The American Journal of Engineering and Technology
ISSN 2689-0984 | Open Access

TYPE Original Research
PAGE NO. 130-138
DOI 10.37547/tajet/Volume07Issue10-16

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BI-Driven Accounting Analytics in U.S. Healthcare: Enhancing Financial Transparency and Decision-making Support.

OPEN ACCESS

SUBMITED 19 August 2025
ACCEPTED 28 September 2025
PUBLISHED 30 October 2025
VOLUME Vol.07 Issue 10 2025

CITATION

Kazi Obaidur Rahman, Fairuz Sadaf Aishwarya, Achhia Khanam, Amir Hamza Akash, Songeta Dhar, Farhan Nasrullah, & Md Ashiqur Rahman Khan,. (2025). BI-Driven Accounting Analytics in U.S. Healthcare: Enhancing Financial Transparency and Decision-making Support. The American Journal of Engineering and Technology, 7(10), 130–138. https://doi.org/10.37547/tajet/Volume07Issue10-16

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1. Abstract: The U.S. healthcare domain is a complex ecosystem of public and private entities including Medicaid, Medicare, hospital systems, commercial insurers, and pharmaceutical companies, monitored and controlled by multiple federal and state regulators. This sector is undergoing rapid digital transformation, where financial efficiency and accountability are as critical as clinical excellence. Traditional accounting methods often lack real-time visibility, predictive capacity, and

integration across healthcare systems. Therefore, Business Intelligence (BI)-driven accounting analytics has emerged as a strategic enabler in improving financial transparency, enhancing decision-making support, maintaining regulatory compliance, minimizing fraud, and optimizing resource allocation. By integrating BI tools with U.S healthcare accounting system, entities can analyze and visualize real-time insights through interactive dashboards, perform predictive analysis to streamline revenue flows, manage cost control, and support strategic decision-making. This study explores the methodological foundations, implementation strategies, and managerial implications of BI-driven accounting analytics in the U.S. healthcare system focusing on financial transparency and data-driven decision-making support for stakeholders like managers, policymakers, and healthcare leaders.

Keywords: Business Intelligence, Accounting Analytics, U.S. Healthcare, BI-Driven Accounting Dashboard, Healthcare KPIs.

2. Introduction

The U.S. healthcare landscape has become one of the dynamic and largest sectors in the United States of America. As per Centers for Medicare & Medicaid Services (2023), the healthcare system represents a US $4.5 trillion sector, which is accounted for approx. 20% of U.S. GDP. As the sector is growing, it poses various financial challenges like increasing trends in administrative costs, fluctuating reimbursement rates, rising patient debt, and fraudulent claims. The financial complexity even becomes worse by fragmented data systems across EHRs (Electronic Health Records), ERP (Enterprise Resource Planning) platforms, and payer systems.

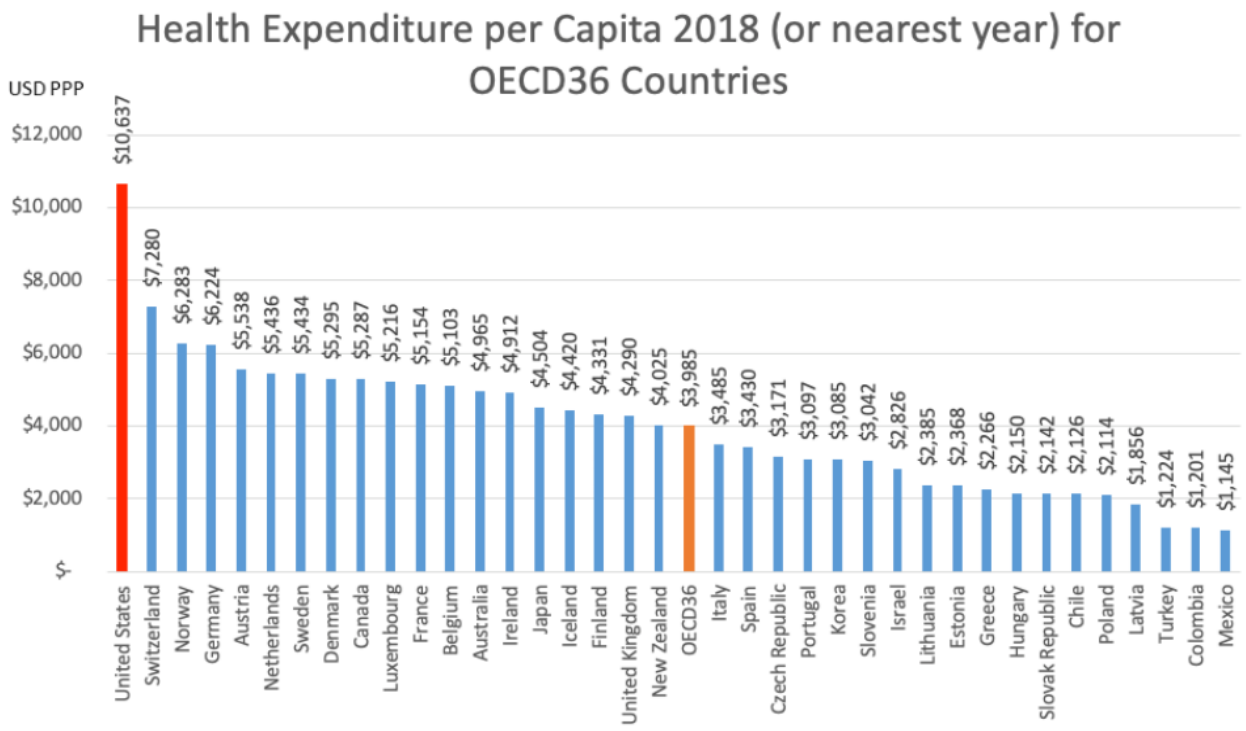
In the U.S. healthcare system, general accounting practices often results in retrospective reports for the managers rather than predictive insights, which limits their usefulness in dynamic healthcare environments. In this case, BI-powered accounting analytics emerged to bridge the gap by integrating financial and operational data into actionable dashboards and predictive models. BI can also enhance decision-making for managers and regulators through real-time transparency and scenario-based forecasting.

In this article, we'd like to examine how BI-driven accounting analytics enhances the U.S. healthcare financial transparency and supports stakeholders for their decision-making efforts by providing BI-powered interactive dashboards for analyzing and visualizing KPIs and valuable insights.

3. Literature review

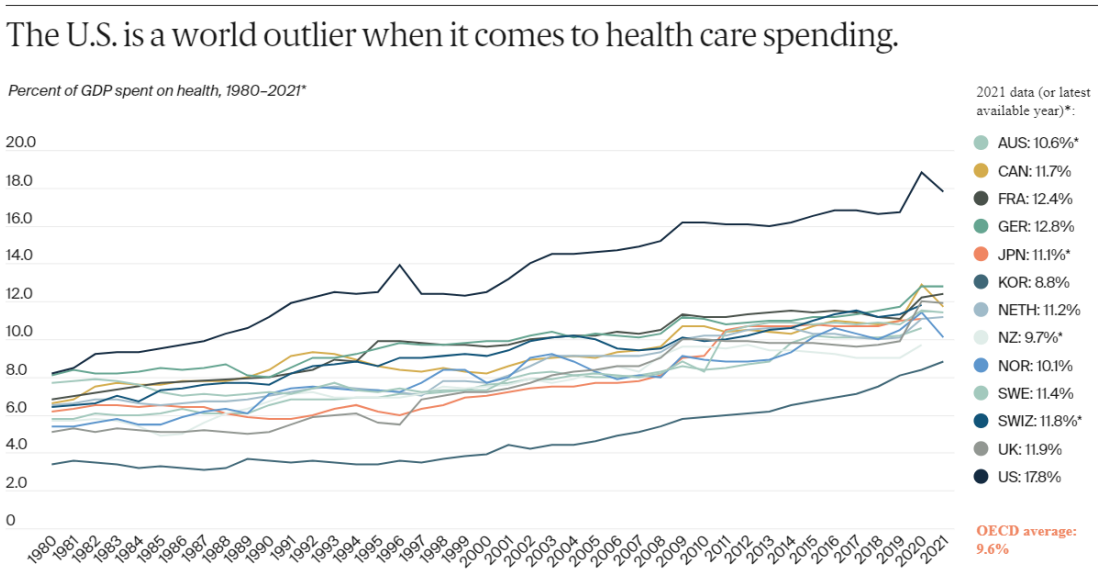
The United States is the third most populous country in the world with a population of over 330 million people. In the year 2018, U.S. spent highest amount of US$3.5 trillion on healthcare, which is approx. 16.9% of its GDP (Gross Domestic Product). Switzerland spent approx. 12.2% of GDP, the second largest country, followed by Germany (11.2% of GDP), and United Kingdom (9.8% of GDP). Figure-1 shows the per capita spending of the U.S. on healthcare comparing with other developed countries across the world. In terms of per capita spending, U.S. stood highest among OECD 36 countries with more than US$10,000 per capita, whereas the average OECD36 spending was around US$4,000 per capita.

(Figure-1. Health Expenditure per Capita for 2018 in the Organization for Economic Cooperation and Development (OECD) 36 Countries.)



[Source: OECD Health Statistics 2018, WHO Global Health Expenditure Database.]

In respect of all OECD countries, we see a steady increasing trend in healthcare spendings since 1980s because of spending growth has outpaced economic growth. This increasing trend may result from advanced medical technologies, price hikes in healthcare sector, and increasing demand for healthcare services across the globe. During the Covid-19 pandemic situation, we experienced a rapid rise in healthcare spendings over the world as governments sought to mitigate the spread of the disease through COVID testing, vaccine development, relief funds, and other measures. In 2021, the U.S. spent 17.8 percent of gross domestic product (GDP) on health care, nearly twice as much as the average OECD country.



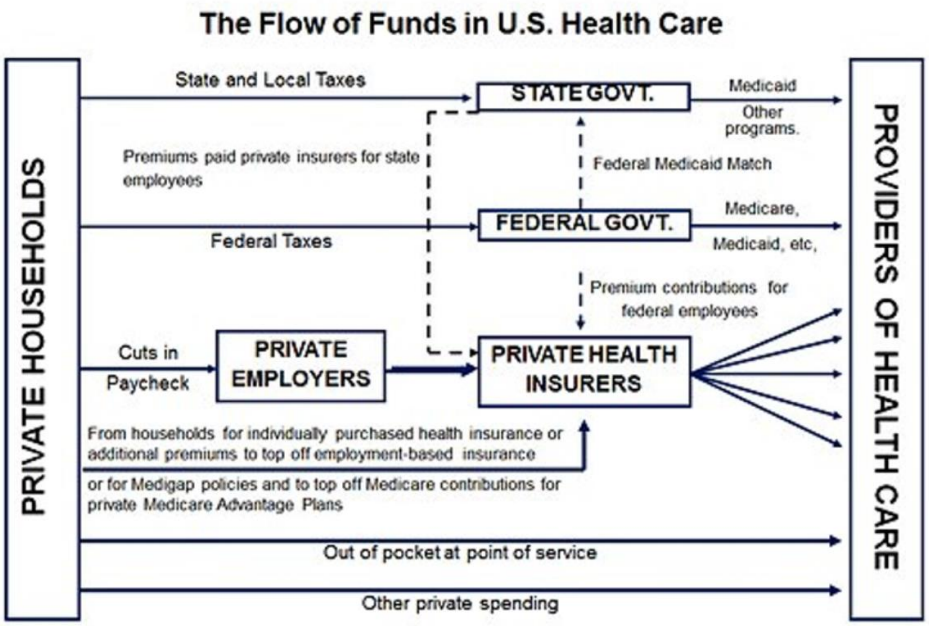
(Figure-2. Healthcare spendings from 1980 to 2021)

[Source data: OECD Health Statistics 2022. (https://doi.org/10.26099/8ejy-yc74)]

3.1 U.S. Healthcare: Overview

The U.S. healthcare sector is one of the complex healthcare systems across the globe based on intertwining relationships among service providers, payers, and patients receiving healthcare services. In figure-3, we see an overview of the financial flow of the US healthcare system. The U.S. healthcare system doesn't provide universal health coverage; it is composed of private and public financing coverage. Publicly financed government Medicare and Medicaid health coverage coexists with privately financed market coverage.

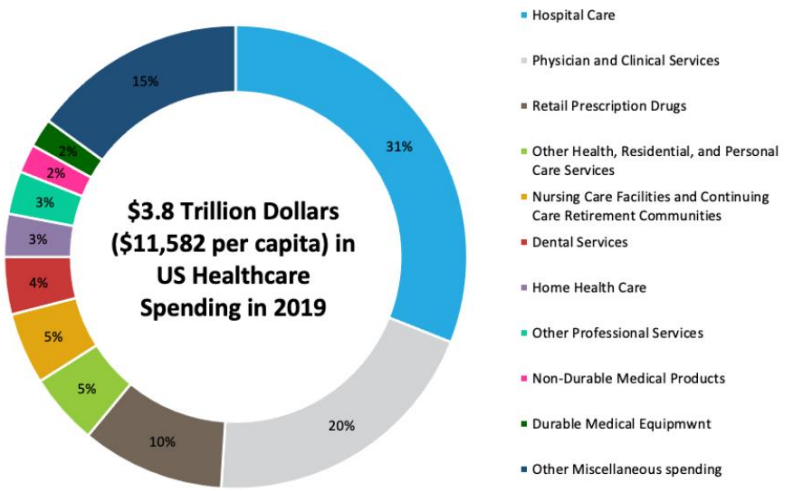
(Figure-3. Financial Flow of the US Healthcare System)



[Source: Reinhardt UE. The Money Flow from Household to Health Care Providers (2011)]

In figure-4, if we look at U.S. healthcare spending type of services or products, hospital care is the highest contributor in this sector with 33% of healthcare dollar spendings in Y2017, followed by physician & clinical services (20%) and retail prescription drugs (10%). A more complete breakdown of overall healthcare spending in U.S. has been displayed by figure-4.

(Figure 4. 2017 Healthcare Spending by Type of Service or Product in the United States)



[Source: National Health Expenditures 2019 Highlights.]

3.2 Business Intelligence

Business Intelligence tools and their applications can enrich business entities, public or private organizations, corporations with valuable insights for taking data-driven strategic decisions, since BI applications provide "useful insight, support decision making, and drive organizational performance" (Ramakrishnan et al. 2012, p. 486). BI tools extract, transform, & load (ETL) structured and/or unstructured data from internal and external sources, analyze them and interpret relevant information for taking informed decisions (Rahman et al., 2025). We see a good range of BI tools with distinct features available in different industries. Organizations or business entities adopt and integrate BI tools as per their requirements. Most popular BI tools include Microsoft Power BI, Tableau, QlikSense, Dundas BI, Sisense, and Microsoft Copilot etc.

3.3 Accounting Analytics

Accounting analytics refers to the systematic applications of quantitative methods & statistical tools to analyze structured and unstructured accounting data from various sources across the organization. This process aims to unveil significant patterns, trends, and actionable insights from financial information. It enables managers to transform raw accounting data (such as general ledger entries) into meaningful insights that guide business operations (*AccountingInsights Team, 2025*).

3.4 BI in Healthcare Accounting

The integration of business intelligence tools in healthcare accounting empowers managers to analyze healthcare center's operational and financial performance, helps identify trends, patterns and so on. We see numerous studies focus on the significance of BI applications in healthcare finance. Kankanhalli et al. (2016) stated that business intelligence applications reduce information asymmetry & improve decision-making in complex healthcare environments. Davenport (2018) showed how BI-powered accounting analytics optimize cost reduction and supports patient-centric financial strategies. Garrido & Adams (2021) stated that the integration of business intelligence tools in hospital accounting dashboards improves financial transparency by analyzing raw data from various sources, such as electronic health records (EHR), insurance claims, billing systems.

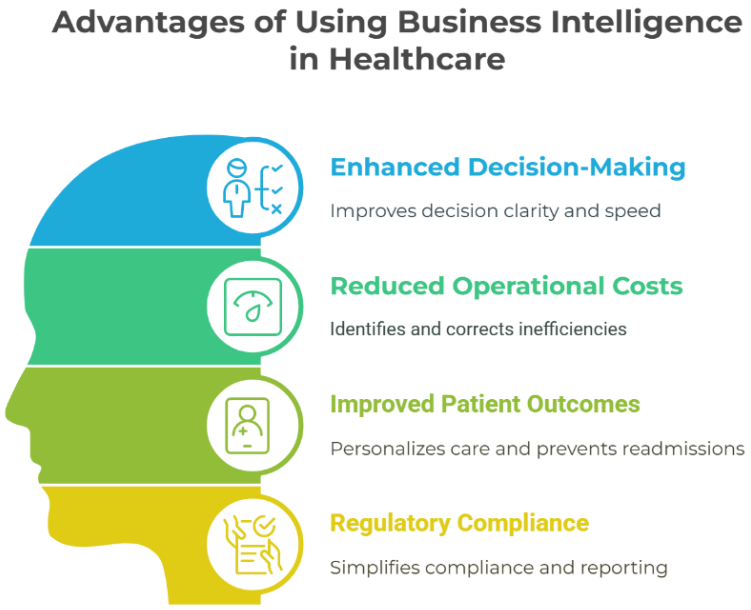
Literature studies collectively emphasize that business intelligence (BI)-powered accounting analytics platform is an effective mechanism for ensuring governance, supporting evidence-based business strategies, reducing fraud, and maximizing operational and financial efficiency. However, there is a limited focus on holistic business intelligence (BI)-driven frameworks that combine financial transparency with managerial decision support in the U.S. healthcare sector—an area this article addresses.

3.5 BI-Driven Accounting Dashboards

Garrido & Adams (2021) have shown that the adoption of BI dashboards (by consolidating financial and clinical data) in hospital/healthcare centers improved reporting standards and transparency in their financial and operational performance. In addition, Sharma et al. (2020) focused on the role of business intelligence tools in detecting fraud within insurance claims.

3.6 Benefits of Implementing BI in Healthcare

The integration and adoption of business intelligence tools in healthcare accounting analytics isn't just about keeping up with trends, it's about building smarter systems that support better care, smarter operations, and long-term growth.



[Source: Business Intelligence in the Healthcare: Applications & Benefits]

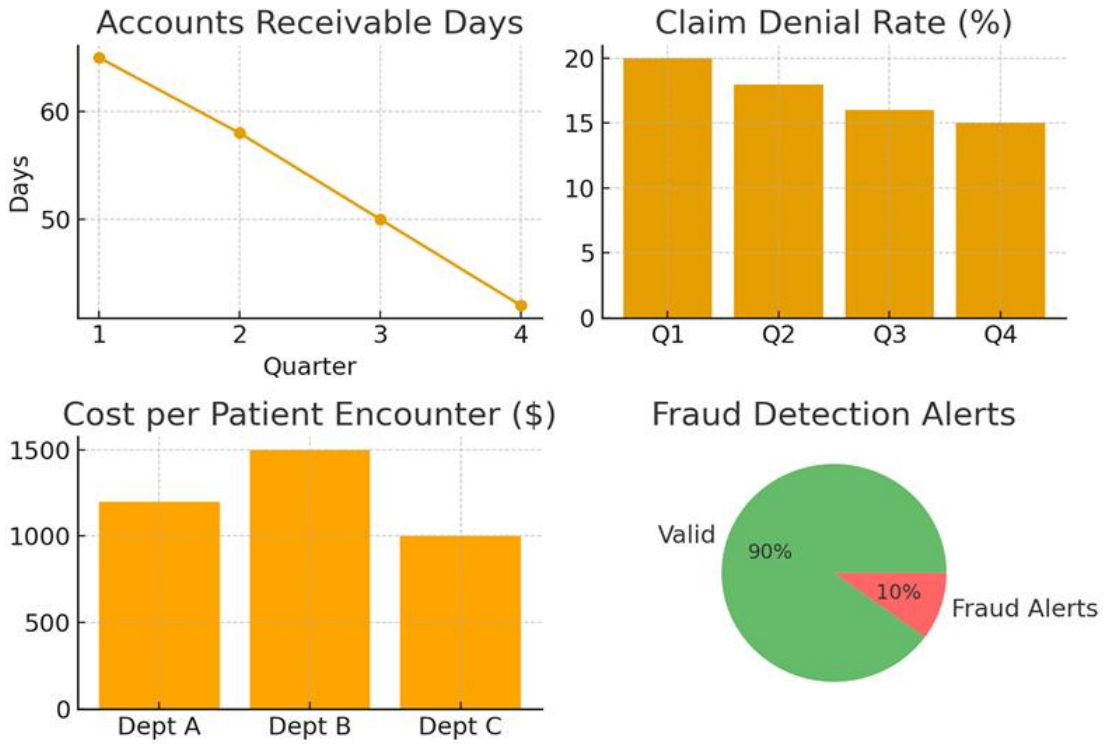
4.0 Financial KPIs and Dashboard in healthcare

For assessment and improvement of organizational operating performance and effectiveness, it is important to set realistic benchmarks on important KPIs for comparisons (Rahman et al., 2025). In table-1, we would like to present some of the key financial performance indicators of healthcare domain. We use KPI "Days in Accounting Receivable" for maintaining the working capital requirements for any organization, which indicates the average days to collect receivables. BI-powered analytics can help us to track this KPI and reduce the time periods for collection. We also can use business intelligence platforms to monitor claim denial rate, estimate cost per patient, measure operating profit margin, detect fraudulent claims and so on.

Table-1. Financial KPIs (Key Performance Indicators) in BI-Driven Accounting in healthcare

KPI	Definition	BI-Driven Benefit	Source
Days in Accounts Receivable	Average time to collect payments	Real-time tracking & reduction	HFMA (2022)
Claim Denial Rate	% of claims denied by payers	Automated exception reporting	Garrido & Adams (2021)
Cost per Patient Encounter	Direct + indirect costs per treatment	Resource utilization dashboards	AHA (2022)
Operating Margin	Net income ÷ total revenue	Predictive modeling for strategic planning	Davenport (2018)
Fraudulent Claim Detection	% of suspicious/fraudulent billing cases	Anomaly detection & AI-based alerts	Sharma et al. (2020)

(Figure_05: A typical financial dashboard for healthcare sector.)



5. Financial Transparency

Since the healthcare sector has been growing steadily over the period, there is a growing need for enhancing financial transparency to maintain trust with patients, regulators, and stakeholders. The integration of BI dashboards with accounting ERP systems enhances financial transparency in the following ways:

- *Visualization:* Organizations can develop interactive dashboards which include charts, graphs, and KPIs displaying revenue flows, cost allocations, and budget variances etc.

- *Drill-Down:* BI tools facilitate users analyzing financial data at macro/external (hospital-wide, across the industry) or micro/internal level (departmental) expenses.

- *Predictive Analytics:* Advanced BI systems use AI/ML models to forecast cash flows, reimbursement trends, and budget constraints etc.

6. Decision-Making Support

Business intelligence (BI)-powered accounting analytics also provides decision-making support to the organization's managers and stakeholders by availing appropriate, sufficient, real-time insights into their operational and financial activities.

- *Data-driven Strategic Planning:* Business intelligence tools assist managers/stakeholders in making long-term financial planning, forecasting. Budgeting etc.

- *Operational Decision-Making:* BI platforms empower managers to get real-time operational insights which can be used to take quick decisions regarding operational activities and assess operational performance and take corrective measures.

- *Patient-Centric Management:* BI tools also assist organizations in optimizing financial management with better patient care by estimating cost per patient, treatment profitability and other financial issues associated with patient care.

7. Use Cases in Healthcare

Business Intelligence platform integrated with healthcare accounting software (ERP system) can be useful in use cases:

- *Revenue Stream Optimization: BI-driven dashboards facilitate managers monitoring claims processing times, reducing denial rate and improving hospital cash flow.*

- *Assessment of operational & Financial performance:* BI-powered accounting analytics platform enables managers to analyze and visualize operational and financial performance of healthcare service

organizations.

- *Detection and prevention of potential fraud:* Business Intelligence-powered predictive analysis can detect unusual/suspicious billing patterns, and prescriptive analysis can prevent potential fraud by prescribing preventive measures, which reduces compliance risks.

- *Optimizing Cost Control:* Large-scale healthcare center/hospital can develop BI-powered interactive dashboards to benchmark expenses across their service facilities so that they can identify cost saving opportunities to optimize cost control.

8. Challenges for BI integration

We know the benefits of BI integration in healthcare accounting analytics, despite those benefits it has some downsides/challenges we need to consider while integrating the system:

- *Implementation Costs:* Organizations face high integration costs of business intelligence tools aligned with accounting software. In addition, there are some costs associated with healthcare staff training and development.

- *Data Privacy & Security:* As per HIPAA compliance requirements, organizations need to safeguard electronic and physical patient health information (ePHI). Therefore, there is a critical challenge for organizations to comply with HIPAA rules and regulations, as well as maintaining cybersecurity standards while implementing business intelligence tools.

- *Standard Data Quality:* Healthcare organizations operate with various operational and financial data. So, maintaining accurate, clean and sufficient datasets are also a challenge for the organizations, because BI-powered dashboards rely on these datasets, poor quality data governance may undermine the effectiveness of dashboard visualizations.

9. Conclusion

The integration of business intelligence in healthcare accounting analytics can play significant role in enhancing financial transparency and supporting decision-making by integrating financial and operational data into actionable dashboards and predictive models. We see the advantages of implementing BI tools in accounting analytics, such as enhanced decision-making, reduced operational costs, improved patient outcomes, regulatory compliance etc. With predictive dashboards, integrated financial models, and fraud detection tools, BI frameworks are central to ensuring the sustainability of U.S. healthcare finance. The study demonstrates that BI-driven accounting not only enhances financial transparency but also provides strategic insights for long-term competitiveness. Finally, we believe, future research work should focus on the integration of AI-driven scalable business intelligence solutions with healthcare accounting analytics for enhancing financial transparency and decision-making support for the managers, stakeholders, policy makers.

10. Statements and Declarations

Statements and Declarations

(a) Funding: “This research received no external funding”

(b) Conflicts of Interest: “The authors declare no conflict of interest.”

(c) Acknowledgments: N/A

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