



TECHNIUM
SOCIAL SCIENCES JOURNAL

www.techniumscience.com



Vol. 73/2025
A New Decade for Social Changes

PLUS
COMMUNICATION P



International
Communication & PR

The role of block chain in protecting financial data

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Abstract. This study discusses the basic components in the field of block chain by studying two main variables: the block chain (asymmetric encryption key, transactions, consensus mechanism between nodes) as an independent variable and financial data protection as a dependent variable. This study provides a vision, forecast, and evaluation of the best economic conditions and company performance in the future. In addition, this study aims to help users and developers through the application programming interface, allowing them to easily replicate data through the blockchain and its impact on financial data.

Keywords. Block chain, financial data, Internet of Things, financial analysis

Introduction

Technological advancements and their adoption began to permeate the service industry in the post-industrial era (Collier, 1983). Since the development of the Internet, organizations have been adopting new information technologies and information systems to provide competitive customer service and enhance corporate value (Chuang & Lin, 2015; Law et al., 2014; Thajil & Al-Abrrow, 2024). Such technologies are adopted to deliver services, referred to in the literature as e-services, and are defined as "the use of new information technologies via the Internet to enable, improve, enhance, transform, or invent a business process or system." "Tasks, solve problems, conduct transactions, or create value for current or potential customers" (Benaroch & Appari, 2011). Block chain technology has recently gained significant public attention and is believed to have the potential to disrupt various application areas. Blockchain is defined as "an encrypted, decentralized electronic ledger that serves as an immutable, incorruptible, linear event database of information/transactions shared among network members" (Risius & Spohrer, 2017). Additionally, Block chain technology can play a major role in protecting financial data by resolving most of the security vulnerabilities and traceability concerns in financial transactions by tracking how devices interact. Block chain is hack-resistant and has a low risk of breach, improving data security (Ahamad & Gupta, 2022). The purpose of financial statements is to provide information about the financial position and changes as a very important basis for managerial decision-making (Asllanaj, 2008). The purpose of financial statements is to provide information about the financial position, financial performance, and changes in the financial position of an entity, which can be used by a wide range of users in Making their economic decisions (Lewis, & Pendrill, 2004).

Theoretical Framework

Block chain

The aggregated dataset forms the core of the block chain, which in turn consists of a set of data blocks. Each block contains several transactions and a unique value for each block, referred to as a block hash (Nofer et al., 2017). This value is therefore a form of encryption that protects against fraud due to the sensitivity of these values when attempting to alter any transaction (Zheng et al., 2018). The integrity of these blocks is usually verified using cryptographic tools (Thajil et al., 2024). This is typically done by accepting the bulk of the data packets and their transactions as a prerequisite and criterion for judging the integrity and validity of the blocks, thus adding those blocks to a connected chain (Glaser, 2017; Catalini & Gans, 2020). Key Components of Block chain:

Block chain technology consists of several essential components, namely asymmetric encryption keys, transactions, and finally, a consensus mechanism between nodes (Puthal et al., 2018). The main component of asymmetric encryption is the adoption of block chain technology to protect data exchange and preserve it from hackers (Li et al., 2017.)

Block chain Applications:

Block chain applications are very broad, and there are many different types of applications. For example, block chain is applied to end-user applications, server-based applications, supply chain applications, and web applications (Bodkhe et al., 2020). Blockchain users perform a variety of roles, sometimes as auditors, sometimes as operators, administrators, or business users. In general, blockchain applications rely on APIs as an important means of accessing a range of services, such as databases, and also for deploying those services (Bhattacharya et al., 2019). These blockchain services can support and enhance diverse and diverse applications, such as those in business, accounting, finance, healthcare, insurance, supply chain, and energy-related fields, resulting in benefits for organizations by reducing effort, time, and costs (Vora et al., 2018a; Fraga & Fernandez 2019).

Block chain can provide significant assistance and support to both users and developers through application programming interfaces (APIs), allowing them to easily replicate data and reuse information to suit their services. Block chain provides multiple APIs that can significantly support business processes (Johng et al., 2018; Khan & Saad, 2018; Bhattacharya et al., 2019). On the other hand, block chain technology is one of the most important applications. Thanks to this technology, it supports smart healthcare, which represents a qualitative shift in the field of data storage compared to traditional methods. It is characterized by storing patient-related data in a manner that tends to be centrally organized. Moreover, not everyone can access this data to protect patient privacy and maintain data security for fear of hackers (Wang et al., 2018a; Vora et al., 2018a). In order to address the problems that prevent traditional healthcare from meeting all requirements for successful and effective performance (Yaga et al., 2019), block chain technology has been introduced into the healthcare system under the title of smart healthcare, which relies on implementing its procedures and practices through smart tools for storing and transferring data and monitoring various patient conditions remotely (Jhala et al., 2018; Bodkhe et al., 2020). It is connected via wearable devices (Vora et al., 2018b; Catalini & Gans, 2020).

Financial Data Protection:

According to accounting standards, financial statements are an organized presentation of the financial and transactional data of an organization. Primary financial statements are the means used by accounting to collect, process, and present economic information. The purpose of financial statements is to provide information about the financial position and changes, which

is a very important basis for managerial decision-making (Asllanaj, 2008). The objective of financial statements is to provide information about the financial position, performance, and changes in an entity's financial position, which can be used by a wide range of users in making their economic decisions (Lewis & Pendrill, 2004). Examples of these statements include:

- Balance Sheet
- Cash Flow Statement
- Income and Expense Statement
- Statement of Changes in Equity
- Explanatory Note Statement
- Statement of Income and Expenses

This statement shows the financial results of a company over a period of time (monthly, quarterly, or annually). It summarizes the revenues and expenses incurred to generate this income.

Income – represents the amount of assets generated by business operations.

Expenditures represent the amount of assets consumed during business operations, respectively, and the inflows and outflows incurred during the production of goods and services (Asllanaj, 2008). The difference between income and expenses represents net income or net profit. Financial analysis indicators are linked to financial statements, and these key financial analysis indicators are the following ratios (Jaswadi et al., 2024)

Liquidity ratio

Profitability ratio

Asset turnover ratio

Long-term solvency ratio (debt)

The importance of liquidity and its analysis

As is well known, a company's liquidity refers to its ability to settle short-term obligations as they fall due. Liquidity, therefore, is the ability to convert activities into cash or generate money in another way (for example, through financing) (Mayo, 2012)

Liquidity analysis through working capital - Working capital is consistently considered one of the most important and crucial indicators in analyzing an organization's liquidity.

From the perspective of creditors, working capital is always one of the first indicators to consider. This is because creditors always seek to find and read "security" in financial statements. They are interested in liquidity because it "protects" them from the undesirable situation of a liquidity shortage (Gupta & Mehta, 2024). Financial statement analysis reviews a company's various financial statements, such as the balance sheet, income statement, statement of equity, and cash flow statement, to analyze its performance and determine the firm's worthiness. Such analyzed data is used by both internal and external users of the company to make better decisions and attract additional investors. There are three basic methods used for analysis: horizontal, vertical, and ratio analysis (Kenton et al., 2022).

Study Problem:

Many studies have indicated that the application of block chain technology has become more active in the financial sector, expanding into settlements, transfers, securities, and smart contracts (Yoo, 2017). Block chains are designed to preserve the data stored in them and prevent modification. This means that once information is stored in the block chain, it cannot be modified later (ICAEW, 2018). Block chains represent a ledger containing the transactions, contracts, and invoices of thousands of users on the chain. Records can be compiled within the chain and encrypted in a complex way. This ledger is shared on the chain, but it can only be

updated and changed with the consent of all parties on the chain. Therefore, it changes the way traditional accounting and auditing are conducted (Simon et al., 2017). Based on this, block chain technology is more transparent and clear, as all nodes can easily access data, which exposes this data to the possibility of intrusion and hacking. Study Objectives In light of the two variables adopted by the study problem, the study attempts to analyze and test the key role played by block chain technology in protecting financial data and other objectives that can be summarized in the following points

1. Growing interest in block chain technology as a modern global technology, as it provides effective oversight for all stakeholders in institutions due to its high level of disclosure and transparency.
2. Testing the role of block chain in protecting financial data by identifying the nature of its work, advantages, and impacts.
3. Testing the relationship between block chain and financial data protection.

The Importance of the Study

In light of previous, old and recent studies on the nature of block chain technology, its operation, and its impact on protecting financial data, this study sought to examine the reality of this role in light of global developments at all levels and the increasing digitization of financial services. Ensuring financial data security measures has become essential to maintaining customer confidence in the financial system. Block chain technology plays a significant role in increasing data security in financial transactions (Mbaye, 2021; Hawash et al., 2022; Muhammad et al., 2022; Farayola, 2024). These technologies enable secure and efficient operations, protect against cyber threats, and ensure the integrity and confidentiality of financial data. Furthermore, block chain is a distributed, time-stamped data structure that allows for a distributed, peer-to-peer network that serves as an interactive medium for untrusted members who do not need a trusted authority. Block chain technology is an interesting area for future research. However, despite its advantages in protecting and securing financial data, there are difficulties and challenges facing the adoption of this technology, which need to be discussed to meet future needs (Kumar et al., 2019; Mohammad & Thajil, 2023).

Study Hypotheses

After reviewing previous studies related to the current study variables, and in light of the study problem upon which the hypothetical scheme was based, and the objectives formulated and sought to be achieved by the researchers, the study hypotheses can be formulated as follows:

" There is a direct, positive, and statistically significant relationship between block chain and financial data protection"

Data Collection

To cover the field aspect of the study, the researchers relied on a questionnaire to collect data from the study sample. Questionnaires are an important means of data collection, and are commonly used in studies where data is difficult to obtain through observation, such as past and future situations and events. The questionnaire was used as the primary source of information collection. It was designed using a five-point Likert scale, which includes the following responses: (Strongly agree "5", Agree "4", Neutral "3", Disagree "2", Strongly disagree "1"), through which the respondent selects one of the specified alternatives. Describe the Population and Sample

In order to achieve the study objectives, a survey was conducted on a group of employees at Rafidain Bank, Rashid Bank, Al-Tayf Bank, and the Development Bank in Dhi Qar Governorate, all affiliated with the Ministry of Finance in Iraq.

To accurately represent the study population, free from bias, the researcher used a simple random sampling method, as individuals in the research population would have equal opportunities to represent the study sample (Hair et al., 2015: 177). A random sample of (263) individuals was selected, distributed among them and randomly selected.

Practical Aspect

First: Statistical Validity of the Research Scales

The statistical validity of the study scale was verified as explained in the steps listed below:

1. Stability of the research scale:

Table (1) shows the internal consistency of each item of the scale. The stability of the research scale was verified using Cronbach's alpha coefficient.

Research Variables	Cronbach's alpha
Blockchain	0.889
Financial Data Protection	0.875
Overall Reliability of the Research Scale	0.900

Source: Prepared by the researcher based on the outputs of SPSS, v.24

2. Descriptive analysis of research variables

Seq.	Dimensions	Arithmetic mean	Standard Deviation	Coefficient of variation	Relative importance	Order of importance
1	Blockchain	3.885	0.596	15.34%	77.7%	1
2	Financial Data Protection	3.837	0.675	17.59%	76.74%	2

Table (2) above shows that the block chain variable had the highest mean, reaching 3.885, with a standard deviation of 0.596. This indicates that the organization under study is working to support technological technologies that contribute systematically to their adoption in work practices, and is making efforts to develop and adopt these new technologies and contribute to the implementation of new ideas in the workplace. The second: Testing Research Hypotheses

1. Correlation between Research Variables The correlation coefficient represents one of the methods or techniques of inferential statistics. It is used to determine the nature, direction, degree, strength, and significance of the linear relationship between two variables. Furthermore, inferential statistics refer to statistics that enable us to draw conclusions from sample data and generalize them to the study population (Zikmund et al., 2010: 413). If the correlation value is between 0 and +0.2, this indicates the absence of a correlation between the variables. A weak positive correlation occurs when it is between +0.2 and +0.35. While the correlation is moderately positive when it is +0.35 to +0.6, the correlation is

A strong positive correlation is observed when it is (+0.6) to (+0.8) and a very strong positive correlation is observed when it is (+0.8 to +1). If the correlation coefficient is (+1), this indicates a perfect positive correlation. If the correlation value is between (0) to (-0.2), this indicates that there is no correlation between the variables, and a weak negative correlation is observed when it is (-0.2) to (-0.35). While the correlation is moderately negative when it is (-

0.35) to (-0.6), a strong negative correlation is observed when it is (-0.6) to (-0.8) and a very strong negative correlation is observed when it is (-0.8 to -1). (-1) indicates a perfect negative correlation (Saunders & Townsend, 2016: 545). Table (3) shows the correlation relationships between the variables of the hypothetical research scheme.

Table (3) Correlation relationships for the variables of the hypothetical research plan

Correlations		
Research Variables	Blockchain	Financial Data Protection
Blockchain	1	
Financial Data Protection	0.593**	1

Source: Prepared by the researcher based on the outputs of SPSS, v.23

2. Testing the Hypotheses of Influence between Research Variables

This test was conducted using Path Analysis using the AMOS V.20 statistical analysis program to verify the influence relationship between the main research variables.

Table (4) The relationship of influence of independent variables on dependent variables

path	Estimate	S.E.	C.R.	P	results
Blockchain --> Financial Data Protection	0.442	0.096	5.032	***	Hypothesis is accepted

Based on what is stated in the table above, we arrive at the acceptance of the first hypothesis, which states that the existence of the blockchain enhances the possibility of protecting financial data effectively, as it is clear that there is a statistically significant effect of 0.442, which leads to the acceptance of the first hypothesis (Tabachnick & Fidell, 2001: 687).

Conclusions:

- Block chain technology creates a world of prosperity for financial institutions through optimal resource utilization, reducing risks, protecting financial data, and facilitating financial transactions between institutions without the need for correspondent banks.
- Blockchain technology plays an incentive role for customers seeking to transfer their funds quickly and at lower costs; it also contributes to increased productivity in financial institutions.
- Block chain technology has emerged as a tool to reduce administrative and financial corruption in financial institutions. It is an effective tool for data protection through complex encryption technology, which contributes to preventing hacking or electronic piracy and ensuring the secure exchange of funds and data.
- Block chain technology achieves global quality standards and enhances competitiveness and sustainability by protecting and maintaining the integrity of financial data; protecting consumer interests; transparency; accountability; and data oversight without the need for or recourse to a trusted central authority.
- Despite the many advantages of block chain technology, there are risks associated with its use, as it limits the use of intermediary institutions, the potential for theft of individual financial data, and the lack of privacy for data within the block chain.
- Block chain has not gained general acceptance in financial institutions due to privacy concerns, a lack of trust among stakeholders, and a lack of administrative and political incentives.

Recommendations

• This study highlights the characteristics of block chain in protecting financial data. It has proven that this technology plays an effective role in securing data and preventing tampering through complex encryption technology. Its adoption by financial institutions will enhance the attraction of customers seeking to transfer their funds quickly and at a lower cost.

• Implementing block chain technology in financial institutions requires a collaborative approach between institutions to keep pace with technological developments, which will reduce financial costs, facilitate transaction exchange, and enhance competitiveness in the financial sector.

• It is essential for Iraqi financial institutions to intensify their delegation programs to countries with financial institutions that operate blockchain technology to transfer successful experiences and benefit from them. In light of this rapid technological development in the financial sector, only institutions that keep pace with developments will have the ability to compete and increase production.

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