# THE IMPACT USED OF BLOCK CHAIN TECHNOLOGY ON IMPROVEMENT OF PERFORMANCE QUALITY OF ECONOMIC SECTORS USED IT IN JORDAN

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## ABSTRACT

*The study aimed to demonstrate the impact of the use of blockchain technology in improving financial performance in the Jordanian economic sectors that use it, by studying and analysing the nature and importance of its application in economic sectors and clarifying the role of blockchain technology in reducing cost and achieving operational efficiency, while highlighting the need to use it in economic sectors and Reference to the most important challenges facing business organizations (economic sectors) when using block chain technology.*

*The researcher used the use of the inductive approach, which is based on collecting information related to blockchain technologies and their impact on the accounting system, and the deductive approach, which is based on the design of a questionnaire that dealt with the research axes in a field study that adopted the (comprehensive survey method) for all companies applying blockchain technology in Jordan. There were 5 companies, and the questionnaires were distributed to the target groups (the company's director and his deputy, financial director and head of the accounting department, internal auditor, and director of the information technology department).*

*The study concluded that business organizations in the Jordanian economic sectors realize the importance of using the block chain technology in completing transactions, and that the use of block chain technology contributes to reducing the cost of services and speed in completing transactions and thus increasing operational efficiency in the Jordanian economic sectors. There are also cognitive challenges and Technical and legislative faces facing the use of blockchain technology in the completion of transactions and the provision of services.*

**Keywords:** Blockchain; Digital technologies; Cost; Efficiency of its operation; Improving financial performance.

## INTRODUCTION

Blockchain technology is one of the most important technologies which will change the shape of technical world we know; blockchain technology has various applications of technical and non-technical fields including electronic payment networks, smart contracts as well as decentralized applications and electronic security in addition to other fields of health care and insurance.

Blockchain technology is a secure cloud network in which the transactions related to government and private documents such as stocks, financial products as well as various types of commercial contracts in addition to digital currency systems, such as ‘Bitcoin’ and Ethereum, are recorded, verified and performed; by automating these applications with blockchain technology, transactions can be quickly, securely and efficiently performed



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between the network parties and network participants. Furthermore, the network is also characterized by a high transparency because all network parties can view all details of each transaction; furthermore, a database is managed in a decentralized manner in which there is no a single point of control. And it depends on distributed data correspondence in order ensure its accuracy and prevent the processes of manipulation through copying identically the data onto a large number of devices all over the world. Block chain is a system of recording the data in a way that makes it impossible to change or amend the system because it is a self-contained block; and all subsequent blocks are chained onto the previously filled block. In other words, if you want to modify the information, you have to modify all blocks, subsequently written and modify this information available on a large number of servers all over the world. Thus, the possibility of manipulating and modifying the information becomes very difficult. Accordingly, impossibility of manipulation and great reliability have made blockchain technology ideal to record and the important information and protect it from modification later such as recording medical events and information, managing records and property rights and recording business transactions.

Blockchain technology is an advanced stage of the process of data storage and transmission; this technology contributes mainly to transformation of recent operation models of finance and economy; it also brings about a qualitative leap in the economic business due to technological innovations and industrial transformation of the nature of institute activities.

Accordingly, blockchain technology creates more efficient and protective financing mechanisms; and it allows identifying quickly and comprehensively client trends and behaviours. In addition, this technology supports the economic sectors in order to provide their services using innovative and stereotypical ways according to the requirements of the advanced business environment as well as the parties related to the financial relations and trust degree, among others. Thus, the businesses based on blockchain technology are characterized by an absence of intermediaries in comparison with traditional businesses and even with an advanced stage of the digital transformations. Consequently, globalization and financial liberalization principles are strongly being solidified; and businesses use the communication method based on peer to peer strategy, thereby reducing the costs of operating and controlling over the financial transactions as well as increasing the efficiency of economic unit activity. Here, the problem of study can be expressed by the following question:

Does blockchain technology contribute to the improvement of performance quality of economic sectors using this technology in Jordan?

## Problem of Study

Blockchain is one of the most important digital technologies which play a significant role in accounting profession; it is an important topic which needs further analysis and discussion. This study, therefore, has aimed at identifying the advantages of using this technology such as speed and accuracy of data processing and security; thus, the following question can express the problem of study:

*What is the impact of the use of blockchain technology in improving the performance quality of the economic sectors which use this technology in Jordan?*

This question is divided into a set of sub-questions as follows:

*What are the advantages achieved by the business organization when using blockchain technology?*

*What are the challenges the business organizations face when using blockchain technology?*



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*Is there a statistically significant relationship between the use of blockchain technology and the reduction of service cost of Jordanian economic sectors?*

*Is there a statistically significant relationship between the use of blockchain technology and the increase of operational efficiency of Jordanian economic sectors?*

## Importance of Study

Blackchain is one of the most interesting technologies these days since it is a pioneering technology which changes radically the method of work of governments, private sector and civil society organizations. Here, the importance of this study stems from the necessity of directing the awareness of the adoption of blockchain technology in various Jordanian sectors; in addition, this study is important because it identifies the contribution of this technology to the improvement of financial performance of these sectors, reduction of the cost as well as the improvement of performance of these sectors. Furthermore, this study pays attention to the direct importance of adopting the blockchain technology in response to the global developments and industrial requirements in the light of the current technological developments.

## Purposes of Study

The study aims at achieving the following purposes:
The main purpose of the study is to identify the impact of the use of blockchain technology in improving the financial performance of Jordanian economic sectors. In order to achieve the main purpose, following sub-purposes shall be achieved:

- Examining and analysing the nature and importance of blockchain technology in the economic sectors;
- Identifying the challenges which face business organizations ( economic sectors) when using blockchain technology;
- Illustrating the role of blockchain technology in reducing the costs and achieving the operational efficiency as well as highlighting the necessity of the use of this technology in the economic sectors; and
- Conducting a field study for the most important companies which use blockchain technology in Jordan; this study, therefore, is distinguished because it includes all companies belonging to various economic sectors.

## Hypotheses of Study

In the light of the problem and purposes of study, the study tests the following main hypothesis:

'There is a statistically significant impact between the use of blockchain technology and the improvement of financial performance of Jordanian economic sectors.'

For testing this hypothesis, it has been divided into the following sub-purposes:

1. Business organizations of Jordanian economic sectors realize the importance of the use of blockchain technology in completing the transactions and providing the services;
2. There is a statistically significant relationship between the use of blockchain technology and the reduction of the cost of the services provided by Jordanian economic sectors;



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3. There is a statistically significant relationship between the use of blockchain technology and the increase of operational efficiency of Jordanian economic sectors; and
4. There are the challenges which the business organizations face when using blockchain technology in completing the transactions and providing the services.

## PREVIOUS STUDIES AND THEORETICAL FRAMEWORK

### Previous Studies

Al-Najjar and Other's study (2020) has aimed at clarifying the concept and nature of the technology, and identifying its forms; in addition, it has examined the economic reality of the technology and has identified its most important applications in financial industry within a theoretical framework. Blockchain is one of the most modern technological innovations affecting the financial industry and its sectors due to its innovative and disruptive power occurring at the same time; if the characteristics and advantages brought by blockchain technology including innovation business models and advanced operational and service capabilities are scrutinized, the importance of this technology and its effective ability to create a radical change and development can be realized. However, many questions still revolve around the nature of blockchain technology and its risks as well as its economic impacts.

Ibrahim (2020) aimed at identifying the role of blockchain in enhancing the operational efficiency and reducing the banking service cost as well as upgrading the banks working in Egypt. The researcher has tested the statistical hypotheses through a field study conducted on the study sample composed of financial managers, heads of departments and major clients of the banks working in Egyptian environment; the field study has aimed at measuring the impact of blockchain technology on the reduction of banking service cost and its development in banking sector in the Egyptian environment. It also has identified to which extent a study sample agrees to adopt this technology; statistical package for the social sciences (SPSS) has been used for analysing the data. Finally, the study has concluded that blockchain technology is the best technological solution available at the present time since it reduces the costs of banking transactions and accelerates the financial transactions; this technology also achieves a security element of financial transactions and decreases the manual procedures. In addition, it meets the needs of banking and financial sector through eliminating the necessity of intermediaries and saving time and money. Furthermore, blockchain technology reduces the operational cost and improves the capital; it also contributes to the enhancement of transparency inside the banks and elimination of opportunities of occurring human errors when providing banking services. Thus, this technology contributes to the improvement of operational efficiency of banks and quality of banking services provided to the clients.

Bonsón and Bednárová (2019) touched upon a general overview of blackchain technology since it is considered a next step of the digital age; this study has identified the impact of blackchain technology on the characteristics of accounting information quality and audit processes. Finally, the study has concluded that there are various advantages associated with the use of blockchain technology such as decentralization, flexibility and encryption. It also has illustrated the challenges which face the effective application of blockchain technology; in addition, the study has indicated that there is an impact of the use of blockchain technology on the characteristics of accounting information.



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McComb and Smalt (2018) discussed the origin of blockchain technology and its current uses as well as its application capabilities in the field of accounting which can enhance the timing, quality and accuracy of accounting information. In addition, the study has examined the effectiveness of many applied processes in any accounting field. Finally, the study has concluded that blockchain technology has an ability to record, organize, verify and publish the data. However, it has not been widely spread and applied yet. Of course, the companies which seek to improve the timing, quality and accuracy of accounting information shall apply blockchain technology.

Cocco et al. (2017) measured the impact of the use of blockchain technology in the banks on the cost; the study has concluded that this technology may contribute to the improvement of the global financial infrastructure; it also leads to various achievements through the use of more efficient systems than the current systems used at the present time. In fact, many banks focus on the use of blockchain technology in order to strengthen the economic growth and handle the financial transaction in a more efficient manner.

Ivan and Anastasiia (2017) found that blockchain technology and its various applications have become a catalyst for many ideas and solutions of financial sector. Although a lot of attention has been paid to blockchain technology, it is still in an experiment in the banking sector so far. In addition, the study has shown the theoretical framework and identified the advantages and disadvantages of this technology; furthermore, the study has particularly illustrated the credit risk management. It also has discussed the impacts of applying this technology on the audit and accounting in general. Moreover, a case study of Ericsson Company has been conducted; finally, general conclusions and potential advantages as well as the problems resulting from the implementation of this technology have been illustrated.

Guo and Liang (2016) indicated that blockchain is the first technology which is necessary for completing banking transactions in Chain. The study has concluded that blockchain technology makes major technological developments of clearing system, credit information systems in the banks and financial transfers. Furthermore, the study has indicated that this technology has contributed to the upgrading of banking services and financial transactions, thereby strengthening the banking services provided by the banking sector.

After reviewing the previous studies touching upon blockchain technology, its uses and impacts on the accounting, it has illustrated that this study is complementary to these previous studies; it has touched upon the role and impact of blockchain technology on the improvement of performance quality. In addition, it is distinguished from Ibrahim's study (2020) touching upon the topic of the reduction of the cost of Egyptian banking sector because it has discussed the topic of the reduction of the cost and the improvement of performance quality of various economic sectors in Jordan; this study is a comprehensive study which does not only discuss the banking sector, but also financial, service and government sectors. Finally, after identifying the companies applied blockchain technology in Jordan, it is illustrated that 5 institutes which perform various activities (a bank, governmental unit, and information technology company). This study is characterized by a diversity of study population composed of Jordanian economic sectors; it is considered one of the first studies touching upon this topic in Jordan.

## Theoretical Framework

This section of the study consists of a brief review of the concept of blockchain technology and the advantages of its use in business organization.



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## Concept and Nature of Blockchain Technology and its Application Field

The concepts associated with blockchain technology have varied. the oldest definition of blockchain technology have been introduced by Nakamoto (2008); it has defined as a network of nodes and devices working together as peers in order to produce an unmodifiable history of transactions which can be publicly displayed. Al-Rahili & Al-Sakhawi (2020) have defined it according to its components and mechanisms as a set of information networks containing a set of devices and nodes and each device, which it contains, represents a database and a ledger saving all transactions performed in the network; and each transaction is performed by two devices verified by the rest of network devices. In addition, Wang et al. (2019) has defined blockchain technology as a chain of blocks used for establishing or recording the ownership of the assets between the parties. Furthermore, it has been defined by Lee Kuo Chuen (2015) as a chain of blocks which contains a complete list of transaction records as in traditional general ledger.

Furthermore, blockchain technology has been linked to the digital currencies recently appeared; in such context; Oxford dictionary has defined it as a system which restricts the transactions performed by Bitcoin systems and other encrypted currencies and these transactions are saved by a number of computers connected to peer to peer network. Regarding blockchain and accounting relationship, Swan (2015) has considered it as a huge spreadsheet used for recording all assets and as an accounting system deal globally with all forms of assets of global parties. Furthermore, Lazanis (2015) and Brandon (2016) have broadly defined blockchain technology as a centralized distributed ledger which is able to save and confirm the transactions passing through it. In other words, the ledger is neither owned nor controlled by any party and network is controlled by the users of network.

Accordingly, blockchain technology works in accordance with the basis of central database which is based on the encryption of transaction data. All transactions are recorded in blocks which form an unmodifiable chain of data. In addition, this technology preserves the rights and properties of the owners of these assets, and provides a feature of ease of access, verification and reliability.

## Importance and Advantages of the Use of Blockchain Technology in Business Organizations

The importance of the use of blockchain technology stems from the advantages and benefits this technology achieves to business organizations; they can be summarized as follows:

### Cost reduction

Adopting blockchain technology reduces various costs including financial transfers through the use of digital wallet for transferring the cash without additional fees. Blockchain technology also contributes to the cost reduction of financing foreign trade (export and import). In addition, it reduces the cost of infrastructure resulting from making financial transfers in remote areas since there is no a need for establishing new infrastructure and using papers.

### Transparency, security and fraud prevention

Blockchain technology introduces new levels of transparency and security which make financial transactions visible; and they cannot be changed. In addition, financial



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transactions are continuously followed up. Furthermore, the dealers feel safe due to the stability of financial transactions which do not change over time. Transaction transparency and stability introduced by blockchain technology eliminate the corruption and reduce the fraud.

**Meeting the needs of global trade**

Adopting blockchain technology meets the needs of global trade regarding the transactions as follows: Electronic payments of global trade related to import and export processes are facilitated; the cost of cash transfers related to import and export processes are saved; import and export processes are accelerated due to instant payments and speed of transfers.

**Enhancing and Upgrading the Services Provided**

Adopting blockchain technology enhances and develops quickly and accurately the services provided; there is no a need for exerting an administrative effort in order to save the records or settle the breaches related to the transactions; in addition, it increases the administrative efficiency and saves and exchanges the data. Furthermore, this technology reduces operation risks and improves the efficiency and increases the transparency.

**Speediness of completing the payments and financial transfers**

The most important application of blockchain technology is related to financial transactions; funds are quickly and easily transferred across the borders in moments; furthermore, transfer fees are lower than the fees of other technologies.

**No need for technical (electronic) infrastructure**

Using blockchain technology does not need to data centers. Remote areas in developing countries, where official banking services are not available, therefore, can use the solutions based on blockchain technology; thus, huge costs of establishing new infrastructure can be saved.

**The Impact of Using and Applying Blockchain Technology in Improving Financial Performance Quality of Business Organizations**

Blockchain is the strongest, best and latest technology which helps the economic units perform efficiently, effectively and safely their services; applying this technology in these units changes the way used for managing them and the method of providing their services. Furthermore, the impacts of applying this technology in the economic units on the improvement of financial performance quality can be summarized as follows:

Reducing the costs of transactions and services: blockchain technology reduces the costs of transaction progressing since huge administrative savings are achieved through saving main client recorders and data; in addition, a specialized application is not required. As result, operational efficiency increases, and the cost of transfers reduces due to the use of digital wallets in transferring the funds without additional fees;

Block chain technology make the financial transactions better, faster and more accurate. In addition, the data is verified; transparency is achieved; and transaction data cannot be modified or tampered over the time;



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Using blockchain technology increases the administrative efficiency and provides the data which can be exchanged between the services providers and insurance companies. In addition, it prevents fraud process because it does not depend on the intermediaries. It also eliminates the corruption and provides the users with more security and peace of mind due to its speed, transparency and decentralization;

Blockchain technology develops the transactions performed by the economic units without a need for exerting an administrative effort in order to save the records or settle the breaches related to the transactions;

Blockchain technology reduces the risks of the operational errors and improves the efficiency;

Blockchain technology increase the trust and transparency by using the so-called smart contracts which aim at completing the transactions without the intermediary, and it controls the advantages of achieving the security and transparency at the highest levels through making all transactions visible to the public and unmodifiable.

Thus, it can be said that using blockchain technology contributes highly to the reduction of transaction costs; it also improves the operational efficiency and achieves a competitive advantage among business organizations due to the reduction of service costs and increase of profitability.

## METHODOLOGY

For achieving the purposes of study, inductive approach which aims at collecting the data related to blockchain technology and its impact on the accounting system has been used; deductive approach which aims at designing a questionnaire touching upon study axes on blockchain technology and its benefits as well as its role in reducing the cost and achieving the efficiency has been also used. The questionnaire has been distributed to a sample study which includes the relevant companies.

### Field Study Design and Analysis

This section describes the population and sample of study and identifies the methods of study measurement; it also tests the validity and reliability of study tool; in addition, it includes the statistical processing which aims at analysing the data and test the hypotheses of study as the following:

### Population and sample of study

The population of study consists of all companies which use the blockchain technology in Jordan; they are 5 companies. The sample of study is composed of the entire population of study; the questionnaire has been distributed to the target categories (i.e company manager, Deputy General Manager, Financial manager, Head of Accounting Department, Internal auditor and information technology department manager). Table 1 outlines the companies and the sectors in which they work.

**TABLE 1**
**NAMES OF BUSINESS ORGANIZATIONS APPLIED BLOCKCHAIN TECHNOLOGY UNTIL PREPARING THE STUDY**

| Name of Company | Starting Date of Application | Business Sector |
|---|---|---|
| Arab Jordan Investment | 2019 | Banks |



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| | | |
|---|---|---|
| Jordan Customs | 2020 | Government ( Customs Collection) |
| JDPC (JORDAN DECAPOLIS PROPERTIES COMPANY ) in cooperation with DLT Labs | 2019 | Properties |
| Ghoorcom Platform | 2016 ( the oldest company) | Marketing of agricultural products |
| Milarite Company | 2017 | Developing the platforms and financing the projects |

Table 1 illustrates that the sectors, in which the companies work, are diverse. The diversity of the sectors reinforces the study; and the results of the study can be generalized; in addition, the diversity of date of using blockchain technology indicates that this technology and its various stages have developed over the time; furthermore, continuous use of blockchain technology by the companies indicates that its benefits are very great and valuable.

## Study tool

A questionnaire has been designed in order to collect the data from the population of study; 6 questionnaires have been distributed to each company; total number of questionnaires has been 30; and all questionnaires have been retrieved and valid for analysing.

## Statistical Analysis

In order to test the hypotheses of study, five-likert scale has been used in order to answer questionnaire's questions. Each of the five responses has a numerical value as follows: 5- strongly agree, 4- agree, 3- neutral, 2 - disagree and 1 - strongly disagree.

In order to analyse the data, ranges have been used as follows: 1-1.79 indicates that there is no impact; 1.8-2.59 indicates that there is a low impact; 2.60-3.39 indicates that there is moderate impact; 3.40-4.19 indicates that there is a high impact; finally, 4.20-5 indicates that there is a very high impact. Furthermore, the data including the percentage and arithmetic means have been analysed by using statistical package for social sciences (SPSS).

## Validity and Reliability of Study Tool

In order to test the reliability of study tool, internal consistency (Cronbach's alpha) coefficient has been calculated; Table 2 illustrates the coefficients; and these ratios have been considered appropriate for the purposes of this study.

**TABLE 2**
**INTERNAL CONSISTENCY (CRONBACH'S ALPHA) COEFFICIENT OF STUDY FIELDS**

| Field | Internal Consistency |
|---|---|
| Importance of the use of blockchain technology in completing the transactions and providing the services | 0.98 |
| Role of the use of blockchain technology in reducing the cost of the services | 0.95 |
| Blockchain technology and the increase of the operational efficiency of Jordanian economic sectors | 0.93 |
| The challenges which face business organizations when using blockchain technology | 0.96 |

## Data Analysis and Hypotheses Testing



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## First hypothesis testing

First hypothesis has touched upon to which extent Business organizations of Jordanian economic sectors realize the importance of the use of blockchain technology in implementing their various works.

To test the validity of this hypothesis, arithmetic means and standard deviations of responses of respondents' sample regarding first hypothesis have been extracted; Table 3 outlines them.

**TABLE 3**
**ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RESPONSES OF RESPONDENTS' SAMPLE REGARDING FIRST HYPOTHESIS**

| | Statements | Arithmetic mean | Standard deviation | Response orientation |
|---|---|---|---|---|
| The importance of the use of blockchain technology in business organization stems from the following advantages it achieves | | | | |
| 1 | Speediness of completing the economic transactions through providing instant payments and fast transfers. | 4.50 | 0.60 | Very high |
| 2 | Competitive advantage which the company obtains due to applying blockchain technology | 4.66 | 0.70 | Very high |
| 3 | The ability to spread widely because there is no need for infrastructure | 4.55 | 0.87 | Very high |
| 4 | Reduction of the cost and increase of the profits | 4.65 | 0.73 | Very high |
| 5 | Error reduction | 4.450 | 0.88 | Very high |
| 6 | Reduction of the financial corruption | 4.60 | 0.89 | Very high |
| 7 | Transparency, security and fraud reduction | 4.55 | 65 | Very high |
| 8 | Meeting the needs of global trade | 4.59 | 0.69 | Very high |
| 9 | Enhancing and upgrading the services provided | 4.64 | 0.87 | Very high |
| | Total | 4.57 | 0.76 | Very high |

Table 3 shows arithmetic means and standard deviations of statements of first hypothesis; Arithmetic means have ranged between 4.45 – 4.66; statement 2 has occupied the first rank and its arithmetic mean has reached 4.66; total arithmetic mean has reached 4.57. The respondents of the study agree very highly that business organizations realize the importance of the use of blockchain technology which achieves various advantages.

In addition, arithmetic mean of the statements which has formed first hypothesis has been compared with standard mark 3 - hypothesis acceptance standard- by using t-test as stated in Table 4.

**TABLE 4**
**ARITHMETIC MEANS, STANDARD DEVIATIONS AND T-TEST OF STATEMENTS WHICH HAS FORMED FIRST HYPOTHESIS IN COMPARISON WITH STANDARD MARK 3**

| Business organization realize the importance of the use of blockchain technology which achieves various advantages | Arithmetic Mean | Standard Deviation | t-Value | Statistical Significance |
|---|---|---|---|---|
| | 4.57 | 0.76 | 3.689 | 0.000 |

Table 4 indicates that there are statistical differences at ($\geq 0.05$) between arithmetic mean and standard mark 3; t-value has been 3.689; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Business organizations of Jordanian economic sectors



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realize the importance of the use of blockchain technology in completing the transactions and providing the services, has been accepted.

## Second hypothesis testing

Second hypothesis has touched upon the impact of the use of blockchain technology on the reduction of the cost of transactions and services provided in business organizations.

To test the validity of this hypothesis, arithmetic means and standard deviations of responses of respondents' sample regarding second hypothesis have been extracted; Table 5 outlines them.

**TABLE 5**
**ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RESPONSES OF RESPONDENTS' SAMPLE REGARDING SECOND HYPOTHESIS**

| | Statements | Arithmetic mean | Standard deviation | Response orientation |
|---|---|---|---|---|
| The use of blockchain technology contributes to the reduction of the cost through the following: | | | | |
| 1 | The reduction of financial transfer cost | 4.55 | 0.66 | Very high |
| 2 | Saving the cost of the transfers related to import and export transactions | 4.68 | 0.75 | Very high |
| 3 | Reduction of the cost of processing the transactions due to huge administrative savings resulting from record keeping | 4.65 | 0.89 | Very high |
| 4 | Reduction of the cost related to the administrative processes including settlement transactions | 4.75 | 0.70 | Very high |
| 5 | A decrease of control procedures | 4.85 | 0.80 | Very high |
| 6 | Reduction of the cost of internal control means | 4.77 | 0.90 | Very high |
| 7 | Decrease of the means organizing the administrative procedures | 4.65 | 0.60 | Very high |
| 8 | Reduction of the cost related to information systems | 4.70 | 0.70 | Very high |
| | Total | 4.70 | 0.84 | Very high |

Table 5 shows arithmetic means and standard deviations of statements of second hypothesis; Arithmetic means have ranged between 4.55-4.85; statement 5 has occupied the first rank and its arithmetic mean has reached 4.85; total arithmetic mean has reached 4.70. The respondents of the study agree very highly that blockchain technology plays an important role in reducing the costs of transactions and services provided by business organizations.

In addition, arithmetic mean of the statements which has formed second hypothesis has been compared with standard mark 3 - hypothesis acceptance standard- by using t-test as stated in Table 6.

Table 6 indicates that there are statistical differences at ($\geq$ 0.05) between arithmetic mean and standard mark 3; t-value has been 4.690; statistical significance has been 0.000. Thus, this hypothesis, stipulating that there is a statistically significant relationship between the use of blockchain technology and the reduction of the cost of the services provided by Jordanian economic sectors , has been accepted.



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**TABLE 6**
**ARITHMETIC MEANS, STANDARD DEVIATIONS AND T-TEST OF STATEMENTS WHICH HAS FORMED SECOND HYPOTHESIS IN COMPARISON WITH STANDARD MARK 3**

| The role of blockchain technology in reducing the costs of transactions and services provided by business organizations | Arithmetic Mean | Standard Deviation | t-Value | Statistical Significance |
|---|---|---|---|---|
| | 4.70 | 0.84 | 4.690 | 0.000 |

## Third hypothesis testing

Third hypothesis has touched upon the relationship between the use of blockchain technology and the increase of the operational efficiency of Jordanian economic sectors.

To test the validity of this hypothesis, arithmetic means and standard deviations of responses of respondents' sample regarding third hypothesis have been extracted; Table 7 outlines them.

**TABLE 7**
**ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RESPONSES OF RESPONDENTS' SAMPLE REGARDING THIRD HYPOTHESIS**

| | Statements | Arithmetic mean | Standard deviation | Response orientation |
|---|---|---|---|---|
| The use of blockchain technology contributes to the increase of the operational efficiency through the following: | | | | |
| 1 | Completing quickly and accurately the financial transactions | 4.80 | 0.76 | Very high |
| 2 | Reducing the operational costs because the papers and documents are not used | 4.88 | 0.75 | Very high |
| 3 | Reducing the costs of transfers related to import and export transactions | 4.75 | 0.89 | Very high |
| 4 | Facilitating electronic payments of international trade transactions | 4.75 | 0.75 | Very high |
| 5 | Reducing the commissions and costs of global transactions | 4.85 | 0.85 | Very high |
| 6 | The ability to save and access easily the data in a case of losing it in order to share it with other parties | 4.77 | 0.90 | Very high |
| | Total | 4.80 | 0.81 | Very high |

Table 7 shows arithmetic means and standard deviations of statements of third hypothesis; Arithmetic means have ranged between 4.75-4.88; statement 2 has occupied the first rank and its arithmetic mean has reached 4.88 total arithmetic mean has reached 4.80. The respondents of the study agree very highly that blockchain technology plays an important role in improving the operational efficiency of business organizations.

In addition, arithmetic mean of the statements which has formed third hypothesis has been compared with standard mark 3 - hypothesis acceptance standard- by using t-test as stated in Table 8.



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**TABLE 8**
**ARITHMETIC MEANS, STANDARD DEVIATIONS AND T-TEST OF STATEMENTS WHICH HAS FORMED THIRD HYPOTHESIS IN COMPARISON WITH STANDARD MARK 3**

| The role of blockchain technology in improving the operational efficiency of business organizations | Arithmetic Mean | Standard Deviation | t-Valuet | Statistical Significance |
|---|---|---|---|---|
| | 4.80 | 0.81 | 5.700 | 0.000 |

Table 8 indicates that there are statistical differences at ($\geq 0.05$) between arithmetic mean and standard mark 3; t-value has been 5.700; statistical significance has been 0.000. Thus, this hypothesis, stipulating that there is a statistically significant relationship between the use of blockchain technology and the increase of operational efficiency of Jordanian economic sectors, has been accepted.

## Fourth hypothesis testing

Fourth hypothesis has touched upon the challenges which business organizations face when using blockchain technology in completing the transactions and providing the services.

To test the validity of this hypothesis, arithmetic means and standard deviations of responses of respondent sample regarding fourth hypothesis have been extracted; Table 9 outlines them.

**TABLE 9**
**ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RESPONSES OF RESPONDENTS' SAMPLE REGARDING FOURTH HYPOTHESIS**

| | **Statements** | **Arithmetic mean** | **Standard deviation** | **Response orientation** |
|---|---|---|---|---|
| There are challenges which business organizations face when using blockchain technology in completing the transactions and providing the services | | | | |
| 1 | Blockchain will change the role of accountant in the future. | 4.65 | 0.77 | Very high |
| 2 | Cognitive skills of dears who use blockchain technology shall be developed. | 4.88 | 0.76 | Very high |
| 3 | Adequate experiences of blockchain field are not available | 4.85 | 0.77 | Very high |
| 4 | An appropriate environment which consists of electronic and legal infrastructure is not available for including blockchain technologies. | 4.75 | 0.75 | Very high |
| 5 | Any transaction cannot be modified after it becomes available on public blockchain networks. | 4.66 | 0.89 | Very high |
| 6 | The cost of investment of information technology increases. | 4.77 | 0.70 | Very high |
| | Total | 4.74 | 0.77 | Very high |

Table 9 shows arithmetic means and standard deviations of statements of fourth hypothesis; Arithmetic means have ranged between 4.65-4.88; statement 2 has occupied the first rank and its arithmetic mean has reached 4.88. Total arithmetic mean has reached 4.74. The respondents of the study agree very highly that there are challenges which business organizations face when using blockchain technology.



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In addition, arithmetic mean of the statements which has formed fourth hypothesis has been compared with standard mark 3 - hypothesis acceptance standard- by using t-test as stated in Table 10.

**TABLE 10**
**ARITHMETIC MEANS, STANDARD DEVIATIONS AND T-TEST OF STATEMENTS WHICH HAS FORMED FOURTH HYPOTHESIS IN COMPARISON WITH STANDARD MARK 3**

| There are challenges which face business organizations when using blockchain technology in completing the transactions and providing the services | Arithmetic Mean | Standard Deviation | t-Value | Statistical Significance |
|---|---|---|---|---|
| | 4.74 | 0.77 | 4.723 | 0.000 |

Table 10 indicates that there are statistical differences at ($\geq 0.05$) between arithmetic mean and standard mark 3; t-value has been 4.723; statistical significance has been 0.000. Thus, this hypothesis, stipulating that there are the challenges which the business organizations face when using blockchain technology in completing the transactions and providing the services, has been accepted.

## RESULTS AND RECOMMENDATIONS

### Results

In the light of the foregoing, it is clarified that there are various uses of blockchain technology; using blockchain technology contributes to a quick and easy implementation of transactions; in addition, the costs of these transactions reduces; this technology also achieves the transparency and a high level of privacy. Thus, adopting blockchain technology contributes to the reduction of the costs and administrative burdens; the study has reached a set of results as follows:

Business organizations of Jordanian economic sectors realize the importance of the use of blockchain technology in completing the transactions and providing the services, and this technology reduces the costs and increases the operational efficiency.

There is a statistically significant relationship between the use of blockchain technology and the reduction of the costs of services provided by Jordanian economic sectors, and blockchain technology reduces the cost of financial transactions and contributes to a quick completion of transactions.

There is a statistically significant relationship between the use of blockchain technology and the increase of operational efficiency of Jordanian economic sectors through reducing the cost of the transactions and the operational cost.

There are various cognitive, technical and legislative challenges which Jordanian business organizations face when using blockchain technology in completing the transactions and providing the services.

### Recommendations

The study has reached a set of recommendations as follows:

Educational programs and plans developed by the universities and training courses shall be updated in order to include the elements of financial technology, specifically blockchain technology and its accounting and financial applications.

Governmental authorities shall encourage business organizations to use the financial technology, particularly blockchain technology.



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Accountants and auditors' cognitive silks shall be developed in order to include blockchain technology.

The use of blockchain technology in all bank branches and government departments shall be generalized in order to benefits from it.

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