

Digital Transformation and Blockchain Technology: A New Horizon for Cost and Managerial Accounting

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Abstract: *Its importance is highlighted by exploring the role of digital transformation and blockchain technology in developing cost and managerial accounting systems, and the resulting improvement in information accuracy and transparency, as well as providing institutions with a cognitive and applied framework that enables them to effectively employ these technologies to address the challenges of traditional systems, such as slow information flow, frequent errors, and weak reliability. This leads to future developments, as it supports the transition towards a smart and secure accounting environment, capable of keeping pace with banking technology requirements and enhancing the competitiveness of institutions and banks. Aim Understanding the concept of digital transformation and blockchain, their most important characteristics in the accounting field, and analysing the impact of digital transformation on the speed and accuracy of cost and managerial accounting data, as well as studying the role of blockchain in enhancing the reliability and transparency of accounting information and evaluating the effectiveness of integration between digital transformation and blockchain in developing cost accounting systems, leading to the provision of practical recommendations for applying these technologies in various business environments, including banks. Problems Due to rapid developments in information technology, many institutions and banks still use traditional accounting systems, particularly cost and managerial accounting. This negatively impacts the processing and flow of cost data and increases the likelihood of errors in calculating or estimating product costs or providing banking services. This raises several questions, as follows: How does digital transformation contribute to improving the accuracy and efficiency of cost and managerial accounting systems? To what extent does the integration of digital transformation and blockchain technology create added value compared to implementing each separately and enhancing transparency and reliability in cost and managerial accounting? Hypothesis Digital transformation and blockchain technology contribute to improving the accuracy of accounting information, enhancing its transparency, and raising the efficiency of administrative decisions in cost and managerial accounting systems. Results Total Difference Ratio between current system, and digital transformation technology, and blockchains is 0.728 approximately 73%.*

Keyword: Digital Transformation, Blockchain Technology, Cost and Managerial Accounting Systems

JEL: G4, H50, M41

INTRODUCTION

Cost management is a core function of businesses and banks. Cost management is defined as the actions managers take in the short and long term to plan and control costs, increasing customer value and reducing the costs of products and services. Cost accounting measures and reports financial and non-financial information related to an organization's acquisition or use of resources it provides information for both management and financial accounting. Management accounting is an integral part of management. It combines accounting, finance, and management with the latest technologies that contribute to business success. Many managers now use data and information analysis techniques to gain insights into the data they collect (Charles T. Horngren, Srikant M. Datar., Madhav V. Rajan., & Alnoor Bhimani, 2023). The vast amount and variety of data has led to the development of many new forecasting techniques. Management accountants apply accounting and financial management principles to create, protect, preserve, and increase value for for-profit and non-profit companies in the public and private sectors. They may participate in identifying, generating, analysing, interpreting, and using information. Hence, the need for digital transformation and blockchains emerged. Digital transformation is defined as the process of sectors or companies transitioning to a business model that relies on digital technologies to innovate products or services and provide new revenue channels that increase the value of their products (Abdel Wahid, al-kateb, & Tijani, 2024). Blockchains offer secure and cost-effective digital transactions by eliminating intermediaries such as banks and exchange centres. They simplify operations, enhance transparency, and facilitate cross-border payments between partners. Decentralization enhances fraud, automates various banking operations, and promotes financial inclusion through digital wallets and cryptocurrencies (Al-Dmour, Al-Dmour, Al-Dmour, & Al-Adwan, 2024).

LITERATURE REVIEW

The Concept of Digital Transformation: There are many definitions of the term "digital transformation." It can be considered a phenomenon resulting from a group of modern digital technologies operating simultaneously. These technologies include artificial intelligence, cloud computing, blockchain, and others. Digital transformation leads to the production of large and new amounts of information that can contribute to decision-making and strategic planning (Ahmed A. A., 2024). It is the use of information and communications technology to improve institutional performance and increase the effectiveness and efficiency of government service delivery by employing modern and innovative technologies (Ebraheem, 2023). The objectives of digital transformation at the social and economic levels are as follows:

Promoting the development of more innovative and collaborative technological systems and a financial culture at the institutional and societal levels, as well as transforming the education system to provide new skills and future guidance for individuals so they can achieve excellence in digital work and society.

Establishing and maintaining digital communications infrastructure, ensuring its management and accessibility, balancing service quality and costs, enhancing digital data protection and transparency, ensuring independence requirements, and enhancing trust.

Improving access to services, establishing controls, mechanisms, and the quality of digital services provided to society, implementing new and innovative business models, and improving the regulatory framework and technical standards (Al-Mutairi M. A., 2022). And From the figure below, we can see the Transaction workflow

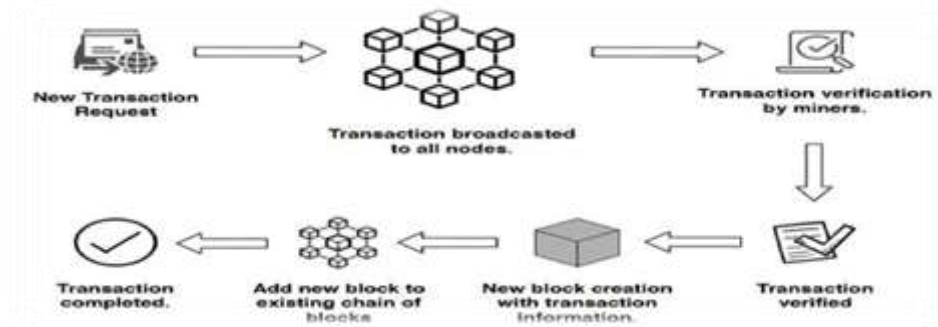


Figure1. Illustration Transaction Workflow

Source: (Shamaseen, Qatawneh, & Elshqeirat, 2025).

Blockchain Concepts: Blockchains are a distributed ledger technology that enables the transparent, secure, and tamper-proof recording of transactions across a network of computers. In 2008, Satoshi Nakamoto introduced the concept of blockchain and, the following year, wrote a key part of the source code for the digital currency Bitcoin, which serves as a public ledger for all monetary transactions (Gebert, 2024). blockchain database is managed independently due to its reliance on a peer-to-peer network and distributed timestamp servers around the world. Use of blockchain in the design of the Bitcoin currency system made it the first digital currency to avoid the double-spending problem (spending the same amount of money for two different transactions) (Sharma, Mukta, kumari, Mittal, & Rajpal, 2025).Originally developed as the underlying technology for the cryptocurrency Bitcoin, it has since evolved into applications that go beyond financial transactions. Its decentralized nature, cryptographic security, and immutability make it suitable for a wide variety of applications, such as smart contracts, supply chain management, and identity verification Blockchain networks utilize massive amounts of data stored on their networks, making them a valuable resource for AI decision-making and sales forecasting (Shamaseen, Qatawneh, & Elshqeirat, 2025). Blockchain, meanwhile, provides a secure and transparent framework for deploying and implementing AI tools. The convergence of these technologies opens up new possibilities in all economic sectors, as giant smart factories, automated processes, and decision-making become increasingly important (Dvorchuk & Shpinareva, 2025). And From the figure below show Blockchain structure

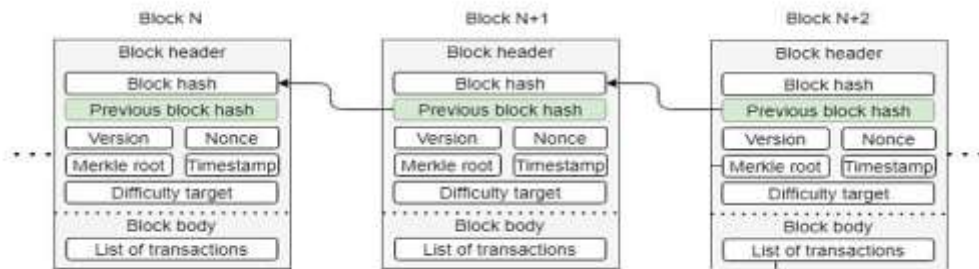


Figure2. Illustration Blockchain Structure

Source: (Shamaseen, Qatawneh, & Elshqairat, 2025).

RESEARCH METHODOLOGY

Descriptive analysis: Rafidain Bank (General Administration) is an Iraqi government bank, established in Baghdad in 1941, as the first Iraqi commercial bank. It has 146 branches inside Iraq, and some other branches are spread outside of Iraq in Jordan, Egypt, the United Arab Emirates, Lebanon, Bahrain and Yemen. An Iraqi postage stamp of 250 ¹filis was issued in 1971 to mark the thirtieth anniversary of the establishment of Rafidain Bank. Rafidain Bank was established pursuant to Law No. (33) Of 1941 and began its operations on May 19, 1941 with a paid-up capital of (50) fifty thousand dinars. The bank went through several stages during its historical journey, represented first by its presence as the first national bank to practice commercial banking among many foreign banks. It began gradual expansion within the country and then went through several stages of mergers that began in 1964, including the commercial banks that were operating in Iraq. In 1974, they were unified with Rafidain Bank, which became the only commercial bank in Iraq.

RESULTS AND DISCUSSION

Descriptive Data analysis And Finding: The Relationship between Digital Transformation and Blockchain and cost and Managerial accounting: If Rafidain Bank (General Administration) uses digital transformation and blockchain technology in banking that show at the following figure:

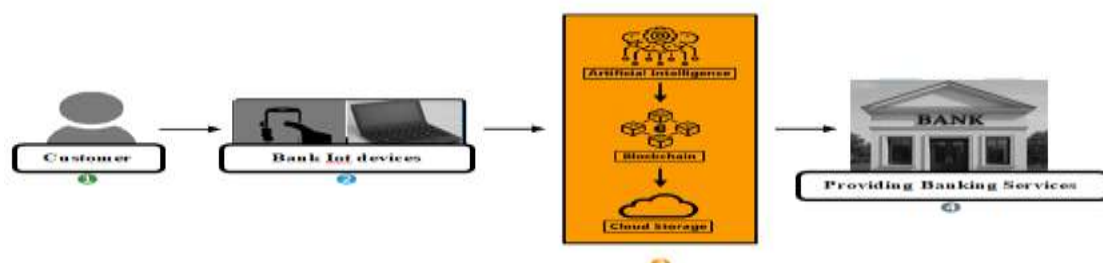


Figure3. Illustration If Rafidain Bank Uses Digital Transformation and Blockchain in Banking Services

¹ It is a small penny that was previously used in Iraq.

Source: prepared by researcher

From the following table we note the current system of Rafidain Bank (General Administration)

Table1. Illustration Current System of Cost and Managerial Accounting at Rafidain Bank

	² Prime Cost Amounts	Indirect Factory Overhead Costs (F.O.H)	Reporting Costs	Accounting Errors / Losses
Direct Materials (D/M)	104,498,944	257,408,087	14,213,911	8,214,910
Direct Labour (D/L)	7,007,300,830	-	-	-
Total Prime Cost 2024	7,111,799,774	257,408,087	14,213,911	8,214,910
Total Cost for year 2024			<u>7,391,636,682</u>	

Source: Prepared by researcher based on bank's annual reports

From the following figure we note the current system of Rafidain Bank (General Administration)

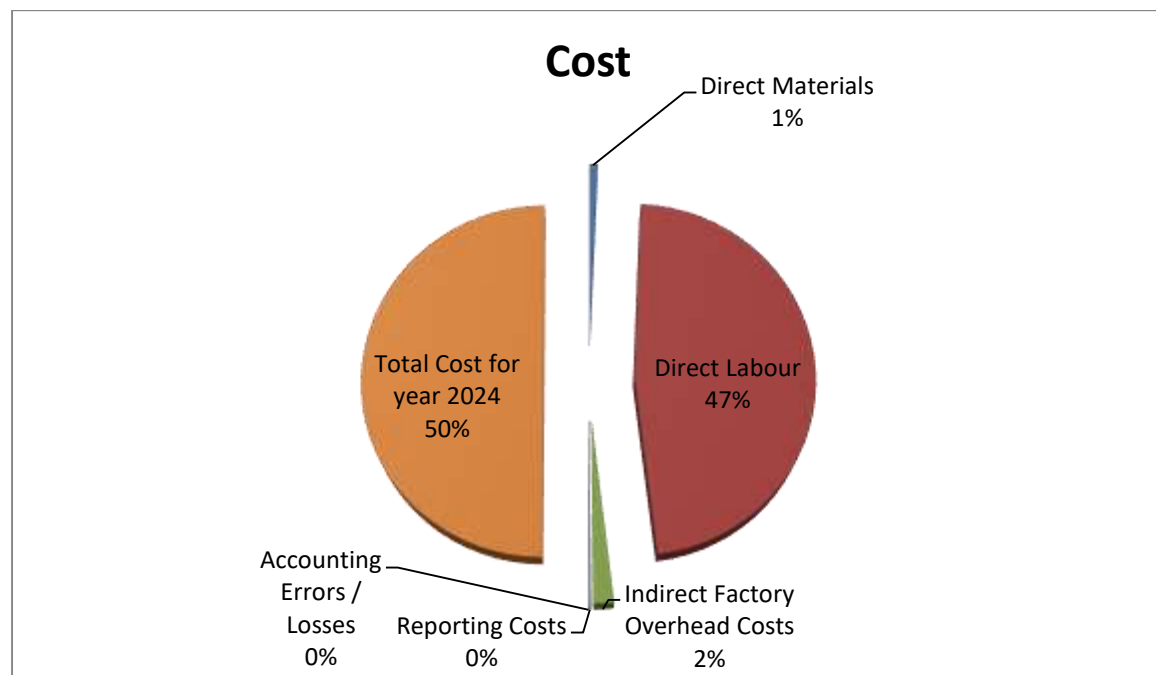


Figure4. Illustration Current System of Cost and Managerial Accounting at Rafidain Bank

Source: Prepared by researcher based on bank's annual reports

For all of the above, we note that Rafidain Bank (General Administration) incurs very large costs, considering the total costs, which amount to (7,391,636,682) IQ. Now we will calculate

² All amounts are in Iraqi dinars.

costs based on the adoption of digital transformation and blockchain technology: a new horizon for cost and managerial accounting from the followings table

Table2. Illustration Digital Transformation and Blockchain Technology: A New Horizon for Cost and Managerial Accounting at Rafidain Bank

³ Prime Cost Amounts	Indirect Factory Overhead Costs (F.O.H)	Reporting Costs	Accounting Errors / Losses
Direct Materials (D/M) 500,344	909,987	513,322	214,988
Direct Labour (D/L) 2,007,200,083	-	-	-
Total Prime Cost 2024 2,007,700,427	909,987	513,322	214,988
Total Cost for year 2024		2,009,338,724	

Source: Prepared by researcher based on bank's annual reports

From following figure we note Digital Transformation and Blockchain Technology: A New Horizon for Cost and Managerial Accounting at Rafidain Bank (General Administration)

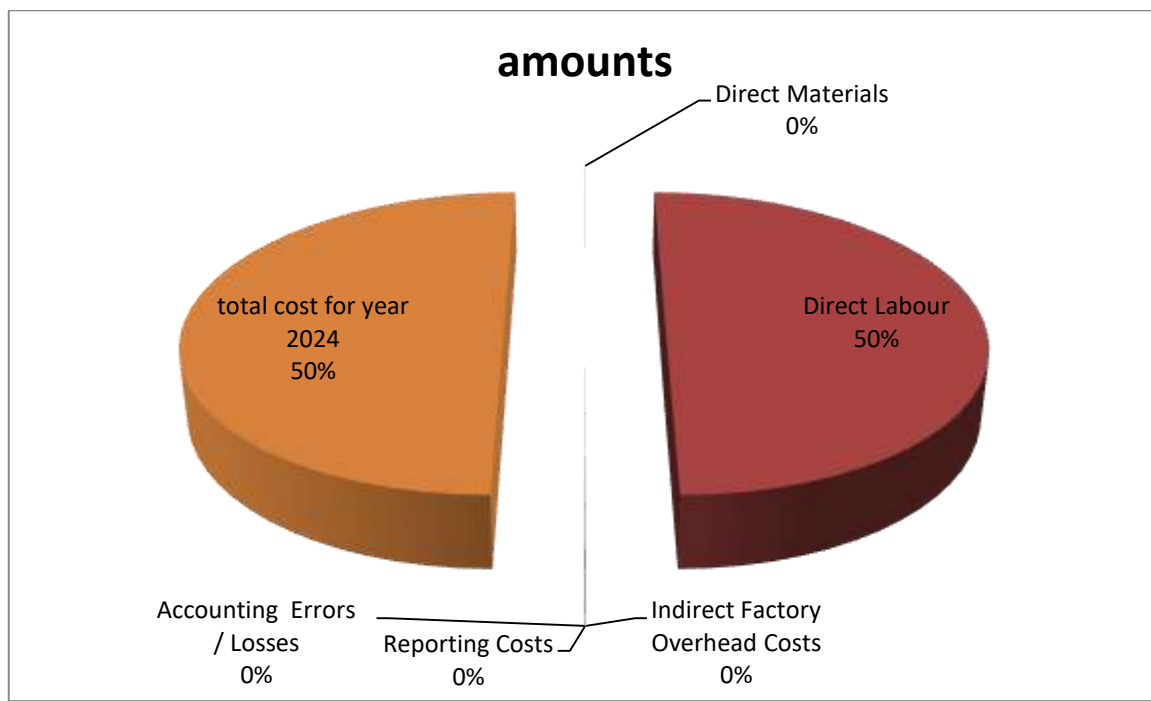


Figure5. Illustration Digital Transformation and Blockchain Technology: A New Horizon for Cost and Managerial Accounting at Rafidain Bank

Source: Prepared by researcher based on bank's annual reports

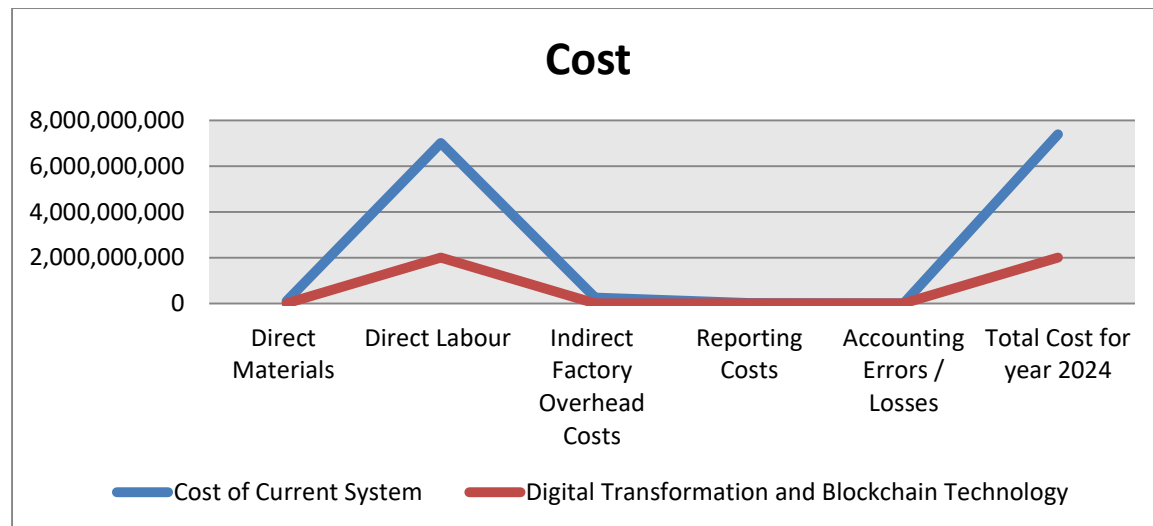
³ All amounts are in Iraqi dinars.

Table3. Illustration Difference between Current System of Cost and Managerial Accounting and Adoption of Digital Transformation and Blockchain for Rafidain Bank

Cost items	Cost of Current System(1)	Digital Transformation and Blockchain Technology(2)	⁴ Difference (3)	⁵ Difference Ratio(4)
Direct Materials (D/M)	104,498,944	500,344	103,998,600	0.995
Direct Labour (D/L)	7,007,300,830	2,007,200,083	5,000,100,747	0.714
Indirect Factory Overhead Costs (F.O.H)	257,408,087	909,987	256,498,100	0.996
Reporting Costs	14,213,911	513,322	13,700,589	0.964
Accounting Errors / Losses	8,214,910	214,988	7,999,922	0.974
Total Cost for year 2024	7,391,636,682	2,009,338,724	5,382,297,958	0.728

Source: Prepared by researcher based on bank's annual reports

From the previous table, we note that Total Difference Ratio between current system, digital transformation technology, and blockchains is **0.728 approximately 73%**. From following figure, we can see the impact of digital transformation technology and blockchain on Rafidain Bank (General Administration)

**Figure6. Impact of Digital Transformation Technology and Blockchain on Rafidain Bank**

Source: Prepared by researcher based on bank's annual reports

⁴ Cost of Current System(1)- Digital Transformation and Blockchain Technology(2)=(3)

⁵ Difference(3) / Cost of Current System(1)=(4)

For all of the above, we will identify the results between the current system and the adoption of digital transformation and blockchain technology at Rafidain Bank (General Administration), as illustrated in the following table

Table4. Illustration Results between Current system and adoption of Digital Transformation and Blockchain Technology at Rafidain Bank

Classification of Costs Associated with Current System	Classification of Costs Associated with Digital Transformation and Blockchain Technology
Operating costs (employees and human resources)	Reducing the need for paper archiving (transitioning to electronic).
Paperwork/archiving costs.	Reducing errors due to transparency and smart documentation.
Time costs (slow processing times).	Accelerating reporting (from days to minutes).
Error/manipulation/duplication costs.	Reducing internal audit costs (a large portion is automated via blockchain)
Costs of errors resulting from administrative decision-making.	Reducing the costs of errors resulting from administrative decision-making

Source: Prepared by researcher based on bank's annual reports

CONCLUSION

The integration of digital transformation and blockchain technology contributes to creating added value and enhancing transparency and reliability in cost and management accounting.

The use of digitization transforms cost accounting from a manual process based on papers and spreadsheets to an integrated, intelligent system that provides immediate and accurate information that supports decisions to reduce costs and improve performance.

Blockchains have a strong relationship with cost accounting in terms of securing, documenting, and tracking financial and production processes.

Total Difference Ratio between current system, and digital transformation technology, and blockchains is 0.728 approximately 73%.

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