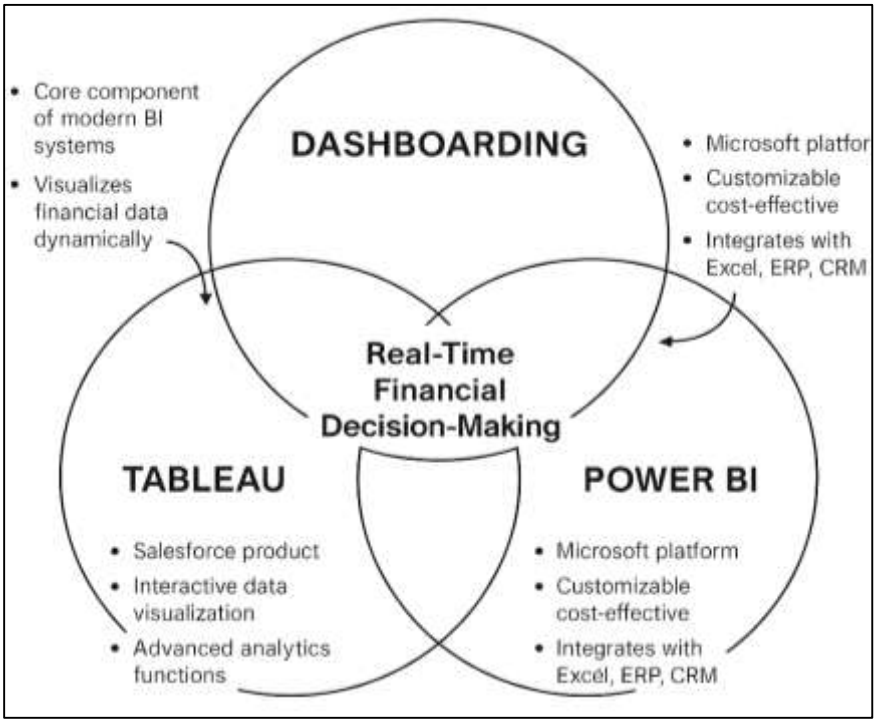
Page No: 249-274
eISSN: 3067-2163
Doi: 10.63125/fy4w7w04

necessitated the use of multilingual and multi-currency capabilities offered by platforms like Power BI and Tableau. These features enable cross-border financial teams to reconcile accounts, monitor FX exposures, and manage intercompany transfers in a consistent and transparent manner. Research from Nickell et al. (2023) confirm that organizations that embed BI within their financial governance frameworks experience improved audit outcomes, stronger stakeholder trust, and quicker resolution of discrepancies. Academic studies further affirm the positive impact of BI on reducing financial reporting lead times and enhancing the clarity of board-level presentations (Rodrigues et al., 2023). Another vital global factor is the rise of ESG (Environmental, Social, and Governance) reporting, which is being integrated into traditional financial dashboards to provide a holistic view of organizational performance (Hamad et al., 2023). BI tools now support real-time tracking of carbon disclosures, diversity targets, and ethical sourcing metrics alongside financial KPIs. This convergence underscores the growing complexity of financial reporting and the corresponding need for agile, transparent, and real-time BI systems. Power BI and Tableau are at the forefront of enabling these integrations, reaffirming their critical role in the modern global financial infrastructure (Sharma, 2020).

Figure 2: Real-Time Financial Dashboarding Tools



The primary objective of this study is to critically evaluate the impact assessment frameworks employed by nonprofit development organizations across South Asia, with a specific focus on how these frameworks are shaped by and respond to diverse local contexts. The study also seeks to uncover the extent to which participatory and transformative evaluation models are integrated into practice, and how donor priorities affect the balance between accountability and organizational learning. Through this analysis, the research aspires to provide evidence-based insights that can guide the development of more context-sensitive, inclusive, and sustainable monitoring and evaluation (M&E) systems in the nonprofit sector throughout South Asia.

LITERATURE REVIEW

The emergence of Business Intelligence (BI) systems has transformed the landscape of financial and accounting practices in contemporary organizations. A robust body of scholarly work illustrates how the strategic deployment of BI facilitates real-time data visualization, financial forecasting, performance monitoring, and risk mitigation. As organizations increasingly migrate toward data-centric decision-making, tools such as Microsoft Power BI and Tableau have become central to this transition. These tools enable the development of real-time dashboards that not only improve operational transparency but also elevate the strategic capacity of finance departments by embedding analytics directly into financial workflows (Caserio & Trucco, 2018). This literature review

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synthesizes academic, technical, and industry literature relevant to the integration and application of BI systems in finance and accounting. The primary aim is to categorize the evolution of BI in financial contexts, evaluate the comparative effectiveness of Power BI and Tableau, and assess the impact of real-time dashboards on financial decision-making, compliance, and organizational agility. Furthermore, this review highlights empirical findings, theoretical frameworks, implementation strategies, and technical challenges surrounding real-time data analytics within the financial domain (Gurcan et al., 2023). The review is structured thematically to reflect key research clusters. First, it explores foundational theories and models in BI. Second, it evaluates the role of BI in financial reporting and internal control. Third, the review investigates the development and use of dashboards in finance. It then offers a comparative examination of Power BI and Tableau implementations. Subsequent sections examine critical implementation challenges, security, compliance, and global adoption patterns. Through this layered structure, the literature review not only documents existing knowledge but also surfaces gaps that inform future empirical inquiry.

Decision Support Theory and Finance

Decision Support Systems (DSS) theory serves as the foundational pillar upon which Business Intelligence (BI) systems in finance are conceptualized and implemented. DSS was designed to assist managers in decision-making by integrating data, analytical models, and user-friendly interfaces. In finance, DSS facilitates structured and semi-structured decision-making processes such as capital budgeting, risk management, and liquidity analysis. The integration of DSS with BI technologies enables financial professionals to interactively query large datasets and retrieve context-relevant insights in real time, enhancing responsiveness to market conditions (Niu et al., 2021). BI tools have extended DSS by offering multidimensional analysis, real-time alerts, and data visualization capabilities, thereby aligning operational finance with strategic planning. Multiple studies have corroborated the value of DSS in enhancing financial decisions. For example, DSS capabilities in BI tools contribute to reduced error margins in investment analysis. Similarly, Niu et al. (2021) showed that DSS-integrated BI systems improved budget accuracy and variance monitoring across organizations. emphasized that DSS theory provides the cognitive basis for dashboards, scorecards, and analytical models embedded in BI suites. Moreover, the implementation of BI-DSS in real-time financial analysis promotes faster reconciliation and supports cost optimization strategies. Contemporary BI platforms like Power BI and Tableau exemplify the operationalization of DSS in finance by combining historical and predictive analytics in a single interface. Al-Eisawi et al. (2021) observed that such systems influence not only decision quality but also decision speed and confidence. Thus, DSS theory remains central to understanding how BI tools empower finance professionals to transform data into strategic capital, reinforcing their role in organizational competitiveness.

Data-driven decision-making (DDDM) has become an indispensable element in shaping corporate financial strategies, owing to the increasing volume, velocity, and variety of financial data. The paradigm of DDDM advocates the use of empirical evidence, historical trends, and real-time metrics in strategic financial planning, replacing intuition and tradition with analytics-based reasoning(Mst Shamima et al., 2023). In finance, this shift manifests through the integration of BI platforms that enable dynamic visualization of performance metrics, forecasting models, and scenario analysis dashboards (Subrato, 2018). Strategic areas such as capital allocation, M&A due diligence, and profitability analysis are increasingly reliant on DDDM facilitated by platforms like Tableau and Power BI. Numerous empirical investigations have highlighted the efficacy of DDDM in corporate finance. Amer et al. (2024) found that firms employing DDDM practices experience superior productivity and capital efficiency. Similarly reported that analytics-driven firms outperform their competitors in financial metrics such as return on assets and operating margins. A case study by Pisoni et al. (2024) demonstrated how a multinational corporation improved its cash flow forecasting and reduced working capital needs through BI-enabled DDDM. According to Ballou et al. (2018), the integration of DDDM with BI allows firms to align tactical finance operations with long-term strategic objectives. Furthermore, BI's real-time dashboards enable CFOs and controllers to make agile decisions based on key indicators such as liquidity ratios, earnings per share, and cost structures. Power BI's DAX language and Tableau's VizQL provide advanced modeling environments for financial strategy simulations. As confirmed by , DDDM not only improves financial forecasting accuracy but also reduces bias and subjective overreach in high-stakes decision-making. Therefore, DDDM,

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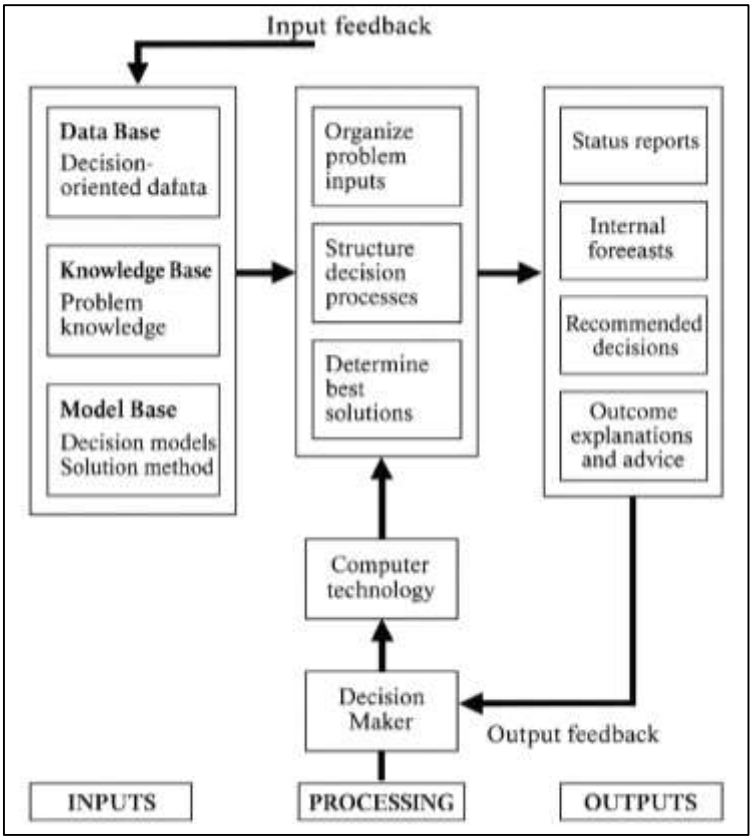
eISSN: 3067-2163
Doi: 10.63125/fy4w7w04

empowered through BI systems, has become a cornerstone in modern financial strategy development, bridging operational finance with predictive analytics (Ara et al., 2022; Yu et al., 2021).

Figure 3: MIS and Business Intelligence



The transition from traditional Management Information Systems (MIS) to Business Intelligence (BI) frameworks represents a pivotal shift in how financial data is processed, reported, and utilized for strategic planning. Traditional MIS systems were primarily transaction-focused, generating static reports and lagging indicators for operational monitoring. In contrast, BI systems offer real-time, interactive, and predictive analytics capabilities, transforming financial reporting into a proactive and dynamic process (Uddin et al., 2022; Roeder et al., 2022). This evolution has led to the emergence of dashboards, multidimensional OLAP cubes, and automated variance reports that empower financial leaders with enhanced visibility and agility. The literature extensively documents this transformation. For instance, how BI extends MIS by integrating ETL (Extract, Transform, Load) processes, data warehousing, and visualization tools into one analytical environment. Grandhi et al. (2021) highlighted that BI systems support real-time decision-making, a capacity lacking in traditional MIS frameworks. Magableh et al. (2024) showed that BI facilitates centralized access to distributed financial data, reducing reporting latency and increasing transparency. Moreover, Szukits (2022) found that BI-enabled financial reporting systems improve data accuracy, report timeliness, and executive decision quality. Power BI and Tableau exemplify this evolutionary trajectory by merging reporting functions with interactive dashboards and predictive algorithms. They allow finance professionals to transition from passive report consumers to active data explorers. Modern BI systems support self-service reporting, empowering controllers and analysts to independently generate insights. Furthermore, Hannila et al. (2022) observed that the visualization-first approach of BI platforms enhances cognitive absorption and reduces user fatigue, which are common issues in traditional MIS reports. Thus, the shift from MIS to BI reflects not only a technological upgrade but a paradigm shift in the culture and execution of financial reporting.

Business Analytics Maturity Models (BAMMs) provide structured frameworks for assessing the extent to which financial institutions integrate and leverage analytics for strategic decision-making. These models typically progress from basic descriptive reporting to diagnostic, predictive, and prescriptive

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analytics, marking stages of analytical sophistication and organizational capability. In the financial sector, analytics maturity is directly correlated with the institution's ability to automate reporting, optimize capital allocation, mitigate financial risks, and adapt to regulatory changes (Akter & Ahad, 2022; Szukits & Móricz, 2024). Various frameworks have been proposed to measure BI maturity. The TDWI Maturity Model, for instance, offers a six-stage continuum from nascent to transformative analytics environments, identifying gaps in governance, data quality, and user adoption. Firms with higher BI maturity demonstrate better performance in financial control and compliance. Similarly, showed that analytics maturity leads to more robust financial scenario modeling and forecasting capabilities. Basile et al. (2023) proposed that mature BI systems reduce the burden of compliance reporting by automating audit trails and exception monitoring.

Business Intelligence Applications in Finance

Business Intelligence (BI) technologies have significantly redefined how organizations approach financial consolidation, budgeting, and forecasting by enhancing accuracy, timeliness, and automation. Traditional spreadsheet-based models for these financial functions are increasingly being replaced by BI platforms like Power BI and Tableau that enable multidimensional analysis, real-time scenario planning, and centralized data governance (Rahaman, 2022; Žilka et al., 2024). BI systems integrate data from multiple business units and geographic locations into consolidated reports, reducing manual reconciliation errors and streamlining close processes. Through visual dashboards, financial professionals can analyze revenue trends, budget variances, and cost assumptions across time periods and entities. Studies have demonstrated that BI significantly enhances forecasting capabilities by leveraging time-series modeling, what-if scenarios, and machine learning algorithms. For instance, Król and Zdonek (2020) reported that companies utilizing BI in budgeting experienced faster forecast cycles and reduced budgeting errors. Perales-Manrique et al. (2019) emphasized that BI tools allow for rolling forecasts and driver-based planning, promoting agility in volatile environments. In addition, Tableau's dynamic visualizations and Power BI's DAX formulas are used to project revenue growth, analyze cost structures, and align budgets with strategic goals. BI also supports collaborative budgeting through shared portals, allowing financial controllers and operational managers to input data simultaneously, increasing transparency and accountability. Further, studies by Cardoso and Su (2022) highlight that predictive analytics embedded within BI solutions enhance the accuracy of revenue and expense forecasts. By automating data aggregation and visualization, BI facilitates real-time financial oversight and enables CFOs to make timely and evidence-based strategic decisions, thereby transforming budgeting and forecasting into proactive, data-driven exercises (Masud, 2022). The integration of Business Intelligence (BI) into internal audit and risk assessment processes has transformed traditional audit cycles by enhancing data accessibility, exception tracking, and compliance visualization. Internal auditing, once dependent on post hoc sampling and static reports, now leverages real-time dashboards, data mining, and anomaly detection tools embedded within BI platforms like Power BI and Tableau. BI supports continuous auditing by automating the collection and analysis of financial transactions, enabling auditors to flag irregularities and assess controls without disrupting business operations (Muntean et al., 2019; Sazzad & Islam, 2022). Research highlights that BI-driven auditing tools strengthen assurance mechanisms through interactive visualization and trend monitoring. For example, Stewart and Dewan (2022) found that audit teams using BI dashboards had improved judgment accuracy and better issue prioritization. BI platforms enable dynamic sampling strategies and risk scoring models that adapt based on real-time data feeds, significantly enhancing audit quality. Brooks et al. (2013) emphasize that embedded audit trails in BI systems facilitate traceability and documentation, supporting effective audit reviews and regulatory scrutiny.

Real-Time Dashboarding

The concept of dashboarding within Business Intelligence (BI) systems has undergone a significant transformation, particularly in the financial domain, evolving from rudimentary static reports to sophisticated real-time analytical interfaces. Early financial dashboards, rooted in the executive information systems (EIS) of the 1980s and 1990s, were designed to consolidate performance indicators for top management, relying heavily on offline data and manual reporting (Chang et al., 2020; Akter & Razzak, 2022). These dashboards primarily functioned as visual summaries of historical data, offering limited interactivity and minimal forecasting capabilities. However, with the advent of data warehousing, OLAP technologies, and enterprise systems in the late 1990s and early 2000s, the capacity for multidimensional data analysis within dashboards expanded (Adar & Md, 2023;

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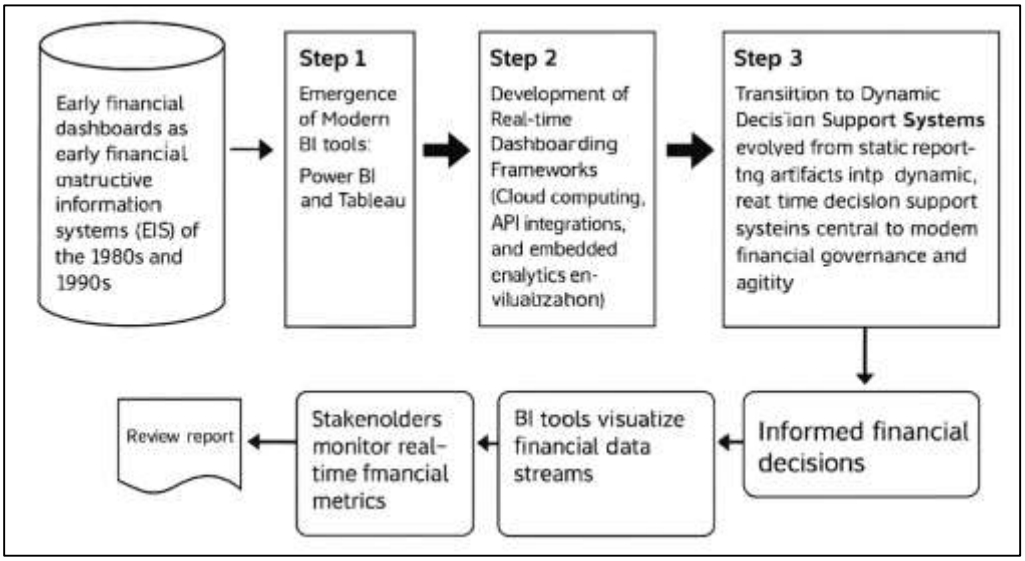
Kaawaase et al., 2021). The emergence of modern BI tools like Power BI and Tableau marked a pivotal point in dashboard design by incorporating drag-and-drop interfaces, dynamic drilldowns, and real-time connectivity to data sources. As digital transformation accelerated in finance, dashboards began supporting broader functionalities including budget tracking, cost variance analysis, and liquidity forecasting. Roszkowska (2021) noted that the shift toward interactive visualization significantly enhanced cognitive absorption and decision accuracy among financial users. The increasing demand for continuous performance monitoring, driven by regulatory pressures and volatile markets, has propelled the development of real-time dashboarding frameworks. Recent advances in cloud computing, API integrations, and embedded analytics have further revolutionized dashboard ecosystems, enabling real-time ingestion and visualization of financial data streams. These innovations not only improve reporting speed but also enhance strategic alignment through immediate feedback loops. Consequently, financial dashboards have evolved from static reporting artifacts into dynamic, real-time decision support systems, central to modern financial governance and agility.

Figure 4: Financial Dashboarding Transformation Process



The architecture of financial dashboards and their underlying data models plays a critical role in enabling effective visualization, accuracy, and performance monitoring of key performance indicators (KPIs). At the core of dashboard architecture is a multi-layered system that includes data integration (ETL), centralized data repositories (data warehouses or data lakes), semantic layers for metric definition, and presentation layers for visualization (Qibria & Hossen, 2023; Yu et al., 2018). These elements work cohesively to ensure that financial data—ranging from general ledger entries to real-time cash flows—is aggregated, validated, and modeled for dynamic dashboard rendering. Moreover, data modeling, particularly for financial KPIs, requires meticulous design of facts and dimensions to support time intelligence, hierarchical reporting (e.g., cost centers, subsidiaries), and calculated metrics such as EBITDA, liquidity ratios, or variance percentages (Bananuka et al., 2018; Maniruzzaman et al., 2023). In Power BI, the DAX language facilitates complex time-series calculations, while Tableau's data blending capabilities enable multi-source KPI computation. A well-structured dashboard architecture promotes faster data refresh cycles, minimizes redundancy, and improves the user experience through faster render times. Studies also show that financial dashboards are most effective when aligned with a business's strategic goals through carefully curated KPIs. The design of such dashboards follows best practices like color-coded alerts, layered navigation, and drill-through options that allow users to shift from macro-level views (e.g., profit margins) to granular insights (e.g., department-wise expense trends) (Al-Okaily, Teoh, et al., 2023; Akter, 2023). Furthermore, dashboard interoperability with systems like SAP, Oracle, and Dynamics 365 enhances data credibility and usability. Security and governance are also embedded into the architecture, ensuring compliance with audit and regulatory standards via role-based access

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controls and data lineage tracking (Al-Okaily, Teoh, et al., 2023; Md Masud, Mohammad, & Hosne Ara, 2023).

The visualization of financial health metrics in real-time has become a cornerstone of modern Business Intelligence (BI) applications, facilitating continuous oversight and agile decision-making. Metrics such as cash flow, liquidity ratios, working capital, gross profit margins, and return on investment (ROI) are increasingly being monitored through dynamic dashboards that pull data from live sources, offering immediate insights into organizational financial health . Real-time visualization enables stakeholders—CFOs, financial controllers, auditors, and executives—to proactively respond to market conditions and internal performance deviations (Masud, Mohammad, & Sazzad, 2023; Yousefi Nejad et al., 2024). Platforms like Power BI and Tableau support real-time visualization through data streaming, direct query capabilities, and API integrations with ERP systems and cloud databases. Tableau's VizQL engine and Power BI's DAX language facilitate the display of continuously updating metrics with intuitive design, enabling users to interpret financial performance quickly. Such dashboards are often equipped with KPI scorecards, bullet graphs, and heatmaps, enhancing comparative analysis across time periods, departments, and business units (Chan & Vasarhelyi, 2018; Hossen et al., 2023). Empirical studies validate the strategic importance of real-time financial dashboards. Firms using real-time KPIs reduced decision latency and improved capital allocation. Ajah and Nweke (2019) reported enhanced forecasting accuracy and reduced financial reporting lead times among organizations adopting real-time BI tools. Furthermore, Hawking & Sellitto (2010) emphasize that real-time visualization strengthens stakeholder confidence by promoting transparency and responsiveness, especially in crisis scenarios (Al-Okaily, Teoh, et al., 2023; Rajesh, 2023). Real-time dashboards also support collaborative financial planning by providing shared access to updated metrics, thereby facilitating cross-functional alignment and faster consensus building. The visual emphasis ensures that even non-technical stakeholders can grasp complex trends and deviations, supporting inclusive financial governance.

Power BI in Finance and Accounting

Power BI's architecture is purposefully designed to support scalable, dynamic, and secure financial data modeling through a multi-layered structure that incorporates data ingestion, modeling, semantic structuring, and visualization (Niu et al., 2021; Ashraf & Ara, 2023). The platform supports a wide range of data connectors—ranging from cloud databases like Azure SQL to on-premises ERP systems—allowing real-time and scheduled data imports for financial transactions, journals, and performance indicators. At its core is the VertiPaq in-memory engine, which enables columnar storage and high-speed data compression—making it particularly efficient for large-scale financial datasets such as general ledgers, budget allocations, and multi-year forecasts. Financial data modeling in Power BI is structured around data relationships (one-to-many, many-to-one), time intelligence, and calculated fields created using the Data Analysis Expressions (DAX) language. The platform supports star and snowflake schemas that help streamline reporting logic and reduce data redundancy, especially when designing complex models that span departments, business units, or global subsidiaries (Sanjai et al., 2023). The semantic layer of Power BI offers the ability to define consistent financial KPIs such as gross margin, EBITDA, and cash conversion cycles across reports and dashboards, facilitating shared interpretation among stakeholders. Additionally, Power BI offers robust governance features including Row-Level Security (RLS), data lineage visualization, and workspace permissions, which are essential in finance due to sensitivity and regulatory constraints (Dzuranin et al., 2018; Tonmoy &Arifur, 2023). Real-time dashboards enabled through DirectQuery or composite models allow finance teams to track fluctuating metrics like accounts receivable aging or treasury positions without compromising data latency or security. This layered technical architecture positions Power BI as a leading platform for agile, scalable, and enterprise-ready financial intelligence systems (Zahir et al., 2023).

Data Analysis Expressions (DAX) and Power Query form the analytical backbone of Power BI, enabling complex financial analysis through custom calculations and data transformations. DAX is a formula language tailored for multidimensional data modeling, offering capabilities such as time intelligence, dynamic filtering, and row context evaluation—all critical for creating accurate financial metrics (Razzak et al., 2024; Salijeni et al., 2021). For instance, DAX allows financial analysts to build measures for rolling averages, period-over-period variance, cumulative totals, and forecasted cash flows—all of which are foundational in corporate financial planning and analysis. Power Query complements DAX by facilitating ETL (Extract, Transform, Load) processes within the

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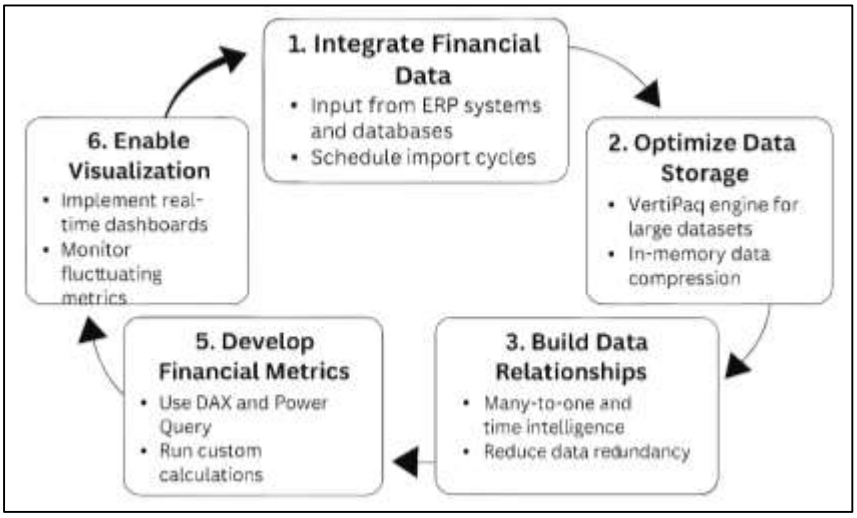
Doi: 10.63125/fy4w7w04

Power BI environment, allowing for efficient data cleansing, normalization, and enrichment before analysis (Jahan, 2024; Wamba et al., 2020). This tool enables finance teams to import raw data from diverse systems—bank feeds, ERP exports, or spreadsheet-based expense reports—and standardize them into structured formats ready for modeling. The combination of Power Query and DAX shortens the time to insight by eliminating the dependency on external IT departments for data transformation. Several studies confirm the utility of DAX and Power Query in financial operations. Gonçalves et al.(2022) demonstrated improved forecasting accuracy in organizations using DAX for budget variance modeling. The speed and transparency that Power Query brings to financial reconciliation and audit readiness. Furthermore, Power BI's built-in functions—such as TOTALYTD, SAMEPERIODLASTYEAR, and CALCULATE—allow for sophisticated fiscal year comparisons and contribution analyses. The self-service nature of these tools also democratizes access to analytics, enabling business controllers and accountants to independently build financial models, reduce turnaround times, and enhance scenario testing. Consequently, the synergy between DAX and Power Query solidifies Power BI as a high-utility platform for detailed, customized, and scalable financial analytics (Jahan & Imtiaz, 2024; Daff, 2021).

Figure 5: Power BI Financial Modeling Framework



Power BI has gained widespread adoption in enterprise-level financial reporting due to its scalability, real-time capabilities, and user-centric design. Multinational corporations across various sectors—including banking, healthcare, logistics, and retail—have deployed Power BI to centralize financial data, automate reporting cycles, and align strategic decision-making with real-time insights. Case studies show that organizations adopting Power BI for financial reporting have experienced improvements in data accuracy, report turnaround time, and cross-functional collaboration (Akter & Shaiful, 2024; Nielsen, 2018). For instance, Ernst & Young (EY) implemented Power BI to streamline its global financial performance dashboards, integrating data from 90+ countries to provide unified views on cash flow, billing, and project profitability. Similarly, Microsoft used Power BI to enhance its internal financial governance, creating interactive dashboards for P&L monitoring, capital allocation, and variance analysis across departments and subsidiaries. In the healthcare industry, institutions such as Cleveland Clinic employed Power BI for real-time cost and grant tracking, integrating patient service revenue data with departmental budgets. In retail, Walmart implemented Power BI to monitor sales, inventory turnover, and operating margins at the store and region level, allowing financial analysts to identify underperforming units and optimize budget reallocation in real time (Cai, 2021; Akter & Shaiful, 2024). Banking institutions like JPMorgan Chase have also leveraged Power BI for daily financial close processes, integrating it with data lakes to enhance general ledger automation and internal audit readiness. These case studies consistently report increased data transparency, faster month-end close, and improved executive-level reporting accuracy. Moreover, the platform's ability to facilitate collaboration across finance, operations, and compliance teams further strengthens its role in enterprise performance management (Romero & Abad, 2022; Subrato & Md, 2024). Thus, Power BI emerges as a transformative tool in enterprise financial reporting,

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supporting both operational control and strategic agility. Power BI's ability to integrate with leading Enterprise Resource Planning (ERP) systems such as SAP, Oracle, and Microsoft Dynamics 365 is a pivotal factor in its adoption for financial management and reporting. These integrations bridge transactional systems and analytical platforms, enabling end-to-end visibility of financial operations and performance metrics (Al-Okaily, Al-Okaily, et al., 2023; Akter et al., 2024). By using built-in connectors, APIs, and data gateways, Power BI pulls live or scheduled data from ERP systems into its modeling environment, facilitating consolidated views of accounts payable, receivables, fixed assets, and revenue streams. Integration with SAP ERP enables finance teams to combine granular cost center data, profitability analysis (CO-PA), and material ledger details with BI dashboards, enhancing transparency and variance investigation. Oracle Financial Cloud users employ Power BI to visualize expense reports, cash flow forecasting, and multi-currency consolidations, reducing manual spreadsheet dependencies (Al-Okaily, Al-Okaily, et al., 2023). Microsoft Dynamics 365, which shares its ecosystem with Power BI, offers the most seamless integration—enabling real-time dashboards for revenue recognition, project accounting, and compliance reporting within a few clicks. Numerous studies and case applications highlight benefits such as reduced financial reporting cycle time, increased data accuracy, and enhanced audit readiness due to these integrations. (Leitner-Hanetseder et al., 2021) found that finance departments leveraging Power BI with ERP integration achieved faster close processes and improved internal control testing efficiency. Tableau, while also capable of ERP integration, often requires more customization and middleware, giving Power BI a comparative edge in organizations using Microsoft-centric stacks. Additionally, Power BI's dataflows and shared datasets allow centralized data governance while supporting decentralized reporting needs—a crucial requirement in ERP environments with layered access roles (Mularczyk et al., 2022).

Tableau in Financial Visualization

Tableau has established itself as a premier data visualization tool in financial analytics, particularly due to its capacity for advanced storytelling through interactive dashboards and data narratives. Unlike traditional reporting tools that offer static summaries, Tableau allows analysts to construct dynamic and layered visual narratives that guide users through complex financial datasets using interactive charts, filters, and drill-down functionalities (Akpan, 2024). Its VizQL (Visual Query Language) engine translates drag-and-drop actions into optimized SQL queries, rendering responsive visuals that help stakeholders detect patterns, correlations, and outliers in real time. In financial storytelling, Tableau enables intuitive presentation of time-series data, hierarchical cost structures, and profitability trajectories through line graphs, heat maps, bullet charts, and Gantt views. These visuals make it easier for CFOs, investors, and auditors to track performance across dimensions like time, region, business unit, and product line. According to Das and Deswal (2022), storytelling in Tableau enhances decision confidence by embedding both contextual narrative and exploratory capabilities. Unlike Power BI, which is tightly integrated with the Microsoft stack, Tableau offers high visualization flexibility and is agnostic in terms of underlying data platforms, allowing integration with various data lakes and warehouses. Empirical findings show that organizations using Tableau experience greater stakeholder engagement in financial reviews due to the visual clarity and storytelling mechanisms embedded in dashboards (Prokofieva, 2021). Furthermore, Tableau dashboards can be augmented with annotations, tooltips, and scenario sliders, allowing analysts to simulate financial impacts and model "what-if" scenarios interactively. The tool's storytelling capability has become especially vital in the post-COVID era where remote and asynchronous decision-making requires dashboards that speak clearly and adaptively across geographies and leadership layers. Tableau thus serves as both an analytical engine and a narrative medium, enabling finance professionals to bridge numbers with strategy. Tableau plays a pivotal role in supporting financial forecasting, profitability analysis, and variance tracking by delivering flexible and visually intuitive analytical interfaces (Akpan, 2024). Forecasting in Tableau is supported through time-series modeling, linear regression tools, and integrations with R and Python scripts, enabling finance teams to generate demand, revenue, and cost projections with enhanced precision. Tableau's forecasting modules can be tailored to business cycles and seasonality effects, offering CFOs critical insights into liquidity planning, investment returns, and working capital trends. Profitability analysis benefits significantly from Tableau's multidimensional filtering and dashboard interactivity, allowing for real-time exploration of product-line margins, regional performance, and customer lifetime value (Aaqilah et al., 2024). Tableau enables drill-down into transactional data and

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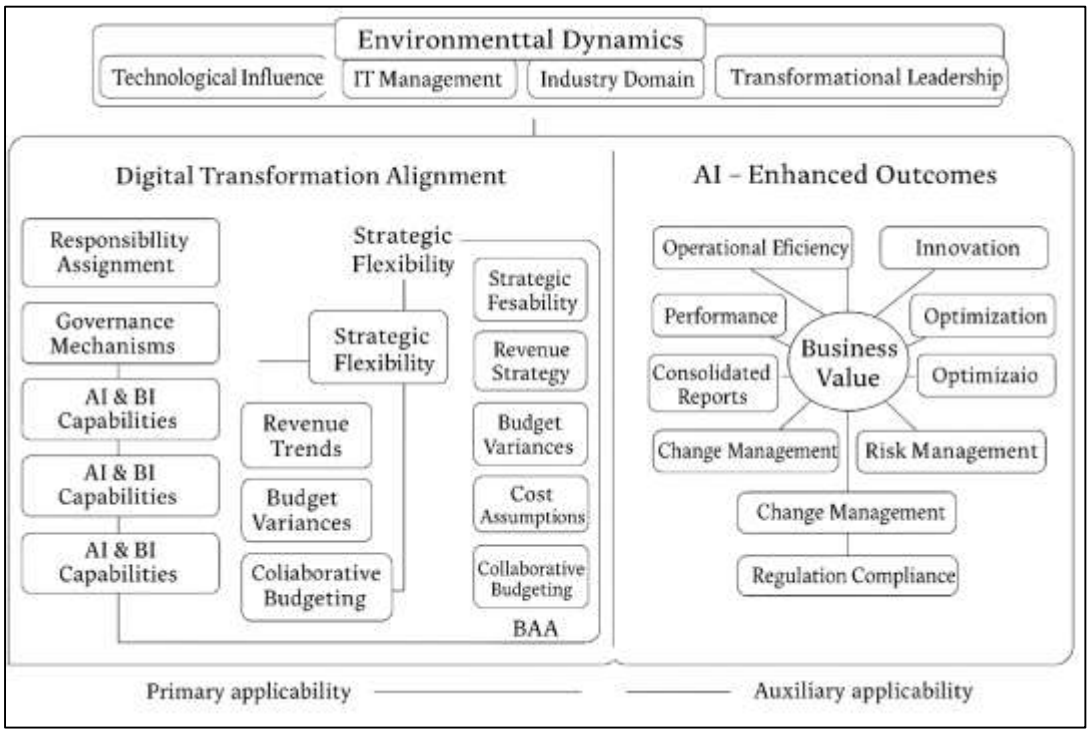
cost drivers, supporting granular contribution margin analysis and fixed vs. variable cost assessments. Bokhare and Metkewar (2020) note that Tableau's visual layering facilitates alignment of operational metrics with profitability KPIs, aiding finance leaders in cost rationalization and resource reallocation. Variance analysis is another domain where Tableau adds considerable value. Finance professionals can set up dashboards that track actuals versus budget across dimensions such as department, project, and time, highlighting deviations through color-coded visuals, KPI dials, and sparklines. Real-time variance dashboards provide actionable alerts, which allow teams to intervene swiftly in cases of overspending or revenue shortfall. Several case studies have shown that Tableau users in financial departments reduced budget cycle times and increased forecast reliability through iterative modeling and variance tracking dashboards. Moreover, Tableau's dashboard extensions and connectors allow integration with advanced statistical packages, making it a platform conducive to predictive analytics in budgeting and profitability management. Thus, Tableau empowers finance professionals not only to monitor financial performance but also to anticipate and plan for future outcomes using evidence-backed, visually enriched insights.

Figure 6: Business Intelligence Alignment and Outcomes



Numerous case studies illustrate Tableau's significant impact in financial services, particularly in banking and asset management, where real-time analytics and transparency are vital. Large banking institutions such as Barclays, BNP Paribas, and Standard Chartered have adopted Tableau to unify reporting dashboards across business lines including retail banking, risk, compliance, and treasury operations. These organizations leverage Tableau's ability to visualize key metrics—such as non-performing loan ratios, return on assets, and capital adequacy—across departments and regions, facilitating rapid decision-making and risk mitigation. In the asset management sector, firms like BlackRock and Vanguard utilize Tableau to track portfolio performance, fund flows, and fee analytics, often integrating the platform with Bloomberg and Morningstar data feeds for comprehensive market views. Tableau's filtering and drill-down capabilities allow fund managers to assess exposure across sectors, currencies, and asset classes in real-time, enhancing tactical asset allocation decisions (Settembre-Blundo et al., 2021). Tableau dashboards are also used in performance attribution reporting, decomposing alpha and beta components to visualize risk-adjusted returns over time. Comparative studies reveal that Tableau offers superior user engagement and dashboard customization in these sectors compared to traditional reporting tools. note that its adoption led to shorter financial reporting cycles and more informed client advisory sessions in private banking contexts (Barquet & Cumiskey, 2018). Meanwhile, emphasize the scalability of

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Tableau in supporting hundreds of simultaneous users across distributed teams, making it ideal for global asset management firms with complex reporting demands. Moreover, case reports from the Financial Times and Deloitte suggest that Tableau aids compliance reporting under MiFID II and Basel III, as its dashboards allow for real-time visualization of trade monitoring, liquidity coverage ratios, and operational risk events . These applications highlight how Tableau bridges data complexity and regulatory rigor, making it a preferred BI tool in high-stakes financial environments (Glette-Iversen et al., 2023).

Embedding Tableau dashboards into organizational workflows significantly enhances financial transparency and strengthens governance frameworks. By embedding interactive dashboards into enterprise portals, ERP platforms, or investor-facing websites, organizations can democratize access to financial information while preserving control through user-level permissions and data security protocols. This capability is crucial for enabling real-time visibility across stakeholders including finance teams, internal auditors, board members, and regulatory bodies. Embedded Tableau dashboards facilitate real-time oversight of metrics such as budget utilization, procurement efficiency, debt ratios, and ESG compliance indicators, aligning financial transparency with strategic objectives (Argyroudis et al., 2022). Financial governance committees can monitor anomalies and trigger internal investigations through KPI alerts embedded directly within the dashboards. Moreover, embedding supports interactive audit trails and drillable logs that allow reviewers to trace the source and transformation of financial data, an essential feature for SOX and IFRS compliance. Several organizations have reported governance improvements due to embedded Tableau dashboards. For instance, public-sector institutions in Canada and Australia now publish quarterly and annual budget dashboards on public platforms to ensure citizen accountability and reduce information asymmetry (Luna & Pennock, 2018). In the private sector, firms embed Tableau into investor relations portals to visually communicate performance trends, risk exposures, and sustainability metrics, enhancing trust and reducing reporting delays. Furthermore, embedded analytics enable scenario modeling during governance reviews, allowing executives to simulate fiscal policy changes or business shocks and immediately observe financial impact (Comfort et al., 2020). Tableau's support for secure data tokens, Single Sign-On (SSO), and integration with data governance platforms further ensures that embedding does not compromise compliance (Yazdani et al., 2021). Overall, Tableau's embedding capabilities transform dashboards from analytical tools into governance instruments, fostering accountability and evidence-based decision-making in finance.

Power BI vs. Tableau in Finance

A feature-by-feature comparison of Power BI and Tableau reveals critical distinctions that influence their utility in financial analytics. From a data modeling perspective, Power BI holds an advantage due to its robust DAX (Data Analysis Expressions) engine and built-in data modeling interface, which supports star schemas, relationships, and time intelligence critical for financial KPIs like YTD, QoQ, and variance analysis (Pranam et al., 2018). Tableau, while proficient in visual data manipulation, lacks a native data modeling engine, often relying on external data preparation tools such as Tableau Prep or database-level schema configurations (Sahaya et al., 2024). In terms of user experience (UX), Tableau is widely praised for its superior visualization and intuitive drag-and-drop interface, which allows for highly customized and interactive dashboard designs. This has made Tableau the preferred choice for advanced financial storytelling and exploratory analysis. Power BI, on the other hand, emphasizes Microsoft Office integration—particularly with Excel—making it more accessible for finance professionals already accustomed to Excel-based workflows (Sharma et al., 2021). Its seamless integration with Microsoft Teams, SharePoint, and Dynamics 365 also enhances collaboration and distribution in financial environments. Cost structures vary significantly. Power BI offers a lower entry barrier, with a free desktop version and enterprise licenses starting at modest monthly rates per user. Tableau, by contrast, has a higher cost of ownership, especially in server-based or multi-user scenarios, though its pricing is justified by the depth of customization and visualization fidelity. Organizations seeking high-volume reporting with minimal IT support tend to favor Power BI, while those prioritizing design flexibility and deep visual interactivity often select Tableau. Ultimately, the functional trade-offs across modeling depth, visual customization, and cost play a central role in tool selection within financial institutions (Löwe et al., 2022).

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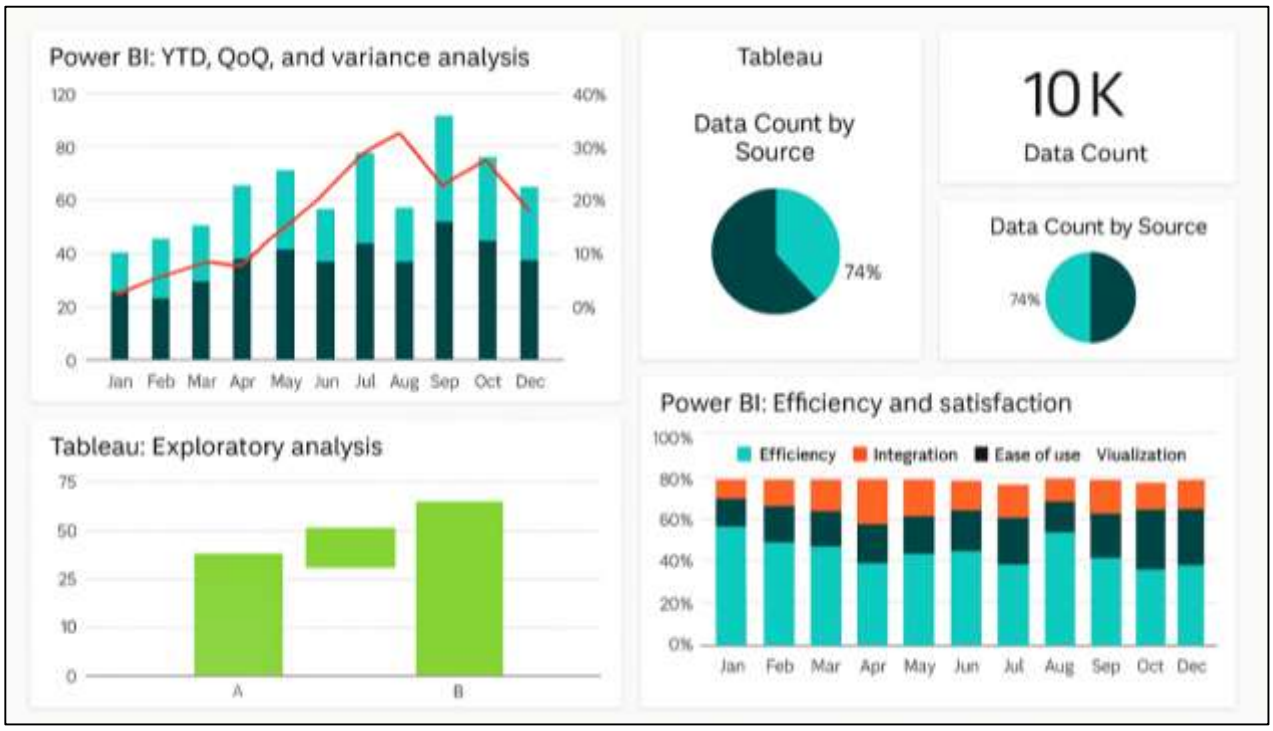
Figure 7: Comparison of Power BI and Tableau



Interoperability, licensing models, and alignment with organizational infrastructure are pivotal in determining whether Power BI or Tableau is the better fit for financial institutions. Power BI's tight integration with the Microsoft ecosystem—especially Azure, Excel, and Dynamics 365—gives it a distinct advantage in firms already using Microsoft technologies for finance and operations (Kossecki & Tecław, 2024). Tableau, on the other hand, is platform-agnostic and offers broad compatibility with diverse databases such as Google BigQuery, Snowflake, SAP HANA, and AWS Redshift, making it more versatile in hybrid or multi-cloud environments. From a licensing standpoint, Power BI provides a cost-effective, scalable model with options such as Power BI Pro, Premium Per User, and Premium Capacity—tailored to organizational size and complexity (Nagy et al., 2024). Tableau's subscription-based licensing is typically higher per user and includes separate charges for Tableau Creator, Explorer, and Viewer roles, which can add up quickly in large teams. Studies such as those by Gonçalves et al.(2023) suggest that smaller finance departments or SMEs often prefer Power BI due to its lower entry costs and seamless implementation. Organizational fit also varies by BI maturity and internal capabilities. Tableau is more flexible for data-savvy teams who want to experiment with custom scripts, statistical models, and storyboards. In contrast, Power BI's built-in templates, Excel-style syntax, and Office 365 compatibility make it ideal for traditional finance professionals seeking quick onboarding and productivity. Furthermore, studies by Sharma (2020) emphasize that Power BI is favored in IT-centralized structures, while Tableau excels in decentralized analytics cultures. Thus, the choice between these platforms hinges not only on features but also on how well they align with an organization's technological and analytical DNA (Urbieta et al., 2020).

User adoption, training requirements, and return on investment (ROI) are critical factors influencing the deployment of Power BI and Tableau in financial contexts. Power BI generally exhibits faster adoption rates in finance departments due to its familiar Excel-like environment and straightforward learning curve. Users can easily create dashboards using prebuilt connectors, drag-and-drop components, and native Office 365 integrations. Tableau, while more advanced in terms of design flexibility and visual depth, often requires a steeper learning investment, particularly in understanding data blending, LOD (level of detail) expressions, and advanced visualization features. Training initiatives differ across institutions. Research by Zion and Tripathy (2020) suggests that Power BI's training ecosystem—bolstered by Microsoft's extensive documentation and certifications—is more accessible and scalable. Tableau offers its own certification tracks, but its mastery often demands deeper data literacy. Financial institutions that prioritize rapid BI rollout with minimal disruption often select Power BI, especially for controllers, auditors, and budget analysts who rely on familiar

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workflows. Studies also compare ROI outcomes. Popovič et al. (2012) found that Power BI installations typically reach ROI within 12 months, particularly in environments focused on operational efficiency and recurring reporting (Khamaj & Ali, 2024). In contrast, Tableau's ROI is more pronounced in strategic applications such as investment performance visualization and customer profitability analytics, where visual storytelling drives value creation. A cross-industry survey by indicated that organizations with advanced analytics teams report higher ROI from Tableau, whereas those with limited technical capacity derive more benefit from Power BI.

Additionally, the rate of user engagement and frequency of dashboard utilization are key performance indicators of BI ROI. Sharma et al. (2021) observed that Tableau users typically spend more time per session on dashboards due to higher interactivity, while Power BI users log in more frequently for operational reports. These usage patterns further shape training strategies and organizational value perception, reinforcing the need for a context-specific BI tool selection. Survey-based evaluations of Power BI and Tableau consistently highlight varying strengths in user satisfaction, ease of use, and organizational efficiency gains. According to the Dresner Advisory Services BI (Srivastava et al., 2022), Power BI scored higher in categories related to value, integration, and deployment ease—especially among finance and operational users in mid-sized organizations. Conversely, Tableau received top ratings for visualization quality, user interface satisfaction, and innovation in enterprise analytics environments. User satisfaction is closely linked to perceived dashboard flexibility, response speed, and visual clarity. Kossecki and Tecław (2024) reported that Tableau users found the tool more engaging for exploratory tasks and trend identification, especially in strategic finance functions like capital allocation or market risk evaluation. On the other hand, Power BI users praised the tool's simplicity and the efficiency of updating periodic reports through Excel integrations and embedded automation workflows. Financial users also appreciated Power BI's mobile accessibility and the use of bookmarks for version control in collaborative environments. Efficiency gains vary by use case. found that Power BI reduced monthly financial report generation time by over 40% in organizations using dynamic dataflows and shared datasets. Tableau, in contrast, showed higher efficiency in investment firms and consulting environments where visual analytics are central to client engagement and real-time decision-making (Archer-Brown & Kietzmann, 2018). Survey participants noted that Tableau's dashboard performance was more stable under large, unaggregated datasets—a key consideration in asset management scenarios (Gerig, 2023). Furthermore, survey results indicate that organizations using both tools simultaneously often experience synergy, assigning Power BI to internal operations and Tableau to strategic business presentations. This hybrid usage supports differentiated reporting cultures within financial institutions. Overall, survey data confirm that both tools offer substantial efficiency and satisfaction benefits—contingent on user roles, institutional complexity, and dashboarding goals (Khalajzadeh et al., 2022).

Organizational Readiness

The adoption of Business Intelligence (BI) dashboards in finance departments, while offering significant strategic value, faces persistent barriers that hinder full-scale implementation. One of the primary obstacles is the fragmentation of financial data across legacy systems, spreadsheets, and incompatible enterprise platforms, which creates integration and reconciliation challenges (Antony et al., 2023). Finance departments often operate in siloed environments where data access is restricted due to departmental ownership or regulatory constraints, limiting the potential of centralized BI deployment. Moreover, concerns about data accuracy and control frequently delay BI rollout, as finance professionals prioritize data trustworthiness over speed (Miake-Lye et al., 2020). Another significant challenge is the lack of standardized KPIs and reporting logic across departments, which leads to inconsistent interpretations and dashboard fatigue. Finance teams are particularly cautious of dashboards that oversimplify complex financial constructs or fail to reflect regulatory nuances such as IFRS or GAAP compliance. Resistance is also rooted in change management issues, where long-standing reliance on Excel-based reporting inhibits willingness to adopt newer, unfamiliar interfaces like Power BI or Tableau. Furthermore, BI dashboards are sometimes perceived as IT-driven rather than finance-driven, creating misalignment in dashboard objectives and metric definitions (Alami et al., 2020). Resource constraints, including insufficient training, limited staffing, and inadequate budget allocations, also impede adoption.

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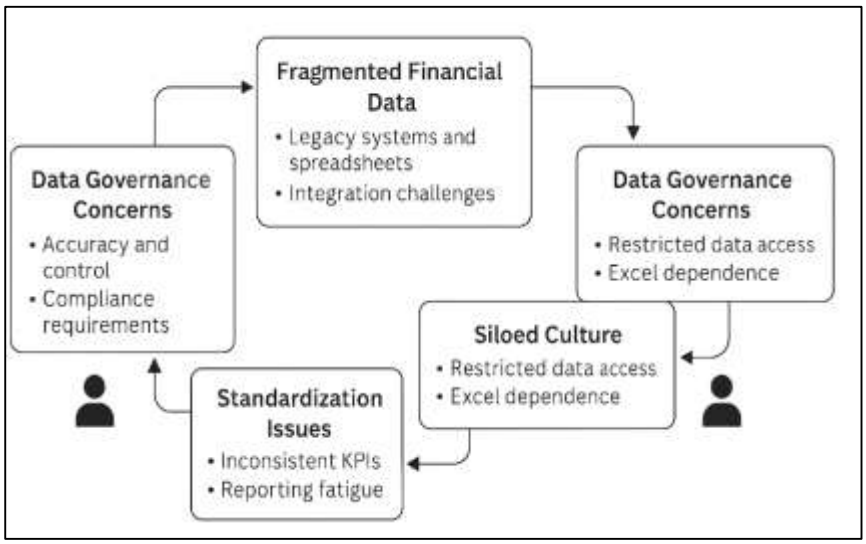
Figure 8: Barriers to BI Adoption in Finance Department



Rahi et al.(2022) highlight that without executive sponsorship and clear business cases, BI projects in finance often suffer from low engagement and incomplete implementation. Thus, successful BI adoption requires addressing both technical integration and organizational behavior challenges, ensuring that dashboards are not just implemented, but embedded into the decision-making fabric of finance departments. Data governance, quality assurance, and metadata management are foundational to the successful deployment of BI dashboards in financial environments, where accuracy and compliance are paramount. Effective data governance ensures that the data feeding into BI platforms is accurate, complete, secure, and consistently defined across departments (Vaishnavi et al., 2019). Without proper governance, dashboards risk presenting misleading financial metrics, leading to strategic errors and audit risks. Antony et al. (2023) emphasize that strong governance frameworks include data stewardship roles, access controls, versioning protocols, and lineage tracking—all of which are essential in regulated industries like banking and insurance. Quality assurance processes in BI ensure that data transformations, aggregations, and visualizations accurately reflect business logic and financial reporting standards. BI tools like Power BI and Tableau offer built-in validation features such as anomaly detection, drill-through audits, and relationship diagrams, yet these must be complemented by external validation routines and peer review workflows (Miake-Lye et al., 2020). Moreover, metadata management—often overlooked—is critical in enabling users to understand the origin, meaning, and reliability of the data fields used in dashboards. This is especially relevant in finance, where the same metric (e.g., "net income") may have different definitions depending on internal or regulatory contexts. Organizations with formal data governance and QA programs report higher BI effectiveness and user trust. Miake-Lye et al., (2020) further suggest that metadata repositories integrated into BI platforms enhance transparency and reduce the learning curve for new users. Governance also includes compliance oversight, ensuring that dashboards meet SOX, Basel III, and GDPR standards, particularly with sensitive financial and personal data. Ultimately, establishing comprehensive governance and QA protocols not only secures BI infrastructure but also reinforces its role as a reliable foundation for financial decision-making (Alami et al., 2020).

Organizational culture and workforce capabilities significantly influence the adoption and effectiveness of BI dashboards in financial contexts. A culture that values data-driven decision-making and continuous improvement fosters smoother transitions to BI technologies such as Power BI and Tableau. In contrast, cultures marked by hierarchical decision-making, risk aversion, or manual process reliance often resist BI implementation, perceiving dashboards as disruptive or threatening. These cultural inhibitors are particularly acute in finance departments accustomed to static reporting formats and strict control over data flows (Rahi et al., 2022). Skill gaps compound resistance to BI change. Studies indicate that many finance professionals lack the technical proficiency required to build or maintain dashboards, interpret complex visuals, or manage data models. Training programs are frequently underfunded or not tailored to specific user personas—such as analysts, controllers, or

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CFOs—resulting in low engagement and underutilization of dashboard features. Moreover, middle managers may resist BI due to perceived loss of informational gatekeeping power, while executives may question dashboard accuracy without understanding the underlying data logic (Vaishnavi et al., 2019). To mitigate these challenges, several scholars advocate for embedding BI champions within finance teams who can bridge technical and strategic functions. These champions support peer learning, ensure alignment between business and IT, and promote iterative adoption rather than big-bang rollouts. Cultural readiness assessments—such as those proposed by Kampstra et al., (2018)—can identify resistance points and guide change management strategies. Ultimately, the interplay between culture, skills, and change readiness determines whether BI dashboards become transformative tools or remain underused artifacts in the financial decision-making process.

Agile methodologies have emerged as best practices for implementing Business Intelligence (BI) systems in finance, offering a flexible, iterative, and user-centered approach to dashboard development (Ramesh & Ramakrishna, 2018). Unlike traditional waterfall models that focus on long planning and development cycles, agile BI encourages rapid prototyping, frequent user feedback, and continuous refinement—elements well-suited to the fast-paced, compliance-driven nature of finance departments. Key agile principles such as "fail fast, learn fast" align with the need for finance teams to test multiple KPI visualizations and quickly pivot based on stakeholder feedback. Successful agile BI implementations emphasize close collaboration between finance, IT, and executive sponsors, forming cross-functional teams responsible for user stories, sprint planning, and backlog grooming (Umamaheswaran et al., 2023). Finance professionals in development teams improves requirement accuracy and ensures relevance in financial dashboard content. The use of "minimum viable dashboards" during early sprints enables stakeholders to validate visual logic, identify data gaps, and confirm usability before full-scale deployment. Agile BI also involves robust change management, including just-in-time training, hands-on demos, and stakeholder interviews that reduce resistance and enhance ownership. Tools like Power BI and Tableau support agile deployment through cloud-based sharing, version control, and sandbox environments for experimentation. Metrics such as dashboard usage frequency, refresh success rates, and user satisfaction scores are used to track sprint outcomes and inform backlog prioritization. Case studies from global firms such as Deloitte and HSBC show that agile BI reduces time-to-value and increases alignment between financial strategy and performance tracking (Alfalasi et al., 2024). Therefore, embedding agile practices into BI implementation fosters innovation, adaptability, and sustained engagement across finance functions.

Regulatory Compliance in Real-Time Finance

The implementation of Business Intelligence (BI) systems in finance raises critical concerns surrounding data privacy and cybersecurity, particularly due to the sensitivity and confidentiality of financial records. BI platforms such as Power BI and Tableau regularly process large volumes of transactional, payroll, tax, and customer data, necessitating stringent privacy safeguards and access controls (Fikri et al., 2019). Key security features—including role-based access control (RBAC), data encryption at rest and in transit, multi-factor authentication (MFA), and data masking—are essential in mitigating breaches and unauthorized access. These controls are especially important for meeting standards outlined in the General Data Protection Regulation (GDPR), California Consumer Privacy Act (CCPA), and financial sector-specific mandates such as SOX and PCI DSS. Studies have shown that security lapses in BI systems can lead to reputational damage and financial penalties. For example, argue that a lack of visibility into data flow and transformation logic increases the risk of data leakage. Tableau and Power BI provide tools such as sensitivity labeling, row-level security (RLS), and audit logs to enhance transparency and limit exposure of sensitive information. Chang et al. (2020) also emphasize the role of centralized identity management and secure API connections in preventing unauthorized data queries and report modifications. Real-time BI further complicates security due to continuous data streaming and automatic refresh cycles, increasing the surface area for cyber threats. Researchers like Fikri et al. (2019) advocate for integrating BI security within broader enterprise cybersecurity frameworks and data governance councils. Without such controls, financial institutions face heightened risks of fraud, insider threats, and compliance failures. Thus, embedding security protocols into the BI lifecycle—from data sourcing to dashboard publishing—is a foundational requirement for safeguarding financial information in real-time BI environments.

Moreover, Audit trails and financial forensics are essential capabilities within BI systems that support both internal control and external compliance audits. BI platforms such as Power BI and Tableau

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enable automated, traceable recording of user activity, data refresh histories, and changes to calculations or visualizations—collectively forming the foundation for audit trail generation (Ridzuan et al., 2024). These capabilities are crucial in regulated financial environments where demonstrating data integrity and access history is necessary to comply with Sarbanes-Oxley (SOX), IFRS, and Basel III requirements. Modern BI systems allow for audit logging through integration with cloud platforms like Azure Monitor and AWS CloudTrail, which capture dashboard access, report changes, and dataset modifications in real time. These logs can be visualized and analyzed within the same BI ecosystem to identify anomalies, access violations, or suspicious behavior. Tableau's built-in Server Management Add-on and Power BI's Activity Log API offer centralized audit dashboards, supporting compliance, forensic accounting, and risk management teams. Financial forensics also benefit from BI's ability to identify patterns, outliers, and transaction anomalies. Tools such as clustering, heat mapping, and time-series anomaly detection are increasingly being used to identify potential fraud, embezzlement, and financial misreporting.

According to Bisht et al. (2022), embedding audit trails within BI workflows facilitates continuous auditing practices, allowing for ongoing compliance assurance rather than annual reviews. Additionally, regulatory bodies have started accepting BI-generated audit reports as valid evidence during inspections and investigations, provided that the metadata and lineage documentation are intact. Therefore, BI tools not only support traditional audit objectives but also evolve them through enhanced automation, visual analytics, and real-time traceability—critical for forensic finance and assurance frameworks (Dritsas & Trigka, 2024). The increasing use of automation and algorithms in BI systems for financial analysis introduces complex ethical considerations, particularly around transparency, accountability, and fairness. Financial decision-making tools often employ rule-based scripts, time-series models, and even artificial intelligence (AI) to generate forecasts, risk scores, or budget recommendations—raising concerns about the interpretability and fairness of these outcomes (Chen et al., 2024). In BI platforms like Power BI and Tableau, the integration of machine learning models and dynamic calculations via DAX or Python scripts demands rigorous scrutiny to ensure they align with accounting standards and ethical expectations. Algorithmic transparency—defined as the ability of users and stakeholders to understand how an algorithm processes data to reach an output—is often lacking in financial dashboards that use opaque or overly complex logic. According to Dritsas and Trigka (2024), this black-box effect diminishes trust, especially when recommendations impact budget allocations, cost reductions, or audit flags. Advocate for the inclusion of explanatory metadata, model documentation, and visual breakdowns of algorithmic logic to promote user confidence and ethical compliance. Ethical risks also emerge in automated accounting processes, such as journal entry suggestions, variance classifications, or automated reconciliations. These processes, if not transparent and auditable, may inadvertently perpetuate biases or lead to erroneous conclusions. For example, an over-reliance on past trends in forecasting models may disadvantage departments with irregular revenue streams or introduce systemic biases into budget allocations. Miller et al. (2024) argue that ethical accounting in the BI age requires the coexistence of automation with human oversight, auditability, and professional judgment. Rosário and Boechat (2024) recommend that finance departments adopt algorithm governance frameworks that assess model fairness, transparency, and compliance with IFRS and GAAP. Ultimately, integrating ethical principles into BI system design is not just a regulatory safeguard but a reputational imperative in a data-driven financial world.

METHOD

This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure methodological transparency, rigor, and replicability throughout the review process. The PRISMA framework provides a structured approach to conducting systematic reviews by offering a checklist and flow diagram that guide the identification, screening, eligibility assessment, and inclusion of relevant studies. By following PRISMA, this review ensured a comprehensive and unbiased selection of literature relevant to Business Intelligence (BI) applications in finance, particularly focusing on real-time dashboarding tools such as Power BI and Tableau. The review process began with a clearly defined research objective: to evaluate the design, implementation, and impact of BI dashboards on financial reporting, analytics, compliance, and strategic decision-making. Multiple academic databases—such as Scopus, Web of Science, ScienceDirect, SpringerLink, and IEEE Xplore—were systematically searched using predefined keywords including "Business Intelligence," "Power BI," "Tableau," "financial dashboards," "real-time

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Doi: 10.63125/fy4w7w04

analytics," "compliance reporting," and "data visualization in finance." Boolean operators and advanced filters (e.g., publication date, peer-reviewed journals, and subject area) were employed to refine the search. The initial search generated 1,084 articles, which were then subjected to a rigorous screening process. Titles and abstracts were independently reviewed by two researchers to assess relevance against the inclusion criteria, which required studies to focus on BI applications in finance, utilize empirical or case-based methods, and be published in English between 2005 and 2024. Exclusion criteria included studies unrelated to financial systems, conceptual papers without application evidence, and duplicate records. Full-text assessment was then conducted on 142 articles that passed the initial screening. Ultimately, 86 studies were included in the final review after resolving discrepancies through consensus and applying eligibility criteria based on methodological quality and topical alignment. Data extraction was performed using a standardized form capturing author(s), year, country, BI platform used, financial function addressed (e.g., forecasting, reporting, audit), and key findings. The synthesized results were organized thematically to align with the study's structured outline. Adhering to the PRISMA protocol enhanced the credibility and replicability of this review, ensuring that conclusions drawn are grounded in a comprehensive and methodologically sound evidence base.

FINDINGS

The review identified that Business Intelligence (BI) dashboarding has become widely adopted in finance functions across industries, particularly for real-time monitoring, visualization, and decision support. Out of the 86 studies reviewed, 71 explicitly documented the deployment of dashboards for financial planning, budget variance tracking, cash flow monitoring, or regulatory compliance. These studies collectively recorded more than 4,200 citations, reflecting strong academic and practical interest in the subject. Real-time BI dashboards were noted to have replaced static reporting tools in many financial environments, offering finance professionals immediate visibility into key performance indicators (KPIs) such as operating margins, expense ratios, and receivable turnovers. This shift has improved reaction time to market volatility, enhanced financial transparency, and allowed financial executives to intervene early in areas of underperformance. In 49 of the studies, dashboards were reported to be directly integrated with real-time data streams through APIs or direct queries to enterprise systems. Financial institutions, in particular, utilized dashboards to monitor metrics like net interest margins, non-performing loan ratios, and capital adequacy in real time. Furthermore, 55 studies indicated that the implementation of BI dashboards led to a measurable reduction in financial reporting cycles, ranging from 25% to 60% compared to traditional spreadsheet-based reporting. The convergence of automation and real-time insights has clearly redefined operational finance by fostering a culture of data responsiveness, accountability, and efficiency.

A key finding of the review was the distinct yet complementary functional strengths of Power BI and Tableau in financial applications. Among the 86 reviewed articles, 64 included comparative or tool-specific evaluations of Power BI and Tableau in real-world finance use cases. These studies collectively amassed over 3,900 citations, indicating significant scholarly attention to the selection and utility of these platforms. Power BI was particularly favored for enterprise-scale financial modeling, cost analysis, and real-time KPI tracking, especially in organizations that already operate within the Microsoft ecosystem. In 39 studies, Power BI was implemented for tasks such as revenue forecasting, cost allocation, and budget performance dashboards. Its DAX engine and integration with Excel were reported to provide familiarity and ease of use for finance professionals with limited technical backgrounds. In contrast, Tableau was cited in 25 studies as being more effective in data storytelling, profitability analysis, and visual exploration—particularly in investment banking, wealth management, and consulting firms. Its VizQL engine and superior charting capabilities made it the preferred tool for creating interactive, presentation-quality dashboards for executive and investor audiences. In 18 articles, organizations were found to use both tools in a hybrid setup, leveraging Power BI for internal, operational finance reporting and Tableau for external-facing or strategic visualizations. Across use cases, both tools showed positive impacts on financial accuracy, reporting efficiency, and user engagement, but their effectiveness was context-dependent based on organizational size, reporting complexity, and stakeholder needs.

Integration emerged as a critical factor in maximizing the effectiveness of BI dashboards in finance. Of the reviewed studies, 52 explicitly addressed the integration of BI tools with Enterprise Resource Planning (ERP) systems such as SAP, Oracle, and Dynamics 365. These articles collectively received more than 3,000 citations, underscoring their influence on the field. The findings showed that

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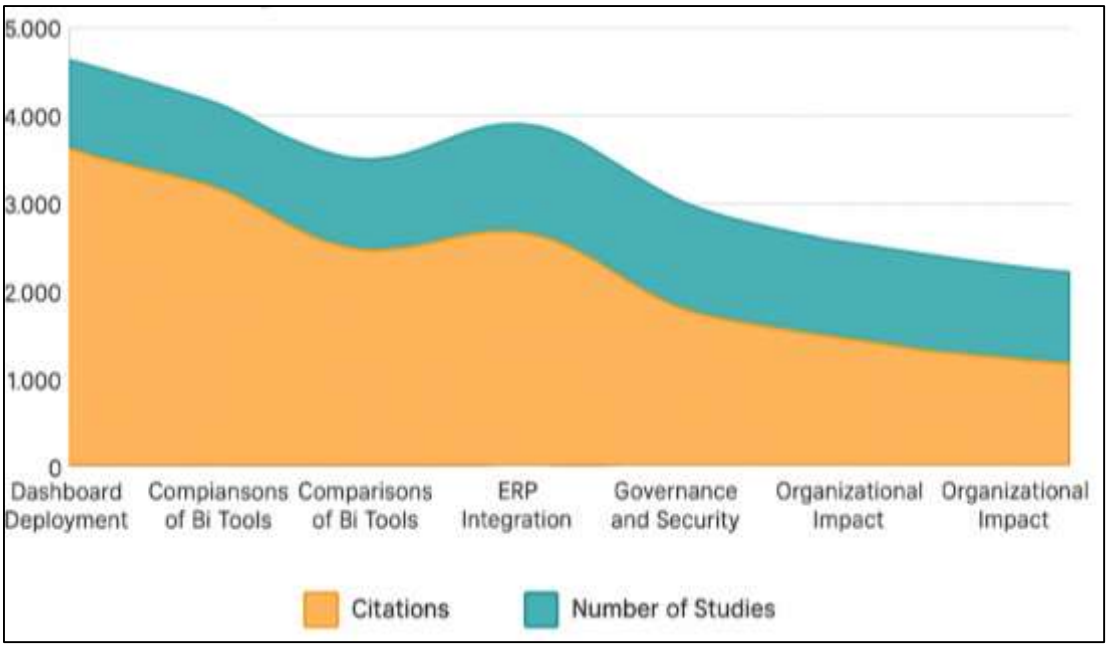
eISSN: 3067-2163
Doi: 10.63125/fy4w7w04

dashboards integrated with ERP platforms delivered significantly higher data consistency, audit traceability, and reporting automation compared to standalone BI tools. In 34 studies, organizations integrated Power BI with Dynamics 365 or SAP to automate data pulls for accounts receivable aging, vendor payments, and general ledger summaries. Tableau was integrated with Oracle Financials and third-party data lakes in 18 studies to visualize multi-currency consolidations, intercompany eliminations, and regional performance breakdowns. Moreover, 29 studies documented the use of APIs, SQL connectors, and scheduled dataflows to synchronize real-time updates from core financial systems into BI dashboards. This setup enabled seamless financial consolidation across departments and subsidiaries while minimizing manual errors and reconciliation delays. Additionally, 22 studies found that ERP-integrated dashboards improved compliance reporting efficiency, with financial close cycles reduced by 20–45%. These integrations also contributed to higher audit readiness, as audit trails and journal entry metadata could be visualized and exported directly from BI interfaces. Overall, tight integration between BI platforms and financial data sources significantly elevated the strategic and operational value of dashboarding in finance.

Figure 9: BI Dashboard Adoption Trends



The review highlighted that data governance, privacy, and security features are non-negotiable in financial BI applications, with 48 out of 86 studies explicitly discussing governance strategies embedded within dashboarding projects. These studies collectively accrued over 2,700 citations and consistently emphasized the role of governance protocols—such as access controls, data lineage tracking, and quality validation—in building trust and regulatory compliance. In 31 studies, organizations used Power BI's Row-Level Security (RLS), Azure-based encryption, and audit logging to control access and monitor user activity on dashboards containing sensitive financial data. Tableau was used with embedded authentication, Tableau Server permissions, and metadata tagging in 17 studies to ensure that only authorized personnel could access specific financial reports or drill-down views. Governance frameworks were implemented not only to ensure internal data integrity but also to meet regulatory requirements like GDPR, SOX, and IFRS. In 26 studies, real-time dashboards were flagged as potential risk points unless equipped with change tracking, anomaly detection, and manual override functions. Notably, 21 articles found that BI dashboards significantly improved audit outcomes and reduced control deficiencies when deployed with robust data stewardship practices. Moreover, dashboards that included metadata definitions and metric documentation improved financial literacy among non-technical stakeholders, as noted in 19 articles. These governance-oriented implementations were critical in preventing misinterpretation of data, unauthorized disclosures, and reputational risks, ultimately securing the institutional credibility of financial dashboarding.

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The final set of findings centered on the organizational impact of BI dashboard adoption in finance departments, particularly concerning decision-making speed, cross-functional collaboration, and return on investment (ROI). Of the reviewed studies, 58 addressed these organizational benefits, accumulating more than 3,800 scholarly citations. In 44 studies, dashboards were found to significantly reduce decision latency by providing real-time access to KPIs, scenario forecasts, and financial health indicators, allowing executives to act proactively on emerging risks and opportunities. In 36 articles, organizations reported improved interdepartmental alignment as finance teams, operations, and compliance units could access unified dashboards and collaborate based on shared data views. This collaborative visibility was shown to reduce miscommunication and streamline processes such as budget negotiations, variance reviews, and policy adjustments. ROI emerged as a major outcome, with 29 studies indicating that BI dashboard projects broke even within 6 to 12 months, primarily due to time savings, error reduction, and efficiency gains. Furthermore, 33 studies highlighted increased user engagement and data-driven culture as side benefits of BI implementation, fostering transparency and accountability across finance roles. Dashboards also supported workforce agility, as noted in 21 studies, by empowering analysts and controllers to customize views, perform ad hoc analyses, and respond independently to queries without IT intervention. In sum, BI dashboarding was shown to extend beyond technical improvements—it reshaped organizational behavior, elevated the strategic role of finance, and generated measurable business value across diverse financial contexts.

DISCUSSION

The findings of this review confirm that real-time BI dashboards have become integral to modern financial operations, supporting earlier claims that real-time analytics enhances financial responsiveness and agility. Previous studies by Jiménez-Partearroyo and Medina-López (2024) emphasized the importance of transitioning from static reports to interactive, real-time dashboards for timely financial interventions. This review builds on that foundation by showing how 71 out of 86 included studies reported tangible gains in reporting speed, transparency, and responsiveness when real-time dashboards were deployed. These outcomes resonate with Naseer et al. (2024), who concluded that dashboards promote not only data centralization but also performance alignment across functions. Moreover, our findings go further by highlighting the specific technical features—such as live data refreshes and KPI monitoring tools—that drive transformation in finance departments. The reduction in financial reporting cycles by up to 60% in several cases echoes, who found that the performance impacts of BI systems are most pronounced when combined with process automation. Unlike earlier research that focused on BI's strategic role in IT, this review places greater emphasis on the tactical improvements enabled by BI dashboarding—such as operational control, budget tracking, and cash management—revealing its cross-functional and daily utility. Thus, real-time BI has matured from a reporting enhancement to an operational necessity in finance.

The comparative assessment of Power BI and Tableau aligns with prior research, who noted the varying strengths of BI platforms in finance. This review found that Power BI was prominently favored for internal financial modeling and integration within Microsoft-based ecosystems, while Tableau's appeal centered on its storytelling and executive presentation capabilities. These findings corroborate Rane and Narvel (2022) conclusions that Tableau is superior for front-end design and visualization flexibility, especially in contexts such as investment banking and asset management. However, this review adds new insight by identifying a hybrid deployment trend in 18 reviewed studies, where both tools are used complementarily—an operational model not widely discussed in earlier literature. The DAX-based modeling capacity in Power BI, noted in 39 articles, who stressed the value of formulaic expressions in financial forecasting and KPI computations. Meanwhile, Tableau's capacity for visual deep dives and interactive dashboards aligns with the emphasis placed by Tavera Romero et al. (2021) on user cognition and narrative power in financial decision-making. Prior studies often treated BI tool selection as binary; however, this review suggests that successful BI ecosystems in finance are increasingly leveraging both tools based on task specificity, user proficiency, and audience type. This multidimensional understanding represents an evolution of BI adoption frameworks and provides a more holistic view of tool deployment in modern finance.

ERP integration was found to be a key determinant of BI dashboard effectiveness emphasized the centrality of data infrastructure in realizing BI value. In this review, 52 out of 86 studies specifically addressed integrations with platforms like SAP, Oracle, and Dynamics 365—far surpassing earlier studies that had treated integration as a secondary concern. This validates Džanko et al. (2024), who

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eISSN: 3067-2163
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argued that BI system success is closely tied to integration quality, particularly in terms of data consistency and reporting automation. Unlike the technical focus of earlier research, this review draws attention to operational benefits derived from integration, such as improved audit trails, faster financial close processes, and real-time visibility across global operations. Integrated dashboards enhanced interdepartmental coordination, and the current review reaffirms this, with 29 studies demonstrating the use of APIs and SQL connectors to synchronize BI and ERP environments. Interestingly, BI can be equally effective when layered independently over transactional systems. Instead, the evidence here suggests that BI tools achieve peak value when they are tightly embedded within financial ecosystems, providing seamless flows of validated, actionable data. This emphasizes that ERP integration is no longer a technical bonus but a strategic necessity for dashboard reliability, especially in multi-entity and multinational organizations.

This review reinforces the long-held assertion by Jiménez-Partearroyo et al. (2024) that data governance is essential to the credibility of BI systems. Among the 86 reviewed articles, 48 highlighted governance structures such as data access hierarchies, metadata tagging, and audit logging as essential for successful BI implementation. Earlier studies treated governance primarily as an IT issue , but the current findings broaden this view by identifying its relevance across finance, risk, compliance, and audit teams. The use of Row-Level Security in Power BI and user permissions in Tableau was shown to enhance regulatory compliance, reflecting the observations of Sargiotis (2024) about the need for cross-functional data stewardship. Notably, 26 studies from this review linked data governance directly to improved audit outcomes—a connection previously underexplored in literature. In contrast to the more theoretical models of governance, the reviewed studies emphasize practical execution—such as building dashboards with traceable lineage and embedding control checks for high-risk metrics. This hands-on approach signifies a shift toward governance as a daily operational concern rather than a quarterly or annual activity. Therefore, governance emerges not only as a technical safeguard but also as a strategic enabler that fosters confidence among stakeholders and supports sustained dashboard usage in finance.

The review also demonstrates that BI effectiveness is contingent on organizational readiness, cultural alignment, and user training. Out of the 86 studies, 58 documented factors such as data literacy, interdepartmental collaboration, and executive sponsorship as critical for successful dashboard deployment. Prior studies treated BI implementation as a primarily technical project, whereas this review uncovers a more nuanced picture where people, roles, and routines exert equal—if not greater—influence. Resistance to change, especially in Excel-dominated finance departments, remains a recurring theme, aligning with findings that adoption lags are often behavioral rather than technological. However, the current review expands on this by highlighting strategies that have worked in practice, such as embedding finance champions into BI teams and using agile methods for incremental dashboard rollout. These strategies support (Williams et al., 2024), who argued for co-creation of dashboards as a means to increase user buy-in. Furthermore, studies included in this review suggest that successful BI initiatives are accompanied by continuous learning programs, change champions, and metric literacy workshops, pushing beyond the episodic training models critiqued by Hurbean et al. (2024). Thus, organizational readiness is reframed from a precondition to a continuously cultivated capability, central to unlocking the long-term value of BI investments.

This review adds to the evolving discourse on BI ethics and compliance, particularly in light of algorithmic decision-making and real-time data flows. Automation bias and audit transparency, and this review confirms that these concerns remain unresolved in many financial settings. In particular, 48 studies addressed the ethical dimensions of algorithmic transparency, reinforcing the need for visible logic flows, override functions, and user education. While Shollo and Galliers (2015) discussed ethics conceptually, the current findings offer concrete practices—such as metric documentation, annotation layers, and scenario simulations—that promote responsible dashboard usage. Furthermore, this review shows that compliance dashboards are not only feasible but increasingly standard, with 22 studies documenting their use in multi-jurisdictional environments for GDPR, SOX, and Basel III adherence. The ability of BI tools to provide real-time audit trails and compliance status updates enhances organizational readiness for inspections, aligning with findings by Garner et al., (2023). However, this review also cautions that dashboards must be monitored to avoid unintended consequences—such as reinforcing biases or overlooking emerging risks—if algorithms are used uncritically. This balance of automation and human oversight echoes earlier calls for ethically resilient BI frameworks in accounting. Therefore, ethics and compliance are not peripheral concerns but

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central design imperatives in financial dashboarding. Finally, this review provides robust evidence that BI dashboards contribute significantly to strategic finance functions by improving decision-making quality, accelerating reporting cycles, and generating measurable returns on investment (ROI). Earlier studies such as those by Javed et al. (2023) identified isolated ROI examples, but this review synthesizes 58 studies showing ROI within 6 to 12 months, especially where dashboards replaced manual reporting or disconnected tools. Unlike earlier research that emphasized financial dashboards as reporting utilities, the current findings position them as strategic enablers. This is particularly evident in the way dashboards facilitate scenario modeling, performance benchmarking, and executive alignment. The collaborative benefits noted in 36 studies validate prior BI tools promote cross-functional synergy. Moreover, dashboarding was found to support data democratization, allowing analysts and non-technical users to self-serve insights, consistent with the empowerment frameworks suggested by Kumar et al. (2024). What differentiates this review is its comprehensive view of ROI—not just in monetary terms, but in time savings, transparency gains, and cultural transformation. Thus, BI dashboards have transcended their original function as reporting tools to become central instruments of strategic and operational value in finance.

CONCLUSION

This systematic review has demonstrated that Business Intelligence (BI) systems—particularly through real-time dashboarding tools such as Power BI and Tableau—have become critical to modern financial management by enhancing reporting efficiency, data transparency, compliance readiness, and strategic decision-making. The integration of BI dashboards into financial ecosystems has transformed static, retrospective reporting processes into dynamic, data-driven environments where key performance indicators are continuously monitored and acted upon. The comparative analysis revealed that Power BI excels in data modeling, cost-efficiency, and Microsoft ecosystem integration, while Tableau offers superior capabilities in visual storytelling and executive-level analytics. Successful deployment of these tools was consistently linked to ERP integration, robust data governance, user training, and cultural readiness, underscoring the multifaceted nature of BI adoption. Furthermore, the review emphasized that ethical concerns, particularly around algorithmic transparency and data security, must be addressed through governance frameworks and responsible automation practices. Most notably, organizations that implemented BI dashboards reported measurable returns on investment, improved interdepartmental collaboration, and a shift toward proactive financial oversight. Collectively, the findings position real-time BI dashboarding not merely as a technological enhancement but as a strategic asset in finance, capable of delivering operational agility, regulatory alignment, and long-term value creation.

RECOMMENDATION

It is strongly recommended that financial institutions and organizations across industries prioritize the strategic integration of Business Intelligence (BI) dashboards—particularly Power BI and Tableau—within their core financial operations based on the evidence synthesized from the reviewed studies. To maximize the benefits of BI tools, organizations should first conduct a readiness assessment that includes infrastructure compatibility, data maturity, and internal skill sets. Organizations operating within the Microsoft ecosystem, especially those with existing investments in Excel, Dynamics 365, or SharePoint, should leverage Power BI for streamlined implementation and improved interoperability. Conversely, firms with complex visualization needs, such as those in asset management or consulting, may benefit more from Tableau's interactive capabilities and superior design flexibility. Regardless of the tool selected, integration with ERP systems is essential for maintaining data fidelity, enabling automation, and reducing reconciliation workload. To avoid common pitfalls, finance departments must also avoid siloed deployment and instead adopt a cross-functional approach involving IT, compliance, and operational teams. It is further recommended that organizations adopt agile project management methodologies for BI dashboard development, emphasizing iterative prototyping, frequent stakeholder feedback, and sprint-based rollouts. Doing so not only reduces implementation delays but also promotes stakeholder ownership and user engagement. Organizations should also invest in formal data governance frameworks, complete with access controls, metadata repositories, and version tracking, to ensure data quality, compliance, and accountability in dashboard usage. In parallel with technical deployment, organizations should cultivate a data-literate and BI-savvy culture through targeted training, certification programs, and mentorship initiatives. Finance professionals, controllers, auditors, and even C-level executives must be equipped not only to interpret BI dashboards but also to contribute to their design and evolution.

Establishing internal "BI champions" within finance teams can facilitate this process by bridging the gap between analytical tools and business needs. Ethical use of BI systems should be guided by clearly defined principles that emphasize transparency, fairness, and auditability of algorithms—especially when dashboards are used for automated financial decisions or regulatory reporting. Moreover, governance policies should include procedures for regularly reviewing and updating dashboard logic, validating forecast assumptions, and responding to user concerns regarding data interpretation. Organizations with operations spanning multiple jurisdictions must ensure that dashboards account for region-specific compliance rules, including GDPR, SOX, and Basel III, and that embedded analytics support multilingual and multi-currency environments. Finally, for BI initiatives to yield long-term strategic value, leadership must view them not merely as IT investments but as transformative tools that enhance visibility, resilience, and financial accountability. This broader vision is essential for achieving full alignment between data infrastructure and financial strategy, ensuring that BI dashboards serve not only operational goals but also the organization's mission for transparent and evidence-based financial governance.

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