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The Role of Power Business Intelligence Applying in Financial Performance Analysis: An Analytical Study of the Opinions of a Sample of Employees in Industrial Companies in Kurdistan Region of Iraq

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Abstract: This study assesses the impact of Microsoft Power BI on financial performance analysis of industrial firms in Iraq's Kurdistan Region. Power BI has grown in popularity as a business intelligence tool as many companies can make data-driven decisions by using big data and digital tools. The study aims to address a lack of real evidence showing how Power BI supports important financial areas such as financial health, investment appraisal, cash flow management, profitability metrics, revenue analysis, and expense tracking.

A quantitative approach is employed to investigate this, and 20 industrial enterprises in Erbil, Sulaymaniyah, and Duhok were handed a pre-made questionnaire. Responses to 78 forms were gathered from 87 surveys that were sent. To determine the relationship between financial performance and Power BI's features such as cost reduction, productivity improvement, and competitive advantage, the data was subjected to correlation and regression analysis.

Based on the findings, Power BI has a beneficial impact on most financial areas, particularly revenue analysis, investment assessment, and profitability. Competitive advantage was the most impact of the variables examined, whereas cost reduction was less significant. The study concludes that faster reporting, better decision-making, and greater financial management are all facilitated by the use of Power BI to analyze big data in financial operations. This shows how beneficial BI technologies are for industrial enterprises in developing reign and recommends that more businesses use digital financial management systems.

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دور تطبيق Power BI في تحليل الأداء المالي: دراسة تحليلية لآراء عينة من العاملين في الشركات الصناعية في إقليم كوردستان العراق

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المستخلص

تهدف هذه الدراسة إلى تقييم تأثير استخدام برنامج مايكروسوفت باور بي آي (Power BI) على تحليل الأداء المالي في الشركات الصناعية في إقليم كوردستان العراق. ومع تزايد اعتماد الشركات على البيانات الضخمة والأدوات الرقمية لاتخاذ قرارات مستندة إلى البيانات، أصبح Power BI أداة شائعة في مجال ذكاء الأعمال. وتحمل هذه الدراسة عنوان حيث تسلط الضوء على النقص في الأدلة الواقعية التي تُبيّن كيف يساهم Power BI في الجوانب المالية الرئيسة مثل الإيرادات، والمصاريف، والتدفقات النقدية، والربحية، والصحة المالية، وتقييم الاستثمار.

ولتحقيق ذلك، تم اعتماد منهج كمي من خلال استبيان منظم وُزّع على 20 شركة صناعية في محافظات أربيل، السليمانية، ودهوك. ومن أصل 87 استبيانًا تم توزيعه، تم جمع 78 استبيانًا صالحًا للتحليل. وقد تم تحليل البيانات باستخدام معامل الارتباط والانحدار لقياس العلاقة بين خصائص Power BI مثل تقليل التكاليف، وتحسين الإنتاجية، وتحقيق الميزة التنافسية، وبين الأداء المالي.

وأظهرت النتائج أن Power BI له تأثير إيجابي في معظم الجوانب المالية، خاصة في مجالات الربحية، وتقييم الاستثمار، والإيرادات. ومن بين الخصائص التي تمت دراستها، كانت الميزة التنافسية هي الأكثر تأثيرًا، بينما كان تأثير تقليل التكاليف أقل نسبيًا.

وفي الختام، تُبيّن الدراسة أن استخدام Power BI في تحليل البيانات الضخمة ضمن العمليات المالية يُسهم في تحسين اتخاذ القرارات، وتسريع إعداد التقارير، وتعزيز الرقابة المالية. مما يبرز أهمية أدوات ذكاء الأعمال للشركات الصناعية في المناطق النامية، ويوصي بتبني المزيد من الشركات للحلول الرقمية في إدارة الشؤون المالية.

الكلمات المفتاحية: power BI، ذكاء الأعمال، تحليل الأداء المالي، الصحة المالية.

1. Introduction

The use of financial data has become essential to operational efficiency and strategic decision-making in today's data-driven company environment. For industrial companies working in developing areas like the Kurdistan Region of Iraq, getting and using timely financial information could give them a big edge over their competitors. Microsoft Power BI and other business intelligence (BI) tools have become more important because they let companies combine, analyses, and see financial data in real time. With its easy-to-use interface and data connectivity features, Power BI helps

businesses measure important financial KPIs, identify trends, and make informed decisions. (2024) Microsoft.

Power BI enables thorough financial monitoring by integrating multiple data source, such as spreadsheets, cloud services, and ERP systems. Businesses can monitor their financial health by using interactive dashboards to track things like revenue, expenses, and profit margins. Outdated financial reporting techniques, that are time-consuming, distracting, and guide, have caused troubles for various businesses in the Kurdistan Region. Power BI provides centralized and reliable access to important data and allows automate these processes (Heesen, 2022).

However, varies problems exist within the put in implement of Power BI. Many companies face technical problems due to inadequate knowledge or inadequate IT infrastructure. Additional limitations to effective Power BI implementation encompass cultural resistance and a discordance among technology and business needs. Nevertheless, businesses that allocate sources to address those problems regularly see improvements in financial transparency, data precision, and reporting efficiency (Aspin, 2018). The primary aim of this study is to evaluate the influence of Power BI on financial performance analysis in the industrial sector of the Kurdistan Region. This study aims to evaluate the efficacy of the instruments in monitoring and enhancing the financial dimensions of the center, encompassing cash flow, profitability, expenses, revenues, financial health, and investment appraisal. This study enhances the understanding of business intelligence BI applications in emerging markets by emphasizing the extensive organizational advantages and obstacles associated with Power BI usage.

This part introduces Power BI as a remedy for the deficiencies of conventional accounting systems, especially for obsolete or disjointed reports. It corresponds with the objectives of management accounting and financial reporting to enhance decision utility and facilitate real-time oversight of financial performance. Concepts like as internal control, comparability, and verifiability are implicitly considered.

2. **Research Problem:** Despite the growing reliance on business intelligence, industrial firms in the Kurdistan Region face difficulties in effectively implementing Power BI. These challenges include real-time data integration, customization barriers, and the alignment of Power BI features with business goals.

Highlights the gap between available technology and its underutilization in financial processes. From an accounting lens, it underlines the importance of integrating information systems with financial operations to improve transparency, consistency, and accountability in line with IFRS and internal audit principles. main research question in below:

- How does Power BI impact financial performance analysis in industrial firms?
- What are the effects of Power BI on revenue, expenses, cash flow, profitability, financial health, and investment appraisal?

3. Research Objectives:

A. Define Power BI and its business intelligence functions.
B. Identify key dimensions of financial performance analysis.
C. Investigate how Power BI contributes to financial performance improvement.

4. Significance of the Research: The research highlights how Power BI can improve financial reporting, decision-making, and competitiveness through dynamic dashboards, real-time analysis, and predictive analytics. It also emphasizes the tool's ability to reduce costs, improve productivity, and provide a competitive advantage.

The study demonstrates scientifically that Power BI enhances financial performance analysis through the integration of AI technologies, real-time dashboards, and automated workflows. This program enhances data accuracy, accelerates decision-making, and incorporates local insights into worldwide research. It transforms conventional finance methods into dynamic, data-driven processes that enhance organizational efficiency.

Practical Impact: Power BI enables enterprises to monitor their financial performance, identify trends, optimize resource utilization, and swiftly respond to market fluctuations. It is an effective instrument for data-driven decision-making as it aids in risk management and forecasting.

5. Research Hypotheses: The following are the main hypotheses of this study:
H1. applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) has a statistically significant role on financial performance analysis by (revenue analysis, expenses tracking, cash flow management, profitability metrics, financial health indicators, investment appraisal) industrial company in Kurdistan region.

H1.1. There is a statistically significant relationship at the level of (α≤ 0.05) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by revenue analysis at industrial company in Kurdistan region.

H1.2. There is statistically significant impact at the level of (α≤ 0.05) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by revenue analysis at industrial company in Kurdistan region.

H1.3. There is a statistically significant relationship at the level of (α≤ 0.05) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by expenses tracking at industrial company in Kurdistan region.

H1.4. There is statistically significant impact at the level of (α≤ 0.05) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by expenses tracking at industrial company in Kurdistan region.

H1.5. There is a statistically significant relationship at the level of (α≤ 0.05) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by cash flow management at industrial company in Kurdistan rgion.

H1.6. There is statistically significant impact at the level of (α≤ 0.05) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by cash flow management at industrial company in Kurdistan region.

H1.7. There is a statistically significant relationship at the level of (α≤ 0.05) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by profitability metrics at industrial company in Kurdistan region.

H1.8. There is statistically significant impact at the level of (α≤ 0.05) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by profitability metrics at industrial company in Kurdistan region.

H1.9. There is a statistically significant relationship at the level of (α≤ 0.05) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by financial health indicators at industrial company in Kurdistan region.

H1.10. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by financial health indicators at industrial company in Kurdistan region.

H1.11. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) and financial performance analysis by investment appraisal at industrial company in Kurdistan region.

H1.12. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the power Bi technique by (Reduced Costs, Improved Productivity, Competitive Advantage) on financial performance analysis by investment appraisal at industrial company in Kurdistan region.

6. Literature Review: Business intelligence (BI) solutions are vital for enhanced decision-making since they convert raw data into actionable insights. According to (Ayuso. 2023), Power BI is a widely applied product because to its sophisticated analytical capabilities, dynamic visualizations, and ease of integration with numerous data sources. The platform allows strategic making plans and complements data comprehension, whilst also enhancing forecast accuracy and imparting real-time data vital for activate decision-making. (Heesen, B. 2024).

Power BI represents a massive transformation in accounting practices. It actions from old fashioned manual structures to more modern automated ones. It may be very vital to give both internal and external stakeholders well timed, relevant, accurate and financial data. Power BI makes audit trails and internal controls better, which makes financial reporting clearer and more trustworthy. Also, the platform meets fundamental accounting standards, like comparison and accurate illustration, by using standardized templates and preserving information updated all of the time. (Aspin, A. 2018).

Power BI is more than just a program; it is a whole system that includes tools, databases, apps, and ways to store, get to, and analyses data. (Sharda et al. 2014), It makes data access more equal and improves general data literacy in businesses by letting people who aren't adept at using technology make dashboards and interactive graphics (Altdorf, 2024). The ability to interact with a wide range of sources, including cloud platforms, SQL databases, and Excel spreadsheets, makes it possible to do dynamic reporting and thorough performance evaluations (Sanabia-Lizarraga, 2024).

From an accounting perspective, Power BI functions as both a data-processing and decision-support system. It enables the extraction, transformation, and loading (ETL) of financial data from disparate systems into unified, insightful reports. Its features support key functions such as financial statement preparation, variance analysis, and KPI tracking, thereby aligning with the modern accountant's role as a strategic advisor.

6-1. key dimensions of power BI's impact

A. Cost Reduction: Power BI reduces costs associated with financial reporting by automating manual data collection and reporting tasks. According to Forrester Consulting (2020) and Barnard (2025), automation via Power BI can lower labor costs by up to 60%, while its cloud-based architecture reduces infrastructure and training expenses. These efficiencies contribute to lean accounting practices and enhance the accuracy of financial records by minimizing human error.

B. Productivity Enhancement:

The tool's self-service analytics capabilities and real-time access to data empower users to focus more on analysis than data gathering. Ulagaratchagan (2019) reports that typical users save approximately 1.75 hours per week, leading to faster financial closings and more timely reporting. This shift supports the evolving role of accountants as value-added advisors within the business ecosystem.

C. Competitive Advantage:

Organizations leveraging Power BI gain a strategic edge by responding swiftly to market dynamics through real-time analytics. Early adoption supports predictive modeling and data-driven strategy formulation, aiding in long-term financial planning and operational agility (Soaring Eagle Data Solutions, 2023: Sabir Jaf, 2020).

Additionally, Power BI fosters collaboration and breaks down data silos by integrating information from multiple departments, which enhances transparency and supports regulatory compliance. Real-time dashboards enable proactive financial monitoring of liquidity, profitability, and risk, aligning operational efficiency with strategic objectives (Singh & Singh, 2021; Alnoukari & Alhussan, 2021; Bhosale & Sawant, 2020).

6-2. Financial performance analysis: Financial performance analysis is a cornerstone of financial management, used to assess how well an organization meets its financial objectives. It encompasses the evaluation of

profitability, liquidity, solvency, and operational efficiency through the analysis of financial statements and performance ratios (Dubych, 2024; Kenton, 2024) ;(Khzer and Sabir Jaf, 2023). These evaluations support transparency, accountability, and strategic decision-making by offering insights into an organization's financial strengths and weaknesses ((Jaf, & Rashid, 2023); Melicher et al., 2017; Tuovila, 2024; CFA Institute, 2024).

6-3. Definition: Financial performance assesses a business's efficiency in utilizing its resources to generate profit, maintain liquidity, and ensure solvency. This assessment serves both internal and external stakeholders, including investors, creditors, and management, by providing indications of financial viability and sustainability (Dokka, 2024; Liberto, 2024).

6-4. Importance: Financial performance analysis is crucial for guiding reinvestment decisions, development plans, and competitive positioning (Ames, 1998; Alexandru, 2019). Organizations can identify their strengths and shortcomings by analyzing important metrics such as return on assets (ROA), return on equity (ROE), and profit margins (Rashid & Jaf,2023). (Melvin et al., 2004). It also makes it easier to compare performance, improves communication within the company, and helps with risk management techniques like predicting cash flow and managing debt (Wahab et al., 2024; Solomon et al., 2012; Chrysafis et al., 2024).

6-5. Dimensions of financial performance analysis

A. Revenue Analysis: Revenue analysis is a process that supports forecasting and income growth plans by identifying revenue sources, assessing trends, and comprehending consumer behavior. (Litvak, 2024; Dealhub, 2024).

B. Expense Tracking: Expense tracking is the systematic process of recording, organizing, and analyzing business expenditures, including operational costs, employee reimbursements, and recurring charges Consisting of subscriptions. (Ramamoorthy et al, 2024; Hamad & Jaf, 2024)

C. Cash Flow Management: Effective cash flow management promotes financial resilience and ensures liquidity, forecasting, buffer maintenance, and account management are some of the strategies that assist businesses fulfill their commitments and look for investment opportunities (Laghari et al, 2023; Egwu et al, 2021).

D. Profitability Metrics: Return on assets (ROA), net profit margin (NPM), and gross profit margin (GPM) are example of profitability ratios that are used to assess how well a business turns revenue into profit. these metrics

support in the assessment of investment and financial planning. (Nariswari et al, 2020; Mahdi et al. 2020).

E. Financial Health: The overall financial sustainability and stability of the company are included in this dimension. The firm's capacity to fulfill commitments and attain expansion is shown in the assessment of solvency, liquidity, and long-term investment capacities (kagan, 2014; unsgsa, 2021)

F. Investment Appraisal: Investment assessment techniques such as net present value (NPV), internal rate of return (IRR), and payback time are employed to assess the viability of a project. These instruments ensure that funds are allocated effectively (TIO Staff, 2024; Brealey, 2020: Jaf & hamid Ahmad, 2021).

7. Methodology

7-1. Data Collection: The primary data source for this study was obtained directly from industrial enterprises in the Kurdistan Region of Iraq. A systematic, closed-ended questionnaire was developed as the primary study instrument for gathering data on individuals' utilization of Microsoft Power BI for financial performance analysis. The primary financial subjects of the questionnaire included revenues, costs, cash flow, profitability, financial health, and investment evaluation. The questionnaire enquired about the advantages of Power BI, including cost savings, enhanced productivity, and competitive superiority.

Twenty industrial firms in Duhok, Sulaymaniyah, and Erbil received the survey in person. Approximately 90% of the 87 sent forms were accurately completed and returned, indicating that 78 forms were filled out correctly. The enterprises represent many sectors, including cement production, beverage manufacturing, medicines, steel, and food processing. Furthermore, this study evaluated impacts and analyzed data utilizing the Statistical Package for the Social Sciences (SPSS) software.

By using this method, the researcher was able to gather first-hand, company-level data, ensure the study was grounded in practical experience, and capture the true use of Power BI in the Kurdistan Region's industrial sector.

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Table (1): list of the names of the companies studied

No	Name	Governorate	Distributed Questionnaire	Returned Questionnaire Forms
1	Shoof	Erbil	6	5
2	Kani Factory for Water Production	Erbil	5	5
3	Izzat plastic factory	Erbil	5	5
4	Erbil Steel	Erbil	6	5
5	Al Hayat Soft Drinks Company	Erbil	5	4
6	Awamedica Pharmaceutical Factory	Erbil	4	4
7	Taz factory	Erbil	4	3
8	Aleen Company	Erbil	3	3
Total forms from Erbil			38	34
9	Mass Cement Company	Sulaymaniyah	4	4
10	Delta Cement Company	Sulaymaniyah	5	4
11	Bazian Cement Company	Sulaymaniyah	5	4
12	Life- Sul	Sulaymaniyah	4	4
13	Ranya Olive Oil	Sulaymaniyah	4	3
14	Tasluja Cement Company	Sulaymaniyah	4	4
15	Lira	Sulaymaniyah	5	5
Total forms from Sulaymaniyah			31	28
16	kavin group	Duhok	4	4
17	Duhok Factory for Precast Concrete	Duhok	4	3
18	Hemn Group	Duhok	4	4
19	Glass Cola	Duhok	3	3
20	Altunsa	Duhok	3	2
Total forms Duhok			18	16
Total distributed and respondent forms			87	78

Source: (prepared by authors)

Table 1 presents the distribution and return of questionnaire forms across 20 industrial companies located in the three governorates of the Kurdistan Region: Erbil, Sulaymaniyah, and Duhok. A total of 87 questionnaires were distributed, out of which 78 successfully returned, reflecting a high overall response rate. Erbil-based companies received the largest share, with 38 distributed forms and 34 returned, followed by Sulaymaniyah with 31 distributed and 28 returned, and Duhok with 18 distributed and 16 returned. The forms were proportionally allocated across individual companies in each governorate, ensuring balanced representation from various sectors, including cement, steel, pharmaceuticals, beverages, and food industries. The high return rate indicates strong participation and interest from the companies, contributing to the reliability and validity of the collected data. Some companies did not respond due to time constraints, lack of interest, or concerns about confidentiality. Others may have faced internal challenges, communication issues, or found the questionnaire irrelevant. Despite this, the overall response rate was high.

7-2. Normality Tests for Study Variables

Table (2): Assessment of Normality Using Shapiro-Wilk and Kolmogorov-Smirnov Tests

Variables	Shapiro-Wilk Sig.	Distribution
Reduced Costs BI	0.180	Normality
Improved Productivity BI	0.323	Normality
Competitive Advantage BI	0.549	Normality
Revenue analysis	0.860	Normality
Expenses tracking	0.457	Normality
Cash flow management	0.994	Normality
Profitability metrics	0.953	Normality
Financial health indicators	0.113	Normality
Investment appraisal	0.389	Normality

Table 2 are showing The Shapiro-Wilk test results indicate that all variables have p-values greater than 0.05, which means there is no significant deviation from normality. Therefore, the distribution of all study variables can be considered normal, validating the use of parametric statistical analyses in the study.

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7-3. Testing Validity and Reliability

Table (3): Cronbach's Alpha

Item	Number of phrases	Cronbach's Alpha
Reduced Costs BI	6	0.934
Improved Productivity BI	6	0.933
Competitive Advantage BI	6	0.932
Revenue analysis	6	0.928
Expenses tracking	6	0.941
Cashflow management	6	0.925
Profitability metrics	6	0.928
Financial health indicators	6	0.929
Investment appraisal	6	0.922

Source (prepared by authors).

As a general guideline, a Cronbach's Alpha value of 0.70 or higher indicates acceptable internal consistency for a scale. If the Cronbach's Alpha value for an individual item is lower than the overall Cronbach's Alpha, this suggests that the item contributes positively to the scale's internal consistency and should be retained. Conversely, if the Cronbach's Alpha value is higher than the total alpha when an item is deleted, this may indicate that the item is detracting from the scale's reliability and warrants further examination. In this analysis, all Cronbach's Alpha values if items are deleted are below 0.941, with the highest value occurring when the "Expenses tracking" item is removed. This indicates that the overall Cronbach's Alpha for the scale is approximately 0.94, reflecting excellent internal consistency. Most items contribute positively to the scale's reliability; however, the "Expenses tracking" item shows the weakest consistency with the rest of the scale and may require revision. In contrast, the "Investment appraisal" item is identified as the strongest and most consistent contributor, as indicated by the lowest Cronbach's Alpha value of 0.922 when it is removed.

7-4. Autocorrelation Problem: Autocorrelation refers to the problem that arises when there is a correlation between the error terms in a regression model. In other words, the value of the studied phenomenon at time (t) is influenced by its value at time (t+1) or (t–1). This issue is common in time series data, where observations are often affected by their preceding or subsequent values. One of the most widely used tests to diagnose this

problem is the Durbin-Watson (D.W.) test, with values ranging from 0 to 4. A D.W. value close to 2 suggests that there is no autocorrelation problem. As shown in Table (9,10,11,12,13,14), the calculated D.W. values are (2.150, 1.910, 1.692، 1.944, 2.208,1.855)Respectively which is sufficiently close to 2. This indicates the absence of autocorrelation in the multiple linear regression model used in this study.

7-5. Multicollinearity Problem: Multicollinearity arises when there is a perfect or a high degree of linear correlation between two or more independent variables. To detect this issue, the Variance Inflation Factor (VIF) is commonly used, and is calculated using the formula:

VIF = 1 / Tolerance

According to the general rule of thumb, if the VIF value for any independent variable exceeds 10, it indicates the presence of multicollinearity (Hair et al., 2010). As shown in Tables (9,10,11,12,13,14), the VIF values for the independent variables are as follows: Reduced Costs BI = 1.821, Improved Productivity BI = 1.476, and Competitive Advantage BI = 2.036. Since all VIF values are below the threshold of 10, it can be concluded that there is no multicollinearity problem in the multiple linear regression model used in this study.

7-6. Testing the hypotheses

7-6-1. Testing First hypotheses.

Table (4) relationships between the dependent variable, Revenue Analysis, and all three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI

Relationship	Pearson Correlation (r)	Significance (Sig.)	Interpretation
Revenue analysis ↔ Reduced Costs BI	0.567	0.000	A statistically significant moderate-to-strong positive relationship
Revenue analysis ↔ Improved Productivity BI	0.543	0.000	A statistically significant moderate positive relationship
Revenue analysis ↔ Competitive Advantage BI	0.656	0.000	A statistically significant strong positive relationship

Source (prepared by authors)

Table 4 show the results reveal statistically significant positive relationships between the dependent variable, Revenue Analysis, and all three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI. The strongest correlation is observed with Competitive Advantage BI (r = 0.656), indicating that the utilization of Business Intelligence tools significantly enhances revenue analysis by reinforcing competitive positioning. Additionally, the correlations with Reduced Costs BI and Improved Productivity BI are moderate to strong, suggesting that improvements in operational efficiency and cost reduction through Power BI positively influence the depth and quality of revenue analysis. These results highlight how business intelligence plays a strategic role in accounting by showing how it may improve revenue analysis processes. In order to improve the quality of financial reporting and disclosure, it is crucial to include technology and financial analytical tools, like Power BI, into accounting procedures, as indicated by the statistically significant associations. Overall, the findings confirm the idea that using Power BI to minimize costs, increase productivity, and gain a competitive edge significantly adds to more accurate insightful, and data-driven revenue analysis in the accounting field.

7-6-2. Testing Second hypotheses.

Table (5): relationships between Expenses Tracking and all three independent variables.

Relationship	Pearson Correlation (r)	Significance (Sig.)	Interpretation
Expenses Tracking ↔ Reduced Costs BI	0.411	0.000	A statistically significant moderate positive relationship
Expenses Tracking ↔ Improved Productivity BI	0.477	0.000	A statistically significant moderate positive relationship
Expenses Tracking ↔ Competitive Advantage BI	0.310	0.006	A statistically significant weak to moderate positive relationship

Source (prepared by authors)

Table 5. According to the research, there are statistically significant positive relationships between Expenses Tracking and the three independent variables of Competitive Advantage business intelligence, Improved Productivity business intelligence, and Reduced Costs BI. The strongest connection (r = 0.477) is seen with Improved Productivity business intelligence, indicating that improving operational efficiency with business intelligence technologies is essential to enabling accurate and effective expense tracking. This research highlights how important business intelligence is for improving resource usage, which helps with cost control and financial monitoring. The link with Reduced Costs business intelligence (r = 0.411) further emphasizes the beneficial relationship between improved expense tracking and oversight and cost-reduction tactics made possible by business intelligence. Statistical significance is maintained even though the connection with Competitive Advantage business intelligence (r = 0.310) is the weakest of the three. It is still statistically significant. This suggests that, even if competitive advantage might not directly affect expense tracking, it might indirectly do so through better strategic resource allocation and pricing decisions based on business intelligence insights.

Overall, these results confirm that integrating Business Intelligence tools such as Power BI into accounting operations significantly enhances expense tracking and analysis. They further underscore the role of BI in strengthening internal controls, promoting financial accountability, and supporting data-driven decision-making—core principles of modern accounting practices. The findings affirm the value of BI in improving the effectiveness and precision of financial oversight.

7-6-3. Testing Third hypotheses.

Table (6): correlations between cash flow management and all three independent variables.

Relationship	Pearson Correlation (r)	Significance (Sig.)	Interpretation
Cash Flow Management ↔ Reduced Costs BI	0.641	0.000	Strong, statistically significant positive relationship

Relationship	Pearson Correlation (r)	Significance (Sig.)	Interpretation
Cash Flow Management ↔ Improved Productivity BI	0.616	0.000	Strong, statistically significant positive relationship
Cash Flow Management ↔ Competitive Advantage BI	0.592	0.000	Strong, statistically significant positive relationship

Source (prepared by authors)

The findings in Table 6 show that cash flow management and the three independent variables—Reduced Costs BI (r = 0.641), Improved Productivity BI (r = 0.616), and Competitive Advantage BI (r = 0.592)—have significant and statistically significant positive associations.

These results indicate that the effectiveness of managing cash flows inside firms is greatly increased by the use of business intelligence (BI) solutions like Power BI. The greatest link was seen with Reduced Costs BI, indicating that cost reductions backed by BI are essential for keeping expenditures under control and cash flow balanced.

In summary, those findings highlight the critical role that business intelligence plays in supporting with financial accounting functions, especially those that include strategic financial planning, short-term cash flow forecasting, and liquidity monitoring. Accurate decision-making is improved and long-term organizational objectives and financial stability are attained by integrating BI technologies into accounting processes.

7-6-4. Testing Furth hypotheses.

Table (7): correlations between Profitability Metrics and the three independent variables.

Independent Variable	Correlation with Profitability Metrics	Significance (p-value)	Interpretation
Reduced Costs BI	0.618**	0.000	Strong positive correlation. Indicates that BI-supported cost reduction improves profitability by controlling unnecessary expenses.

Independent Variable	Correlation with Profitability Metrics	Significance (p-value)	Interpretation
Improved Productivity BI	0.725**	0.000	Very strong positive correlation. Suggests that enhanced productivity via BI leads to higher profitability through efficiency and process improvement.
Competitive Advantage BI	0.827**	0.000	Strongest correlation. Demonstrates that strategic advantages gained through BI significantly boost profitability.

Source (prepared by authors)

Table 7 show the analysis demonstrates strong and statistically significant positive correlations at the 0.01 degree between the dependent variable Profitability Metrics and the three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI. These findings confirm the important role of Business Intelligence (BI) tools, such as Power BI, in improving organizational profitability.

The strongest relationship was observed between Competitive Advantage BI and Profitability Metrics (r = 0.827), indicating that leveraging BI to strengthen competitive positioning significantly contributes to improve financial outcomes. Similarly, the correlation with Improved Productivity BI (r = 0.725) highlights that operational efficiency, driven by BI applications, has a substantial positive effect on profitability by streamlining processes and reducing waste. In addition, the correlation between Reduced Costs BI and profitability (r = 0.618) reflects that BI-supported cost-reduction strategies positively influence profitability by minimizing unnecessary expenses and optimizing resource use.

From an accounting perspective, these results underscore the value of integrating BI tools into financial analysis and decision-making processes. By providing real-time, data-driven insights, BI enhances the quality of strategic planning, financial oversight, and performance evaluation. Ultimately, the use of BI not only supports short-term profitability goals but also contributes to the long-term financial sustainability of the organization.

7-6-5. Testing Fifth hypotheses.

Table (8): Correlations between Financial Health Indicators and the three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI.

Independent Variable	Correlation with Financial Health Indicators	Significance (p-value)	Interpretation
Reduced Costs BI	0.553**	0.000	Strong positive correlation. Indicates that BI-driven cost reduction contributes to better financial health by improving expense management.
Improved Productivity BI	0.530**	0.000	Strong positive correlation. Suggests that increased productivity through BI positively affects financial stability and operational performance.
Competitive Advantage BI	0.587**	0.000	Strong positive correlation. Demonstrates that leveraging BI for competitive advantage supports overall financial health and sustainable growth.

Source (prepared by authors)

Table 8 show the results reveal strong and statistically significant positive correlations between the dependent variable, Financial Health Indicators, and all three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI.

The strongest correlation is observed between Competitive Advantage BI and Financial Health Indicators (r = 0.587), underscoring the vital role of BI tools in enhancing competitive positioning and consequently improving an organization's financial health.

The correlation with Reduced Costs BI (r = 0.553) indicates that BI-driven cost control strategies positively contribute to financial stability. Similarly, the correlation with Improved Productivity BI (r = 0.530) suggests that operational efficiency improvements facilitated by BI enhance overall financial health.

From an accounting perspective, these findings highlight the essential role of Business Intelligence in providing data-driven insights that improve financial planning, monitoring, and decision-making processes. The integration of BI tools supports sustainable financial performance and strengthens financial accountability.

7-6-6. Testing Sixth hypothesis.

Table (9) presents the correlations between Investment Appraisal and the three independent variables: Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI.

Independent Variable	Correlation with Investment Appraisal	Significance (p-value)	Interpretation
Reduced Costs BI	0.762**	0.000	Strong positive correlation indicating cost-reduction strategies via BI improve investment appraisal accuracy.
Improved Productivity BI	0.788**	0.000	Very strong positive correlation suggesting efficiency gains from BI enhance investment decision-making.

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Independent Variable	Correlation with Investment Appraisal	Significance (p-value)	Interpretation
Competitive Advantage BI	0.767**	0.000	Strong positive correlation showing competitive advantages through BI positively impact investment evaluation.

Source (prepared by authors)

Table 9 demonstrates a strong and statistically good-sized connection among funding appraisal and the three impartial variables: reduced charges BI (r = 0.762), stepped forward productivity BI (r = 0.788), and aggressive advantage BI (r = 0.767). This relationship signifies that Business Intelligence (BI) technology significantly enhances investment assessment through enabling value manipulate, optimizing operational performance, and improving competitive positioning. These results illustrate the significance of BI in handing over correct, data-driven insights that resource accountants in growing greater monetary making plans and strategic investment decisions.

These findings demonstrate the price of business intelligence equipment in enhancing investment choices from an accounting perspective by means of offering short, correct, and information-driven insights. Incorporating Business Intelligence into accounting activities enhances financial planning, optimizes investment decisions, and elevates overall performance.

7-6-7. Testing Seventh hypotheses.

Table (10) Regression dependent Variable (Revenue analysis)

Revenue analysis						
	B0	SE	B1	T	VIF	Sig
(Constant)	0.816	0.488		1.670		0.099
Reduced Costs BI	0.239	0.137	0.194	1.748	1.821	0.085
Improved Productivity BI	0.247	0.107	0.232	2.320	1.476	0.023
Competitive Advantage BI	0.337	0.099	0.401	3.417	2.036	0.001

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Revenue analysis						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
R Square	0.499					
Adjusted R^2	0.479					
Durbin–Watson	2.150					

Source (prepared by authors)

Table 10 show the multiple linear regression analysis examines the impact of three independent variables—Reduced Costs BI, Improved Productivity BI, and Competitive Advantage BI—on the dependent variable, Revenue Analysis. The results indicate that Competitive Advantage BI has the strongest and statistically significant positive effect on Revenue Analysis ($\beta = 0.401$, $p = 0.001$), followed by Improved Productivity BI, which also shows a significant positive influence ($\beta = 0.232$, $p = 0.023$). Reduced Costs BI exhibits a positive but not statistically significant effect ($\beta = 0.194$, $p = 0.085$). The overall model explains approximately 49.9% of the variance in Revenue Analysis ($R^2 = 0.499$), indicating good explanatory power. The Durbin-Watson statistic (2.150) confirms the absence of autocorrelation in residuals, validating the regression assumptions.

From an accounting perspective, these findings emphasize the critical role of Business Intelligence tools—particularly those enhancing competitive advantage and productivity—in improving the accuracy and effectiveness of revenue analysis. Integrating BI into accounting processes thus supports more precise financial reporting and informed decision-making, contributing to better financial performance and strategic planning. Table 10 show the results of the multiple linear regression analysis indicate varying effects of the independent Business Intelligence (BI) variables on the dependent variable, Expenses Tracking. Both Reduced Costs BI and Improved Productivity BI show statistically significant and positive effects. Specifically, the regression coefficient for Reduced Costs BI is ($\beta = 0.291$, $p = 0.032$), and for Improved Productivity BI is ($\beta = 0.396$, $p = 0.002$), suggesting that the use of BI tools contributes to enhanced monitoring and control of organizational expenses by reducing inefficiencies and operational waste.

In contrast, Competitive Advantage BI did not exhibit a statistically significant effect on expenses tracking ($\beta = -0.099$, $p = 0.484$), implying that

its influence may be indirect or related to other financial performance aspects rather than direct cost monitoring. The R^2 value of 0.277 indicates that the model explains approximately 27.7% of the variance in expenses tracking. Additionally, the Durbin–Watson statistic (1.910) suggests no serious autocorrelation problem, supporting the reliability of the regression estimates.

These findings underscore the importance of integrating BI tools into accounting systems, particularly for improving expense tracking and achieving operational efficiency. However, the role of strategic BI elements like competitive advantage may require further investigation to assess their indirect impact on financial control and decision-making.

7-6-8. Testing Eighth hypotheses:

Table (11): Regression dependent Variable (Expenses tracking).

Expenses tracking						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
(Constant)	1.571	0.521		3.012		0.004
Reduced Costs BI	.318	0.146	0.291	2.180	1.821	0.032
Improved Productivity BI	0.375	0.114	.396	3.296	1.476	0.002
Competitive Advantage BI	-0.074	0.105	-0.099	-0.704	2.036	0.484
R Square	0.277					
Adjusted R^2	0.248					
Durbin–Watson	1.910					

Source (prepared by authors)

Table 11 show the analysis revealed that both Reduced Costs BI and Improved Productivity BI have a statistically significant positive impact on Cash Flow Management, as indicated by the following results:

Reduced Costs BI: Significant positive effect ($\beta = 0.377$, $p = 0.001$), suggesting that BI-supported cost-reduction strategies contribute to better management of cash flows.

Improved Productivity BI: Significant positive effect ($\beta = 0.359$, $p = 0.000$), indicating that operational efficiency enabled by BI enhances control over cash inflows and outflows.

In contrast, Competitive Advantage BI did not show a statistically significant effect (β = 0.146, p = 0.194), implying that its influence on cash flow may be indirect or long-term. The R^2 value of 0.549 indicates that the model explains approximately 55% of the variance in cash flow management. The Durbin–Watson statistic (1.692) suggests that there are no issues with autocorrelation among the variables. These findings highlight the importance of integrating Business Intelligence tools into accounting practices to enhance liquidity control and fulfill short-term obligations, particularly through effective cost management and productivity improvements.

7-6-9. Testing Nineth hypotheses:

Table (12): Regression dependent Variable (Cashflow management)

Cashflow management						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
(Constant)	0.387	0.437		.885		0.379
Reduced Costs BI	0.438	0.122	0.377	3.577	1.821	0.001
Improved Productivity BI	0.360	0.095	0.359	3.780	1.476	0.000
Competitive Advantage BI	0.116	0.088	0.146	1.311	2.036	0.194
R Square	0.549					
Adjusted R^2	0.531					
Durbin–Watson	1.692					

Source (prepared by authors)

Table 12 show the results indicate a strong and statistically significant positive impact of:

Improved Productivity BI on profitability (β = 0.378, p = 0.000), suggesting that productivity enhancements enabled by BI tools such as Power BI contribute significantly to higher efficiency and revenue growth, thereby improving profitability.

Competitive Advantage BI shows the strongest influence (β = 0.582, p = 0.000), reflecting that achieving a competitive edge through BI strongly supports financial performance and profitability enhancement. In contrast, Reduced Costs BI does not show a statistically significant effect (β = 0.058, p = 0.425), indicating that cost reduction alone may not have a direct impact

on profitability within this model. The R Square value of 0.791 indicates that approximately 79.1% of the variance in profitability is explained by the model, representing a high explanatory power. The Durbin–Watson value of 1.944 suggests no serious autocorrelation issues among residuals.

These findings highlight the critical role of Business Intelligence tools in enhancing profitability by enabling precise performance analysis and supporting strategic decision-making. Integrating BI tools like Power BI into accounting systems strengthens operational productivity and competitive positioning, which are key drivers of financial success.

7-6-10. Testing Tenth hypotheses.

Table (13) Regression dependent Variable (Profitability metrics)

Profitability metrics						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
(Constant)	-0.070	0.338		-0.207		0.836
Reduced Costs BI	0.076	0.095	0.058	0.803	1.821	0.425
Improved Productivity BI	0.431	0.074	0.378	5.851	1.476	0.000
Competitive Advantage BI	0.523	0.068	0.582	7.665	2.036	0.000
R Square	0.791					
Adjusted R^2	0.782					
Durbin–Watson	1.944					

Source (prepared by authors)

Table 13 show the results demonstrate that all three independent variables have a statistically significant positive effect on Financial Health Indicators, as follows:

Reduced Costs BI has a significant effect ($\beta = 0.245$, $p = 0.040$), indicating that implementing BI tools to reduce costs contributes positively to improving financial stability.

Improved Productivity BI also shows a significant impact ($\beta = 0.260$, $p = 0.017$), suggesting that operational efficiency achieved through BI strengthens the organization's financial health.

Competitive Advantage BI has a notable effect ($\beta = 0.282$, $p = 0.026$), implying that leveraging BI to gain strategic advantage plays an important role in enhancing financial well-being.

The R Square value is 0.439, meaning that approximately 43.9% of the variance in Financial Health Indicators is explained by the three BI-related variables. The Adjusted R^2 of 0.416 confirms the model's moderate explanatory power. The Durbin–Watson value of 2.208 indicates no concern for autocorrelation in the residuals, supporting the validity of the regression model.

These findings underscore the importance of integrating Business Intelligence tools into accounting and financial decision-making processes. BI enables cost control, productivity enhancement, and strategic positioning, all of which are essential for maintaining and improving the financial health of an organization. The results support the role of data-driven decision-making in strengthening the financial oversight and sustainability of accounting practices.

7-6-11. Testing Eleventh hypotheses:

Table (14) Regression dependent Variable (Financial health indicators)

Financial health indicators						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
(Constant)	1.321	0.429		3.078		0.003
Reduced Costs BI	0.251	0.120	0.245	2.089	1.821	0.040
Improved Productivity BI	0.230	0.094	0.260	2.453	1.476	0.017
Competitive Advantage BI	0.197	0.087	0.282	2.272	2.036	0.026
R Square	0.439					
Adjusted R^2	0.416					
Durbin–Watson	2.208					

Source (prepared by authors).

Table 14 show the results indicate a strong and statistically significant positive effect of all independent variables on investment appraisal, as follows:

Reduced Costs BI has a significant positive effect ($\beta = 0.365$, $p = 0.000$), indicating that cost-reduction strategies supported by Business Intelligence tools such as Power BI significantly enhance the accuracy and efficiency of investment appraisal processes.

Improved Productivity BI shows the strongest positive effect (β = 0.469, p = 0.000), suggesting that operational efficiency improvements driven by BI play a key role in more effective investment decision-making. Competitive Advantage BI also demonstrates a significant positive impact (β = 0.268, p = 0.000), implying that BI-driven competitive advantages contribute to better strategic investment evaluations.

The R Square value is 0.854, meaning that 85.4% of the variation in investment appraisal can be explained by the three independent variables, reflecting a highly predictive model.

The Adjusted $R^2 = 0.848$, confirming the model's reliability even after adjusting for the number of predictors.

The Durbin-Watson value = 1.855, indicating that there is no serious autocorrelation issue in the residuals, which is favorable for the validity of the model.

These results highlight the critical role of Business Intelligence tools (like Power BI) in enhancing investment appraisal within accounting practices. BI provides accurate, real-time, and analyzable data that supports informed and data-driven investment decisions. This, in turn, improves long-term financial planning, reduces investment risks, and strengthens overall financial performance.

7-6-12. Testing Twelfth hypotheses.

Table (15): Regression dependent Variable (investment appraisal)

investment appraisal						
	B0	**SE**	**B1**	**T**	**VIF**	**Sig**
(Constant)	-0.793	0.267		-2.973		0.004
Reduced Costs BI	0.455	0.075	0.365	6.089	1.821	0.000
Improved Productivity BI	0.505	0.058	0.469	8.688	1.476	0.000
Competitive Advantage BI	0.228	0.054	0.268	4.231	2.036	0.000
R Square	0.854					
Adjusted R^2	0.848					
Durbin–Watson	1.855					

Source (prepared by authors)

Table 15 provides the regression results, demonstrating the significant positive effects of Power BI dimensions on investment appraisal. Improved Productivity BI indicates the strongest impact (β = 0.469, T = 8.688, p = 0.000), followed by Reduced Costs BI (β = 0.365, T = 6.089, p = 0.000) and Competitive Advantage BI (β = 0.268, T = 4.231, p = 0.000).

The high R^2 value of 0.854, as shown in Table 15, shows that those three variables give an explanation for 85.4% of the variance in investment appraisal effects. The adjusted R^2 of 0.848 confirms the model's strong explanatory power, and the Durbin–Watson statistic of 1.855 shows no critical autocorrelation.

From an accounting standpoint, the outcomes in Table 15 confirm that Power BI tools significantly enhance investment appraisal practices by enhancing capital allocation, forecasting, and strategic decision-making—positioning accountants as proactive, data-driven advisors in financial planning and investment analysis.

8. Conclusions, Recommendations and Limitations

8-1. Conclusions

1. The results confirm significant positive relationships between Business Intelligence tools (cost reduction, productivity improvement, and competitive advantage) and key financial indicators. BI tools enhance revenue analysis, expense tracking, cash flow management, profitability, financial health, and investment appraisal. From an accounting perspective, integrating BI supports more accurate planning, efficient resource use, and data-driven financial decisions, thereby improving overall organizational performance and financial sustainability.
2. The regression analysis confirms that Business Intelligence tools—particularly those enhancing competitive advantage and productivity—have a significant positive impact on revenue analysis. Competitive Advantage BI has the strongest effect, followed by Improved Productivity BI, while Reduced Costs BI shows a weaker, non-significant influence. The model explains nearly half of the variance in revenue analysis, indicating strong explanatory power. From an accounting standpoint, these results underscore the value of integrating BI tools to improve revenue assessment, enhance financial reporting accuracy, and support strategic decision-making.
3. The results indicate that Business Intelligence tools significantly enhance expense tracking through cost reduction and improved productivity, as

shown by the positive and statistically significant effects of Reduced Costs BI and Improved Productivity BI. However, Competitive Advantage BI does not have a direct significant impact on expense tracking. The model explains 27.7% of the variance, supporting its moderate explanatory power. These findings highlight the importance of adopting BI tools within accounting systems to improve operational efficiency and financial oversight, while the strategic role of competitive advantage may influence financial outcomes more indirectly.

4. The analysis confirms that Business Intelligence tools, specifically those aimed at reducing costs and improving productivity, have a significant positive impact on cash flow management. Reduced Costs BI ($\beta = 0.377$, $p = 0.001$) and Improved Productivity BI ($\beta = 0.359$, $p = 0.000$) contribute to better liquidity control and cash flow efficiency. However, Competitive Advantage BI shows no significant direct effect. With the model explaining 55% of the variance ($R^2 = 0.549$), these findings underscore the vital role of BI in supporting accounting practices by improving operational efficiency and financial stability through enhanced cash flow oversight.
5. The findings indicate that Business Intelligence tools—specifically Improved Productivity ($\beta = 0.378$, $p = 0.000$) and Competitive Advantage ($\beta = 0.582$, $p = 0.000$)—exert a robust and statistically significant positive influence on profitability, as they enhance operational efficiency and foster a competitive edge that bolsters financial performance. On the other hand, Reduced Costs BI does not have a significant direct effect ($\beta = 0.058$, $p = 0.425$). The results show that Business Intelligence plays a key role in supporting profitability by allowing for accurate performance analysis and strategic decision-making within accounting systems. This is shown by the fact that 79.1% of the variance in profitability is explained ($R^2 = 0.791$).
6. The outcomes display that enterprise intelligence (BI) additives which have a fantastic and giant effect on economic health signs include fee reduction, productivity improvement, and aggressive benefit. This demonstrates how making use of BI techniques can increase financial stability by way of reducing expenses, growing operational effectiveness, and giving a aggressive aspect. According to the model's explanatory strength (R2 = 0.439), these variables account for almost 44% of the variant in financial nicely-being. According to the consequences, BI strategies ought to be carried out in accounting to assist human beings make precise, long-time

period monetary selections. This enhances the enterprise's long-term sustainability and economic tracking.

7. The consequences show that BI equipment, like Power BI, substantially growth the accuracy and efficacy of investment assessment. The first intention changed into to growth output, which become followed by using cutting charges and gaining a competitive advantage. The version showed strong predictive strength, accounting for 85.4% of the version in funding assessment. These outcomes reveal how crucial AI technology are for helping humans make informed funding alternatives, decreasing risk, and enhancing lengthy-term accounting monetary overall performance.

8-2. Recommendations

1. The examiner recommends that business firms put into effect business intelligence (BI) abilities into their accounting and economic management structures to beautify the precision of financial making plans and optimize aid usage.
2. Industrial corporations must priorities the improvement and utilization of commercial enterprise intelligence tools that beautify strategic selection-making and revenue analysis, considering that technology substantially impact each area.
3. To adapt to the evolving nature of commercial manufacturing settings, it's far really helpful to utilize enterprise intelligence answers to reduce prices and decorate efficiency through advanced expenditure tracking and financial oversight.
4. Industrial enterprises have to employ business intelligence solutions to enhance cash glide management, ensuring monetary balance and extended liquidity in an ever-evolving market.
5. Industrial businesses should make improving productiveness and aggressive gain through business intelligence technologies a pinnacle precedence. These technologies are what pressure profitability boom and better financial overall performance. The look at shows that commercial groups use BI equipment to enhance their economic fitness by using combining fee-slicing, operational performance, and competitive positioning.
6. It is important for industrial companies to rely on BI tools to enhance investment appraisal processes, enabling timely and accurate data-driven financial decisions, reducing investment risks, and supporting long-term financial sustainability.

8-3. limitations: This study is subject to several delimitations that define its scope and focus. Firstly, the research is limited to analyzing the role of Power BI, specifically, as a business intelligence tool in enhancing financial performance analysis. Other BI tools such as Tableau, QlikView, or SAP BI are not considered in this study.

Secondly, the study is confined to industrial companies operating within the Kurdistan Region of Iraq. As such, the findings may not be generalizable to companies in other sectors (e.g., services, finance, or agriculture) or geographical areas outside this region.

Thirdly, the analysis focuses on six core dimensions of financial performance: revenue, expenses, cash flow, profitability, financial health, and investment appraisal. Other financial or operational metrics are beyond the scope of this research.

Additionally, the data was collected using a structured closed-ended questionnaire distributed to a sample of industrial firms. Qualitative methods such as interviews or case studies were not employed, which may limit the depth of contextual insights.

Finally, the study is time-bound, reflecting the conditions and perceptions prevalent during the data collection period. Therefore, the results may not fully capture changes in BI application or financial strategies that occur after this timeframe.

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