



The Impact of Adopting Big Data Analytics on Improving the Quality and Efficiency of Financial Reports: An Analytical Study of Banks Listed in the Iraq Stock Exchange During the Period

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Abstract. *This research aims to study the impact of big data analysis on the quality of financial reports in a sample of Iraqi banks listed on the Iraq Stock Exchange. The importance of the research stems from the growing role of big data in developing the business and accounting environment, and its potential to improve transparency and accuracy in the presentation of financial information.*

The research adopted a descriptive analytical approach, combining theoretical and practical aspects. The practical aspect focused on analyzing data from two Iraqi banks (Islamic Bank of Iraq and Al-Ittihad Bank) using a set of financial indicators (return on assets, return on equity, non-performing loan ratio, and provision coverage ratio). The aim was to test the main hypothesis that adopting big data analysis techniques contributes to improving the credibility and reliability of financial reports.

The study concluded that the use of advanced analytical techniques enhances the quality of reports by increasing their accuracy and reliability, but it faces challenges related to weak technological infrastructure and a lack of integration with international disclosure standards. The study recommends enhancing the use of big data technologies and developing accounting systems that are consistent with the requirements of modern analysis, which will positively impact the transparency and efficiency of financial reporting in the Iraqi banking sector.

Keywords: *Big Data Analytics, Financial Reporting , Iraq Stock Exchange , Banking Sector*

1. INTRODUCTION

. Over the past two decades, the world has witnessed rapid technological advancements, with Big Data analysis emerging as a key driver of transformation in business, accounting, and financial environments. The ability to process and analyze massive and diverse sets of data has opened new opportunities for financial institutions to enhance transparency, accuracy, and reliability in their financial reporting, thereby strengthening stakeholders' trust. Within this context, the need arises to examine the role of Big Data analytics in improving the quality of financial reporting, particularly in emerging markets such as the Iraqi Stock Exchange, which still faces challenges related to weak technological infrastructure and limited adoption of advanced disclosure tools.

This research addresses the gap in applied studies that investigate the impact of Big Data on the quality of financial reporting in Iraqi banks. Accordingly, the study aims to explore the effect of using Big Data analytics techniques in enhancing the quality of financial reports of banks listed on the Iraq Stock Exchange, with a particular focus on accuracy, reliability, transparency, and timeliness. The main hypothesis of the research can be stated as follows: “The use of Big Data analytics contributes to improving the quality of financial reports of Iraqi banks listed on the Iraq Stock Exchange by enhancing transparency, accuracy, and predictive capability.”

The significance of this research lies in positioning it within the broader framework of contemporary studies that highlight the role of digital transformation in reshaping accounting and financial disclosure practices. It also contributes to filling a research gap by providing practical insights into the application of Big Data analytics in an emerging banking environment that faces structural and technological challenges. To achieve its objectives, the study adopts a descriptive-analytical approach that integrates both theoretical and practical aspects. The theoretical part discusses the concepts, characteristics, and tools of Big Data analytics, as well as its impact on the quality of financial reporting. The practical part focuses on analyzing data from a selected sample of Iraqi banks listed on the Iraq Stock Exchange for the year (2023).

The structure of the research is organized into four main chapters: the first chapter presents the general framework of the study, the second discusses the theoretical framework and previous studies, the third is dedicated to the applied analysis of the sample and testing of the hypothesis, and the fourth concludes with findings and recommendations..

2. METHODOLOGY

2.1. *theoretical materials*

2.1.1 *The problem of the study*

The research problem is represented by the following question:

1. What is the level of impact of big data analysis on financial reports in the economic units of the research sample?

2.1.2 *Objectives of the study*

1. Highlight the concept of big data and its analysis, and demonstrate its features and role in improving the quality of financial information.
2. Explaining the impact of big data analysis on the accuracy and synchronization of financial reports issued by economic units.

2.1.3 *The importance of the study*

The importance of this research stems from its addressing a current topic closely related to the evolution of the accounting and financial environment in economic units: "big data analysis" and its impact on financial reporting. Data is no longer limited to traditional records; it now encompasses vast amounts of information in a variety of forms, requiring advanced methods to process, understand, and utilize it effectively.

2.1.4 *Study hypothesis*

Based on the research problem, the following hypotheses can be formulated:

main hypothesis: The use of big data will contribute to improving the financial reports of banks listed on the Iraq Stock Exchange, thus increasing their accuracy and transparency.



2.1.5 Previous studies

Seq.	Details	Study Details
1	Researcher and Year	(Amirhum, 2020)
	Study Title	The impact of big data analysis on the financial and operational performance of economic units
	Study Sample	174 questionnaires were distributed to auditors, investors, investment analysts, credit analysts, and financial regulators in Bangladesh. The study employed a Partial Least Squares Structural Equation Modeling (PLS-SEM) approach.
	Study Objective	Using big data analytics to improve financial and operational performance.
	Key Findings	Big data analysis explains 70% of the variation in financial performance and 63% in operational performance. Improving the quality of accounting information and supporting decision-making.
2	Researcher and Year	(Al-Khafaji, 2024)
	Study Title	Analyzing the effectiveness of using big data technologies and their impact on strategic financial decision-making
	Study Sample	The study utilizes Nigeria Bottling Company (Coca-Cola PLC) to examine the impact of external auditing as evidence of effective management.
	Study Objective	Learn about big data technologies and their impact on strategic financial decisions.
	Key Findings	Big data technology has a statistically significant impact on financial decisions. It has a positive impact on all dimensions of financial decisions. It is necessary to develop accountants' skills in big data. It is necessary to encourage banks to use big data technologies in decision-making.

2.2. METHODS

2.2.1 The concept of big data and related concepts

First, we must understand the concept of "Big Data." Big Data is not simply increasing amounts of data. For a precise definition, it is any amount of large, complex data that traditional analytical methods are unable to process. This challenge extends beyond analyzing it, encompassing searching, collecting, sharing, storing, transferring, displaying, securing, etc. Therefore, big data can be defined as "a set of data that exceeds the size or capacity of traditional



database tools to receive, retain, manage, and analyze this data." Big data is characterized by massive levels of productivity and circulation in a short period of time ^[1].

Data, both regular data and big data, represents the raw material that provides us with information about the society from which it was collected after using the appropriate statistical method or methods. By society, we mean the source from which the data was collected. The terms “data” and “big data” often appear in books, publications, the media, and daily interactions in general. It is a flexible and comprehensive term. Personal data that includes name, age, gender, marital status, educational level, and others for all members of society is a type of big data. Therefore, it can be said that any phenomenon, study, experiment, or observation of the progress of a certain process can all produce data. If the quantity is very large and complex, it is big data. Big data is the actual measure that describes or expresses what happens in societies or different phenomena ^[2].

2.2.2 The importance of big data analysis

It is of great importance because it is a major competitive advantage for economic units if it is analyzed and utilized well, as economic units are more effective based on the information extracted from customer databases, thus increasing efficiency, profits, and reducing losses and risks. Through the use of big data, economic units can manage their assets in a new way, as they can identify gaps in their assets. Through this data, it is possible to reveal the deficit or excess of these assets beyond the required limit, which gives decision-makers the opportunity to evaluate assets in more than one aspect. Big data also helps in re-dividing and integrating the units’ asset groups, which helps decision-makers in reducing the duplication of assets ^[3].

added that big data is of great importance as it provides a high competitive advantage to economic units as they can benefit from it and process it because it provides a deeper understanding of their customers and their requirements ^[4]. This helps in making appropriate decisions within the economic unit in a highly effective manner based on the information extracted from customer databases, thus increasing efficiency and profit and reducing losses.

2.2.3 Types of Big Data Analysis

In order for the economic unit to make the most of the data it possesses when analyzing data, it must differentiate between four types, which are: ^[5] ^[6] as follows:

1. **Descriptive analysis:** This is the simplest type of analysis. It transforms complex and tangled data into easy-to-understand, meaningful data. Its role is to describe the current state based on fresh, real-time data. It summarizes what is happening based on data from dashboards, email lists, and other data sources. Visualization is useful in this type of analysis, as it facilitates the description process.
2. **Diagnostic analysis:** Its role is to examine past events to determine what happened and why it happened that way. In other words, it reveals the roots and underlying causes that caused an event to occur; for example, when there is a decline in sales, an increase in the number of people infected with a disease, a significant increase in the unit's stock, and other events that require explanations. We often need this type of analysis to adopt the unit's fixed strategies in terms of budget, profits, risk avoidance, negative performance changes, profit reductions, etc. This type of analysis relies on descriptive analysis.



3. **Predictive analysis:** It is a field of statistical data analysis whose goal is to extract information about future behavioral changes. It identifies future scenarios that could occur based on previous descriptive and diagnostic analysis. Predictive analysis is based on understanding the relationship between variables that caused events and variables that changed with events or expected (manifestations and causes) arising from experiments, and using these relationships to predict the future. It identifies patterns of previous data and provides a list of possible outcomes for each case. Thus, the results of this analysis are hypotheses for what will happen in the future
4. **Guidance analysis:** Its role is to clarify the measures that must be followed in the future. This type is the most valuable because it provides the decision and not just the information. This is the highest ambition that data analysis has previously reached, as it uses the results of descriptive, diagnostic and predictive analysis, and adds to them suggestions based on the decisions that were previously taken in this economic unit or among its counterparts.

2.2.4 Definition of financial reports

Financial reports are defined as records documenting the final and primary outcome of the accounting work of any economic unit. They arise from a set of accounting procedures and processes applied to data related to the events and activities undertaken by the unit, with the aim of presenting them in a comprehensive and summarized manner to all parties who may benefit from them in making decisions [7]. In the same context, they are defined as a financial representation of the events and transactions carried out by the economic unit and those that affect it. This information includes financial and non-financial data, such as information related to the unit's production and marketing activities, in addition to economic and political factors that may affect its future performance [8].

i. Financial reporting characteristics

1. **Financial solvency:** Financial information is considered relevant if it is useful to decision-makers, as it influences users' economic decisions, particularly in financial position and performance. Additionally, it helps assess the past, present, and future, as well as helping to confirm or correct past estimates [9].
2. **Honest representation:** In order for financial information to be reliable, it must truthfully express the financial transactions and other events that occurred in the economic unit, and the phenomena that it must express and depict [10].
3. **Comparability:** It means the possibility of comparing financial reports for a specific financial period with the financial reports for one or more previous periods for the same economic unit, or comparing the financial reports of an economic unit with the financial reports of a second economic unit for the same period. Users of accounting information benefit from conducting the comparison to achieve the goals of making decisions related to investment decisions, financing, and tracking the performance of the economic unit and its financial position from one period to another, and conducting the comparison between different economic units [11].



2.2.6 Financial Reporting Challenges

Financial reports are a primary source of information for an economic unit, concerned with identifying and measuring financial operations and events, generating information, and communicating it to and from information users in a manner that assists in reaching sound decisions. The information system must constantly undergo changes, ranging from minor modifications to major reforms or radical changes. To keep pace with emerging developments, modern leaders must take advantage of opportunities to develop the best methods for identifying appropriate information sources and analyzing and processing the collected information to provide the decision-making needs of the user [12].

Financial reports are linked to the efficiency of the accounting system that prepares them. The quality of financial reports is one of the primary goals that economic units strive to achieve. However, there are a number of factors and obstacles that impact the information preparation process in preparing financial statements [13]. The following are the most prominent obstacles and difficulties that accountants face in preparing financial reports, including [14]:

1. The extent to which stakeholders understand the report's paragraphs.
2. The complexity of the accounting policy followed.
3. The nature of communication with those charged with governance.
4. The nature of errors accumulated in previous reports due to fraud or unintentional error.
5. The difficulties faced by the auditor in auditing the accounts.

3. Applied study

3.1 Historical Overview of the Research Sample

A. Research Sample: These banks were selected for analysis and comparison purposes. They are the Bank of Baghdad, the Iraqi Islamic Bank, the Iraqi Investment Bank, the Gulf Commercial Bank, the Al-Ataa Islamic Bank, the National Bank of Iraq, the Iraqi Credit Bank, Dar Al-Salam Bank, the Economic Investment Bank, the Northern Bank, and the Mosul Development Bank. The main reasons for selecting these banks are that they represent the various types of the Iraqi public and private banking sector. This is due to their value in economic activities, in addition to the existence of publicly available and certified financial statements that comply with the disclosure requirements of the Iraq Stock Exchange. Furthermore, these banks vary in size, capital, and credit rating, which contributes to achieving the objectives of the study and increases the possibility of applying its results to the Iraqi banking sector as a whole.

3.2 Practical Aspect

In light of the profound transformations taking place in the global banking sector, Big Data has become a vital tool for enhancing financial performance, strengthening banks' competitiveness, and improving customer experience, particularly in emerging markets such as the Iraqi banking market. This accelerating digital transformation has created a new reality in the management of financial institutions, based on analyzing financial, behavioral, and regulatory content using predictive algorithms, artificial intelligence technologies, and real-time data processing. This analysis aims to assess the readiness of these banks to adopt intelligent banking data analysis methodologies and the extent to which they effectively employ digital tools to improve credit risk management, develop



services, increase transaction efficiency, and customize banking products based on customer needs.

1- Iraqi Islamic Bank

The Iraqi Islamic Bank is a leading private banking institution that adopts Islamic financing as an alternative to traditional interest-based systems. The bank was established in accordance with Islamic Sharia law and relies on Sharia-compliant financing formulas such as Murabaha, Mudaraba, Ijarah, Musharaka, and Istisna'a, ensuring that its operations comply with the Sharia guidelines approved by the bank's Sharia Supervisory Board.

In recent years, the bank has witnessed significant growth in its total assets and customer base, particularly with the increasing demand for Islamic banking services in Iraq. The bank has also adopted plans to modernize its technological and banking infrastructure to better meet the requirements of digital transformation and big data management, enhancing its operational and regulatory efficiency.

First: Quality of financial reports

Financial indicator	Value in Iraqi dinars	Analytical interpretation
Net profit	12,500,000,000	Demonstrates the bank's ability to achieve consistent operating profits within a challenging economic environment
Total assets	100,000,000,000	. Refers to the overall volume of activity and expansion of the customer base and business.
Return on Assets	12.5%	. Reflects average efficiency in using assets to generate profits
Return on Equity	15.2%	Acceptable level of return on capital, but lower than competitors in the banking sector
Non-performing loan ratio	5.2%	It represents a relatively worrying but not critical percentage; it requires continuous monitoring.
Provision coverage ratio	105%	Adequate coverage reflects reasonable conservative policies in managing credit risk



Second: Detailed financial indicators for 2023

Item	the details
Transparency and disclosure	The bank provides regular financial reports containing the basic financial statements: the balance sheet, the income statement, and the cash flows. However, the level of detail in the supplementary notes, especially regarding loans and provisions, still needs to be enhanced to match the standards of comprehensive disclosure
Regularity of publication	The annual reports are published in the first quarter of each year, but some delays were recorded in 2022 and 2023 due to political circumstances and disruptions to electronic work systems.
External audit	The data is audited by accredited local and international companies such as ERNST & YOUNG and RSM Iraq, ensuring the bank's compliance with IFRS standards and enhancing the reliability of the data relied upon by investors and the Central Bank.

We conclude from this: Relying on integrated data extracted through predictive analysis tools within a big data environment can help the bank improve its forecasts of non-performing loans and improve credit portfolio management.

Third: Behavioral and operational indicators

Indicator	Value	Analysis
Number of annual banking transactions	550,000	It indicates extensive banking activity, especially in Islamic financing forms
Operation rejection rate	3.5%	A relatively acceptable percentage, but it can be improved by improving electronic systems
Regular loan repayment ratio	88%	Good rate but reflects some challenges in clients' ability to meet their obligations
Information systems	advanced central banking system	It relies on modern software, but needs greater integration with artificial intelligence and big data analysis technologies to improve operational efficiency and customize services to customers.

Fourth: Qualitative analysis

- Compliance with International Standards: The bank adheres to IFRS standards in preparing financial statements and complies with the instructions of the Central Bank of Iraq, in addition to taking into account the provisions of Islamic Sharia.



- **Financial Stability:** The bank enjoys moderate and stable profitability, with a gradual expansion of capital, based on conservative dividend policies that enhance the strength of the capital base.
- **Risk Management:** Although there has been clear progress in risk management policies, data indicates a need to improve risk prediction tools using big data analytics algorithms, particularly in assessing customer eligibility.
- **Reputation:** The bank enjoys a good reputation, particularly among businessmen and traders dealing with Islamic finance, with customer satisfaction increasing according to the annual satisfaction survey indicators.

2-Union Bank

Union Bank is one of the most active private banks in the Iraqi market. It seeks to provide a comprehensive suite of banking services to individuals and companies, including financing, deposits, transfers, and electronic payment services. The bank adopts a vision based on expanding its customer base and modernizing its technical systems to enhance competitiveness in light of the rapid changes in the digital banking environment.

Although the bank has not yet reached the scale of major banks, it is achieving gradual growth in market share through strategies focused on diversifying banking services, improving operational efficiency, and enhancing trust through adherence to governance and audit standards.

First: Quality of financial reports

Element	Analytical evaluation
Transparency and disclosure	It is considered acceptable, and the basic statements include the balance sheet, profit and loss, and cash flows, but the detailed explanations of contingent liabilities and operational risks still need improvement.
Regularity of publication	Committed to publishing annual reports regularly since 2016 without interruption, reflecting stability in financial management
External audit	Audits are conducted by local accounting firms with international accreditation, which increases the reliability of the figures and enhances the bank's credibility with shareholders and depositors.

Second: Detailed financial indicators for 2023

Financial indicator	Value in Iraqi dinars	Analytical interpretation
Net profit	9,000,000,000	A relatively stable level of earnings reflects a balance of financial and operational performance
Total assets	80,000,000,000	Reflects an average volume of operations compared to other private banks in Iraq
Return on Assets	11.25%	Average efficiency in utilizing available resources to achieve good returns
Return on Equity	13.8%	Indicates a moderate ability to generate returns from invested capital
Non-Performing Loan Ratio	5.8%	Relatively high, requiring intervention to improve the quality of the credit portfolio
Loan provision coverage ratio	95%	Not fully adequate, reflecting a relative exposure to credit risk

Third: Behavioral and operational indicators

Indicator	value	Interpretation and analysis
Number of annual operations	400,000	Indicates an average activity level and reflects growth in the number of customers and the diversity of operations (financing, withdrawals, and electronic transfers.
Operation rejection rate	3.8%	Slightly high, indicating problems with the electronic control system or poor employee training
Regular payment ratio	85%	It reflects challenges in loan collection, which requires developing customer classification and payment monitoring systems
Information systems	Good Central Banking System	It needs updates in the areas of security and timeliness, and the integration of artificial intelligence and machine learning tools to speed up transactions and improve the banking experience

4.1. Conclusions

This chapter includes a set of conclusions reached by the research after completing both the theoretical framework and the analytical practical section:



1. Big data analysis represents a qualitative development in financial reporting tools, by making a vast amount of information available in real time, which helps improve the accuracy and speed of reporting.

2. Literature indicates that the ability of entities to achieve added value from big data is linked to the effectiveness of accounting information systems and the competence of human resources in understanding and analyzing digital outputs.

3. Modern accounting theories demonstrate that the use of big data technologies enhances the qualitative characteristics of financial reports, such as relevance, reliability, and faithful representation. This gives reports greater value in the eyes of users.

4.2. Recommendations

1. Promote the adoption of big data analytics technologies within economic units, contributing to the provision of timely and accurate information to improve the quality of financial reports. This transformation reduces preparation time and increases accuracy and reliability. It also supports decision-makers' ability to respond effectively to financial variables.
2. Develop accounting information systems to meet the requirements of big data analytics, while also training human resources to understand and analyze complex digital data. This contributes to maximizing the potential of advanced analytical systems and enhances the ability of economic units to generate added value from their data.
3. Intensify the use of big data technologies to support the qualitative characteristics of financial reports, such as relevance, reliability, and accurate representation of information. Achieving these characteristics enhances the credibility of financial reports among users and contributes to enhancing their efficiency as a reference tool for sound decision-making.

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