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*Article*

# The Use of Blockchain Technology and Its Reflection in the Financial Performance of Investment Projects Developed by the Ministry of Sports

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**Abstract:** Blockchain has received a lot of attention in financial technology, as it combines many computer technologies, including data storage, point-to-point transmission, and consensus mechanisms, as it is considered a decentralized technology for managing transactions and data that has been developed. The study aimed to demonstrate the impact of the use of blockchain technology on the financial performance of investment projects developed by the Ministry of Sports. We used the descriptive approach (survey study method) as an appropriate method to achieve the objectives of the study due to the suitability of its procedures. The participants in the study included some leaders of the Ministry of Sports and experts in the field of sports investment, as well as some leaders working in the directorates of youth and sports, and some members of the board of directors of the Olympic Committee, sports federations, sports clubs, and youth centers. The study sample was selected in a deliberate way based on the categories of the study population. There were 300 participants in the study, and the researchers used two questionnaires as tools to collect the data. The results revealed a lack of the use of blockchain technology at the Ministry of Sports and a low level of financial performance at the Ministry of Sports. With a correlation between the level of financial performance and the use of blockchain technology, the level of the financial performance of the investment projects developed by the Ministry of Sports could be predicted based on the use of blockchain technology. Finally, the study also provides insight into political implications, limitations, and future directions.

**Keywords:** technology; blockchain; financial performance; investment projects; smart contracts



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## 1. Introduction

The Ministry of Sports seeks to reduce the burden on the public budget and make optimal use of resources and facilities by attracting the private sector to invest, manage and operate sports facilities for their development. It is working to keep pace with global development by launching freedom of investment, encouraging the participation of the private sector in the sports industry, managing sports institutions, and developing them economically. On the other hand, sports investment must take into account some factors of economic growth in order to achieve development. Due to the huge advances in information technology, computers as an electronic data processing method can provide a variety of information and process data quickly and accurately (Aini et al. 2020; Treleaven et al. 2017). This has affected the way these organizations operate, as these technologies helped provide

modern digital solutions that enabled organizations to gain a competitive advantage with good performance (Sanni and Apriliasari 2021).

The use of "Industry 4.0" technologies has revolutionized how the various functions of the organization communicate and collaborate to work efficiently. These technologies include automation, artificial intelligence, blockchain, cloud computing, Internet of Things (IoT), and big data analysis (Raja Santhi and Muthuswamy 2022a). The blockchain, with its various characteristics, such as the reliable sharing of information, security, and traceability, makes it a powerful tool for information (Guo and Liang 2016; Aslam et al. 2021). It is one of the revolutionary technologies of the twenty-first century and can be used to share data among an infinite number of users via a decentralized global ledger system. It cannot be interfered with as it can simultaneously record transactions in real time on every computer that is connected to the network. In the event of interference or hacking, the malicious node is identified and removed from the chain. Blockchain technology can transfer ownership of assets with instant settlement easily and effectively; thus, there is no need for third-party settlement transactions (Bholane 2022). Although blockchain technology was first used as a peer-to-peer ledger for recording transactions (Nakamoto 2008), an increasing number of blockchain-based applications have since been developed in various fields (Memon et al. 2018; Alammary et al. 2019). Blockchain can contain complete and accurate information about addresses and their balances right from the genesis block to the most recent completed blocks (Raja Santhi and Muthuswamy 2022b; Fanning and Centers 2016). It has witnessed tremendous progress in the field of information technology, through which information can be exchanged in a secure, reliable and transparent manner that allows quick and easy access to data (Liu et al. 2019).

Blockchain technology is a class of technologies that creates a transparent, autonomous, and decentralized data management system that gives users confidence that the archived information has not been tampered with (Beck et al. 2018) without the need to validate brain data. As a communication technology, blockchains can enable peer-to-peer public service delivery (Lember et al. 2019). Thus, they are considered to constitute a new generation of democratic processes (Tan and Müller 2020).

The use of blockchain technology in smart contracts for digital authentication processing. Blockchain does not require moderators from regulatory agencies or third parties. Proprietary information can be stored on a distributed network of multiple users (Sanni and Apriliasari 2021). Smart contracts are self-executing contracts (usually stored on a blockchain) in which the terms are written directly as lines of code without the need for human control (Rahardja et al. 2019). The use of blockchains for smart contracts has recently received increased attention from the media (Aini et al. 2020) and has been referred to as the "next big thing" (Oganda et al. 2020), "the new black", and the new grail" (Yi 2019). A smart contract on a blockchain is a trusted computer, and the results are generally reliable (Pathak et al. 2021). The application of blockchain technology is based on the fact that blockchain technology has a relatively high degree of fault tolerance, as it is supported by distributed nodes (Sanni and Apriliasari 2021).

The financial performance of organizations is a measure of the results that have been achieved based on specific criteria. An economic outcome can be measured by collecting information about the growth rate in terms of sales, cash flows, return on investment, and economic value. Thus, it depends mainly on the financial policies followed by the organization and the extent to which the organization's growth rate contributes to its success, as these policies affect financial performance and the extent to which financial returns are related to all activities, as well as the appropriate use of available resources in order to achieve financial goals at the lowest cost (Alam et al. 2018).

### *1.1. Problem Statement*

Scientific and technological progress led to the need for the development of sports. The economies of countries are measured by the development of sports and the financial resources available as a result of these developments. Thus, some sports institutions have

become dependent on investing all their resources and raising the level of their services (Alammary et al. 2019). Blockchain technology can contribute to increasing the value of organizations. We provide this technology with many incentives to convert customers to business models based on the blockchain: blockchain reduces costs resulting from the lack of mediation and transparency with the speed of transactions. The technology also improves operational efficiency and reduces record keeping with the ability to track and verify data, which stimulated investors to invest in this technology (Kamatra and Kartikaningdyah 2015). Moreover, the advantages of blockchain technology include its ability to record, store, and retrieve data, thus reducing the cost of its preparation in the long term, as well as the ability to guarantee the quality of stored financial data, the ability to maintain that financial data and the ability to continuously renew and update it, as explained by Raja Santhi and Muthuswamy (2022b) and Weking et al. (2020). These studies illustrate the importance of using blockchain technology in providing the source, traceability and securing of data.

It is worth noting that the term "link between the economy and sports" appeared in recent years when there was an urgent need for an economic system for the sports industry. Hence, there was a need to study the complementary relationship between sports activities and economic interests because the sports system is based on economic pillars and solutions to economic problems can be found in improving financial efficiency. The Ministry of Sports lacks the use of modern technological methods to meet its needs and prioritizes the necessity and feasibility of projects based on economic aspects. Organizations are increasingly looking for new ways through the use of technology, which has increased the quantity and importance of data, as well as the use of blockchain technology in many areas. Thus, organizations prioritize technological progress by investing in technology and machine learning by providing better customer service, improving operational performances, and increasing revenue. Based on the above, it is clear how important the use of blockchain technology is for institutions within the sports industry. The importance of the Ministry of Sports, with the management of the sports movement, is that it is the administrative body that is responsible for implementing plans, programs, and sports projects. This gave the researchers the idea to study the use of blockchain technology and its effect on the financial performances of the investment projects developed by the Ministry of Sports.

### *1.2. The Significance of the Research*

The importance of the study stems from the novelty of the issue of using blockchain technology in the field of sports, as well as its impact on financial performance, as the study draws attention to what the application of blockchain technology can achieve in terms of improving financial performance. The study aims to bring to the attention of sports officials the use of blockchain technology in the field of sports, with their knowledge of the potential impacts of re-sponsorship as a result of the use of blockchain technology to improve financial performance.

### *1.3. Objectives*

The objective is to produce a statement pertaining to the impact of using blockchain technology on the financial performance of investment projects developed by the Ministry of Sports by identifying the extent of the use of blockchain technology for investment projects. With regard to the level of the financial performance of the investment projects developed by the Ministry of Sports, it is necessary to determine the extent to which there is a statistically significant correlation between the use of blockchain technology and the financial performance of the investment projects implemented by the Ministry of Sports. It is also necessary to identify the extent of the likelihood of blockchain technology being used to assess the financial performance of investment projects developed by the Ministry of Sports.

### *1.4. Research Questions*

Based on the study's objectives, the following research questions are posed:

- To what extent is blockchain technology used for the investment projects developed by the Ministry of Sports?
- What is the level of the financial performance of the investment projects developed by the Ministry of Sports?
- Is there a statistically significant correlation between the use of blockchain technology and the financial performance of investment projects developed by the Ministry of Sports?
- Does (or can) the use of blockchain technology contribute to predicting the financial performance of investment projects developed by the Ministry of Sports?

### *1.5. Literature Review*

A study by Wouda and Opdenakker (2019) indicated that blockchain technology could lead to improvements in efficiency and transparency, thus, trust in the transaction process. Therefore, it is valuable for the future of data management and transactional process. Puthal et al.'s (2018) study has proven that it is a good peer-to-peer (P2P) information exchange and the most secure, efficient, and transparent way. Morkunas et al. (2019) outlined the impact that blockchain technologies can have on every element of a business model, along with illustrations from companies developing blockchain technology. The study of Yang et al. (2020) also outlined the process, benefits, and challenges of adopting private and public blockchain technologies in the construction field. It provided insights to researchers and practitioners regarding the adoption of blockchain technology, especially in the construction industry. The study by Sander et al. (2018) also revealed the conflicting views of various stakeholders regarding the importance of BCT-based text-to-speech. The acceptability of blockchain technology (BCT) as a viable system for transparency and traceability (TTS) was assessed.

The study of Velte (2016) showed that the development of financial accounting and corporate social responsibility integrated reporting, along with the increasing importance of control, goes hand in hand. Control will form the central link between the quality of corporate governance and integrated reporting.

Many of the studies that have addressed blockchain technology have attempted to study the impact of its application in an attempt to draw attention to the importance of this modern technology and the consequences of its application in the business world. According to Cangemi and Brennan (2019), the use of blockchain technology does not completely eliminate the role of accountants, but it does change the way that they or their workers perform. The study by Fanning and Centers (2016) demonstrated the benefits of blockchain technology in terms of its ability to record, store, and retrieve data, as well as to reduce the costs of preparing data in the long term, to ensure the quality of the stored financial data, and the ability to maintain and update financial data continuously.

The study by Ghode et al. (2020) presented by Van Hoek (2019) provides evidence of the importance of companies embracing the concept of blockchain by showing that the use of blockchain has led to a reduction in product costs and increased market share in existing competition. In addition, blockchain technology is seen as an opportunity to exploit existing resources and efficiencies derived from the ability to provide immutable data. Further to this, Abreu et al. (2018) analyzed the concept of blockchain, examining what this technology can offer professional auditors to reduce audit workload and reduce fraud risk.

The study by Almustafa et al. (2023) indicated that shareholders and managers of companies with low performance should take all measures to improve their operational efficiencies, and it also showed that the governance system provided a good environment for companies and reduced the effects of economic shocks. Dang and Nguyen's (2021) study also showed that factors related to corporate governance, such as the independence of the board of directors and reviewing the quality and size of companies, affected the quality of

financial reports. The study by Nguyen (2022a) revealed the impact of developing financial technology (FinTech) on financial stability in emerging markets. The study found that the development of FinTech negatively affected financial stability, and that study provided important implications for regulators to develop financial technology and maintain financial stability in emerging markets. Qing et al. (2022) study also showed the relationship between green technology innovation and corporate financial performance. Examine the specific role of risk governance in enhancing the effectiveness of risk management in a bank. The study of Nguyen (2022b) examines the specific role of risk governance in enhancing the effectiveness of risk management in a bank.

The study by Cao et al. (2018) discussed applications resulting from the use of blockchain for financial reporting and auditing by analyzing the competition among auditors, the auditing quality, and the not material errors of the auditing client and the organizational policy in one framework. The use of blockchain was found to reduce auditors' reporting errors and sample costs while also decreasing errors to the minimum. The study by Bonsón and Bednárová (2019) provided a general view of the form of an accounting and auditing system that used blockchain technology, which revealed the need to benefit from this modern technology and to integrate it into accounting information systems to benefit from its advantages.

## 2. Materials and Methods

### 2.1. Research Sample

The study population included leaders of the Ministry of Sports and experts in the field of sports investment, as well as some leaders working in sports directorates and some members of the board of directors of the Olympic Committee, sports federations, sports clubs, and youth centers in the Kingdom of Saudi Arabia. The sample of the study was chosen in a non-probabilistic sampling frame (purposive manner), who had experience in financial performance and sports investment, based on the categories of the study population; the criterion for inclusion was that the participants had more than 10 years of experience. The strength of the study is that it had 300 participants. The researchers adopted a descriptive approach: Table 1 presents a description of the study sample.

**Table 1.** Description of the study sample.

| No. | Profile | Basic Sample | Sample Survey |
|---|---|---|---|
| 1 | Leaders of the Ministry of Sports | 61 | 4 |
| 2 | Experts in the field of sports investment | 24 | 3 |
| 3 | Leaders working in sports directorates | 49 | 4 |
| 4 | Members of the Board of Directors of the Olympic Committee | 7 | 3 |
| 5 | Members of the Board of Directors of Sports Federations | 33 | 3 |
| 6 | Members of the Board of Directors of Sports Clubs | 65 | 5 |
| 7 | Members of the Board of Directors of Youth Centers | 61 | 3 |
| | Total | 300 | 25 |

### 2.2. Research Instruments

We used two questionnaires. The first aimed to identify the extent of the use of blockchain technology at the Ministry of Sports, while the second aimed to identify the level of financial performance at the Ministry of Sports. We prepared a specific questionnaire to measure the extent to which blockchain technology was used in investment projects developed by the Ministry of Sports. The study tool included 29 phrases, and a three-point Likert scale was used to measure the scores for the participants' answers. The questionnaire was divided into six areas of training and development, engagement, traceability, programmability, digital services provided, and processes and systems (see Appendix B). We also prepared a specific questionnaire to measure the level of the financial performance of the investment projects developed by the Ministry of Sports. This study tool

included 27 phrases, and a three-point Likert scale was used to measure the participants' answers. The questionnaire was divided into five areas of development rates, applied financial transactions and systems, investment opportunities, financial value-added, and operational activities (see Appendix A). The validity and stability of the forms were verified by calculating the internal flow coefficient using Cronbach's alpha, and the value of the stability coefficient was 0.78 overall for the first tool and 0.81 overall for the second tool. These percentages are acceptable when conducting this type of study.

## 3. Research Timeline

The baseline study was conducted from 12 April to 29 May 2022, using a sample of 300 individuals at the Ministry of Sports, Saudi Arabia. The data were analyzed using Pearson's correlation coefficient, Cronbach's alpha coefficient, percentages, relative weight, mean response, confidence intervals, chi-squares, and multiple regression analysis. The statistical package for the social sciences (SPSS) was used to calculate the statistical coefficients and to determine the level of significance (0.05).

## 4. Results

Figure 1 shows the average and percentage of responses to the respective questionnaire on the use of digital blockchain technology for investment projects developed at the Ministry of Sports.

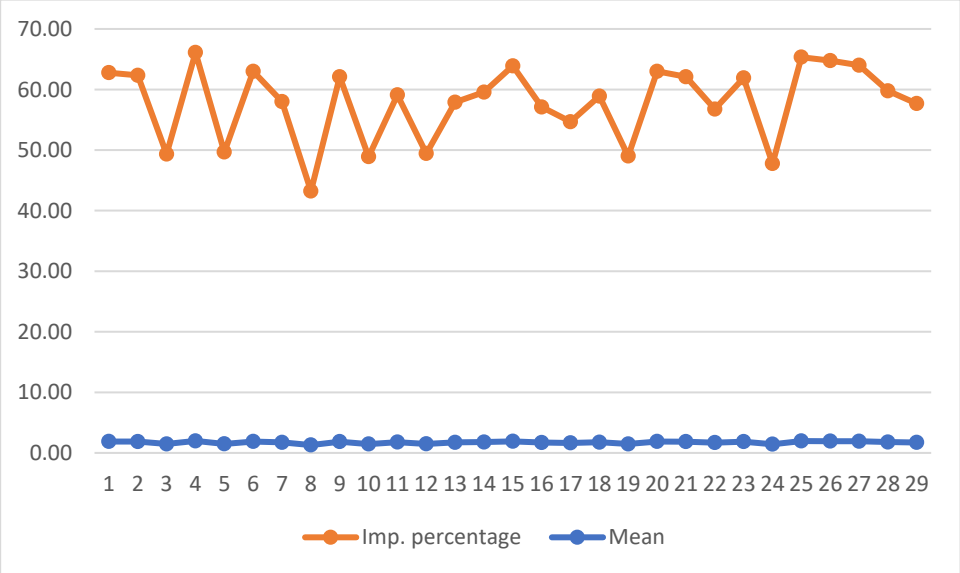


**Figure 1.** Response to the questionnaire on the use of digital blockchain technology.

Table 2 shows the responses and $X^2$ of the questionnaire using blockchain technology for investment projects developed at the Ministry of Sports, where the average response to all incoming statements ranges between (0.43: 0.66), and the average response to the axes ranged between (0.55: 0.60), while the average response to the questionnaire as a whole was (0.58).

**Table 2.** Mean and Std. Deviation, average response and $X^2$ for the opinions of the sample in the questionnaire of using blockchain technology for investment projects developed at the Ministry of Sports (n = 300).

| No. | Item | Mean | SD | Average Response | $X^2$ | Imp. Percentage |
|---|---|---|---|---|---|---|
| **The first axis—training and development:** | | | | | | |
| **1** | Training is constantly carried out to keep pace with modern technological developments. | 1.88 | 0.824 | 0.63 | 7.29 | 62.77% |
| **2** | There is interest in introducing new technological software to improve the quality of work. | 1.87 | 0.842 | 0.62 | 11.94 | 62.33% |
| **3** | A qualified team and associate trainer are available for blockchain technology. | 1.48 | 0.734 | 0.49 | 148.14 | 49.33% |
| **4** | Human capital is relied upon through the development of knowledge pillars. | 1.98 | 0.820 | 0.66 | 0.14 | 66.10% |
| **5** | Specific programs are available to prepare cadres in the field of blockchain technology. | 1.49 | 0.725 | 0.50 | 135.42 | 49.67% |
| **Average axis response** | | | | **0.58** | | |
| **The second axis—participation:** | | | | | | |
| **6** | The techniques used are modern and commensurate with the requirements of the work. | 1.89 | 0.817 | 0.63 | 5.58 | 63.00% |
| **7** | All transactions can be seen, and cost causes identified and identified. | 1.74 | 0.817 | 0.58 | 36.42 | 58.00% |
| **8** | Blockchain technology is used in the various financial works of the TSU version. | 1.30 | 0.640 | 0.43 | 298.22 | 43.23% |
| **9** | Investments are made in techniques based on self-learning to carry out routine tasks. | 1.86 | 0.845 | 0.62 | 13.82 | 62.10% |
| **10** | Blockchain technology is used in quality control of active production. | 1.47 | 0.715 | 0.49 | 149.66 | 48.90% |
| **Average axis response** | | | | **0.55** | | |
| **The third axis—tracking:** | | | | | | |
| **11** | Smart contracts are set up for transactions with low fees compared to traditional systems. | 1.77 | 0.831 | 0.59 | 30.38 | 59.10% |
| **12** | Blockchain technology is used to achieve added value. | 1.48 | 0.752 | 0.49 | 156.14 | 49.43% |
| **13** | Through tracking, consistent data is provided, which contributes to resource utilization. | 1.74 | 0.814 | 0.58 | 36.62 | 57.90% |
| **14** | The costs of the services provided are tracked and compared with the costs of competitors' activities. | 1.79 | 0.794 | 0.60 | 20.54 | 59.57% |
| **Average axis response** | | | | **0.57** | | |
| **The fourth axis—programmability:** | | | | | | |
| **15** | Strong supporting infrastructure (networks, software, and internet) is available. | 1.92 | 0.816 | 0.64 | 3.14 | 63.90% |
| **16** | Electronic devices and computerized programs are continuously maintained and updated. | 1.71 | 0.783 | 0.57 | 37.94 | 57.10% |
| **17** | Continuous development of plans and programs supporting blockchain technology is available. | 1.64 | 0.828 | 0.55 | 87.36 | 54.67% |
| **18** | Information is used and developed as a key factor of economic and productive value. | 1.77 | 0.853 | 0.59 | 41.84 | 58.90% |
| **Average axis response** | | | | **0.59** | | |
| **The fifth axis—digital services provided:** | | | | | | |
| **19** | The necessary technical services for blockchain technology are being developed. | 1.47 | 0.733 | 0.49 | 156.78 | 49.00% |
| **20** | Services are provided and made available through internet applications and smart devices. | 1.89 | 0.829 | 0.63 | 6.66 | 63.00% |
| **21** | Modern technologies are employed to provide services and follow them up continuously. | 1.86 | 0.821 | 0.62 | 9.14 | 62.10% |
| **22** | The latest information security technologies are used. | 1.70 | 0.859 | 0.57 | 72.74 | 56.77% |
| **23** | New networks are introduced during the provision of services. | 1.86 | 0.807 | 0.62 | 9.26 | 61.90% |
| **Average axis response** | | | | **0.59** | | |
| **The sixth axis—processes and systems:** | | | | | | |
| **24** | Blockchain technology is used to determine cost shifts. | 1.43 | 0.679 | 0.48 | 161.84 | 47.77% |
| **25** | The accuracy of financial information is improved, and the chances of manipulation through technology are reduced. | 1.96 | 0.821 | 0.65 | 0.78 | 65.33% |
| **26** | Work is being done to find sophisticated ways to translate the ITAT into programs that can be implemented. | 1.94 | 0.822 | 0.65 | 1.58 | 64.77% |
| **27** | Work processes are re-engineered and converted to the digital system. | 1.92 | 0.826 | 0.64 | 3.42 | 64.00% |
| **28** | Software is available that actively predicts through data analysis. | 1.79 | 0.856 | 0.60 | 34.58 | 59.77% |
| **29** | Areas of correction and cost reduction are determined through technological techniques. | 1.73 | 0.836 | 0.58 | 47.22 | 57.67% |
| **Average axis response** | | | | **0.60** | | |
| **Average response to the survey as a whole** | | | | **0.58** | | |

Minimum confidence = 0.62 Maximum confidence = 0.72; The value of $X^2$ is a function at a significance level (0.05) = 5.99.

It is clear from Table 2 that the values of $X^2$ are a function at the level of significance (0.05) for the questionnaire statements using blockchain technology for investment projects developed at the Ministry of Sports. In contrast, the KMOs for the axes of the questionnaire (training and development, participation, tracking, programmability, digital services provided, processes and systems) were, respectively, 0.861, 0.815, 0.864, 0.867, 0.879, and 0.882, which indicate an appreciable level. The KMO was 0.964, indicating a meritorious level based on Kaiser (1974), and Barlett's test for sphericity was significant (df = 406, $p = 0.000$). Thus, there are statistically significant differences between the responses of the study sample members in favor of the "no" response.

Figure 2 shows the mean and percentage of responses for the questionnaire statements of the level of financial performance of investment projects developed at the Ministry of Sports.

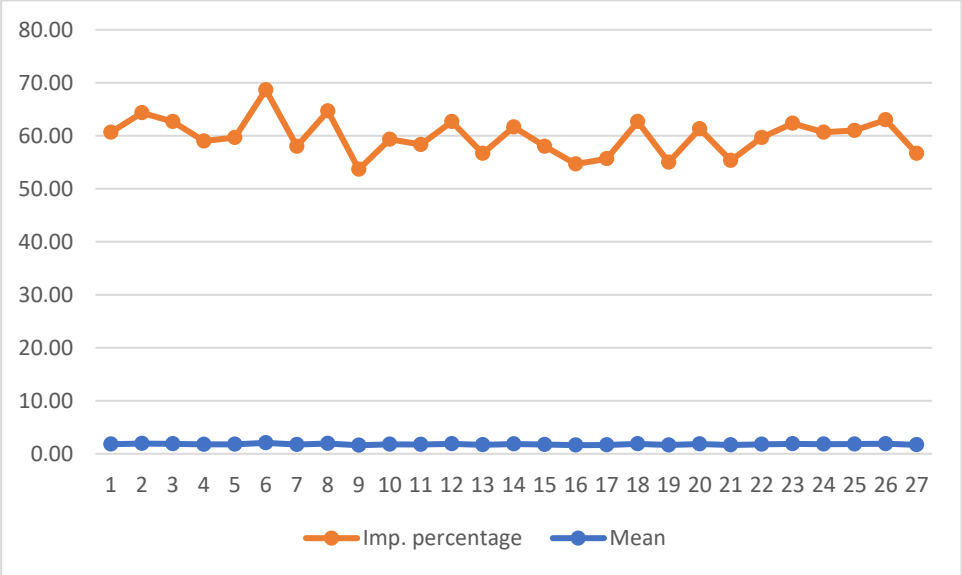


**Figure 2.** Percentage of responses to the questionnaire statements of the level of financial performance of investment projects developed at the Ministry of Sports.

Table 3 shows the average response and $X^2$ of the questionnaire on the level of financial performance of the investment projects developed at the Ministry of Sports, where the average response to all statements received ranges between 0.54–0.69, and the average response to the axes ranged between 0.58–0.61, while the average response to the questionnaire as a whole was 0.60.

It is clear from Table 3 that the values of $X^2$ are a function at the level of significance (0.05) for the questionnaire statements of the level of financial performance of investment projects developed at the Ministry of Sports. In contrast, the KMOs for the axes of the questionnaire (the rate of development, applicable financial transactions and systems, investment opportunities, added financial value, and operational activities) were respectively 0.866, 0.853, 0.883, 0.848, and 0.897, which indicates an appreciable level. The KMO was 0.967, indicating a meritorious level based on Kaiser (1974), and Barlett's test for sphericity was significant (df = 351, $p = 0.000$). Thus, there are statistically significant differences between the responses of the study sample members in favor of the "no" response.

**Table 3.** Relative weight, average response and $X^2$ for the opinions of the sample in the questionnaire of the level of financial performance of investment projects developed at the Ministry of Sports (n = 300).

| No. | Item | Mean | SD | Average Response | $X^2$ | Imp. Percentage |
|---|---|---|---|---|---|---|
| **The first axis—the rate of development:** | | | | | | |
| **1** | A periodic study of the size of the economic returns of the programs and activities provided. | 1.82 | 0.816 | 0.61 | 16.34 | 60.67% |
| **2** | Programs and activities offered that do not achieve an economic return are eliminated. | 1.93 | 0.823 | 0.64 | 2.66 | 64.33% |
| **3** | Programs and activities are developed that are expected to have a high financial return. | 1.88 | 0.827 | 0.63 | 8.06 | 62.67% |
| **4** | Quantitative targets are set to determine the size of the target economic return periodically. | 1.77 | 0.821 | 0.59 | 29.36 | 59.00% |
| **5** | There is an increase and diversity in the sources of financing. | 1.79 | 0.830 | 0.60 | 25.26 | 59.67% |
| **Average axis response** | | | | **0.61** | | |
| **The second axis—applicable financial transactions and systems:** | | | | | | |
| **6** | Spending efficiency is improved by adhering to budget items. | 2.06 | 0.814 | 0.69 | 0.69 | 68.675 |
| **7** | The speed of decision for the process of resource development is available through flexibility in the applicable regulation. | 1.74 | 0.838 | 0.58 | 0.58 | 58.00% |
| **8** | Permanent follow-up of approved financial plans. | 1.94 | 0.838 | 0.65 | 0.65 | 64.67% |
| **9** | Financial regulations are amended in proportion to the services and activities provided. | 1.61 | 0.808 | 0.54 | 0.54 | 53.67% |
| **10** | Mechanisms are available to attract and encourage investment in activities through the applicable regulations and systems. | 1.78 | 0.832 | 0.59 | 0.59 | 59.33% |
| **Average axis response** | | | | **0.61** | | |
| **The third axis—investment opportunities:** | | | | | | |
| **11** | There is an increase in the volume of programs and activities that attract investment. | 1.75 | 0.836 | 0.58 | 0.58 | 58.33% |
| **12** | The available facilities are invested effectively. | 1.88 | 0.839 | 0.63 | 0.63 | 62.67% |
| **13** | Specific investment objectives are set. | 1.70 | 0.804 | 0.57 | 0.57 | 56.67% |
| **14** | There is an increase in the volume of programs and activities that attract investment annually. | 1.85 | 0.825 | 0.62 | 0.62 | 61.67% |
| **15** | It is an application of some modern investment systems (B.O.T). | 1.74 | 0.785 | 0.58 | 0.58 | 58.00% |
| **16** | Specialized technical elements are available to manage and invest in activities in an economical manner. | 1.64 | 0.821 | 0.55 | 0.55 | 54.67% |
| **Average axis response** | | | | **0.59** | | |
| **The fourth axis—added financial value:** | | | | | | |
| **17** | Expenditures on revenues are reduced. | 1.67 | 0.811 | 0.56 | 0.56 | 55.67% |
| **18** | Financial indicators are provided to achieve them. | 1.88 | 0.836 | 0.63 | 0.63 | 62.67% |
| **19** | Long- and short-term sources of funding are available. | 1.65 | 0.810 | 0.55 | 0.55 | 55.00% |
| **20** | Human assets, sports facilities and equipment are invested. | 1.84 | 0.844 | 0.61 | 0.61 | 61.33% |
| **21** | Feasibility studies are used in investment as a sports institution. | 1.66 | 0.799 | 0.55 | 0.55 | 55.33% |
| **Average axis response** | | | | **0.58** | | |
| **The fifth axis—operational activities:** | | | | | | |
| **22** | Clear and announced exchange rules are defined. | 1.79 | 0.802 | 0.59 | 0.59 | 59.67% |
| **23** | There is an automated accounting system. | 1.87 | 0.824 | 0.62 | 0.62 | 62.33% |
| **24** | Programs are provided to rationalize expenses. | 1.82 | 0.832 | 0.61 | 0.61 | 60.67% |
| **25** | Financial rules and regulations are adhered to. | 1.83 | 0.824 | 0.61 | 0.61 | 61.00% |
| **26** | Sufficient financial resources are provided to cover the activities and services provided. | 1.89 | 0.831 | 0.63 | 0.63 | 63.00% |
| **27** | A clear financial reporting system is available. | 1.70 | 0.819 | 0.57 | 0.57 | 56.67% |
| **Average axis response** | | | | **0.60** | | |
| **Average response to the survey as a whole** | | | | **0.60** | | |

Minimum confidence = 0.62 Maximum confidence = 0.72; The value of $X^2$ is a function at a significance level (0.05) = 5.99.

Table 4 shows the correlation coefficients between the use of blockchain technology and the development of the financial performance of investment projects developed at the Ministry of Sports.

**Table 4.** Correlation coefficients between the use of blockchain technology and the development of the financial performance of investment projects developed at the Ministry of Sports (n = 300).

| | Digital Blockchain Technology | Financial Performance | | | | | |
|---|---|---|---|---|---|---|---|
| | | DR | FTS | IO | AFV | OA | OS |
| 1 | Training and Development | 0.53 | 0.66 | 0.68 | 0.57 | 0.71 | 0.65 |
| 2 | Participation | 0.69 | 0.68 | 0.69 | 0.60 | 0.60 | 0.72 |
| 3 | Trace | 0.71 | 0.59 | 0.71 | 0.64 | 0.66 | 0.60 |
| 4 | Programmability | 0.63 | 0.70 | 0.55 | 0.68 | 0.63 | 0.65 |
| 5 | Digital Services Offered | 0.71 | 0.58 | 0.72 | 0.70 | 0.70 | 0.57 |
| 6 | Processes and Systems | 0.77 | 0.63 | 0.63 | 0.71 | 0.69 | 0.59 |
| | Overall Score | 0.72 | 0.69 | 0.64 | 0.71 | 0.68 | 0.67 |

Development Rate (DR); Financial Transactions and Systems (FTS); Investment Opportunities (IO); Added Financial Value (AFV); Operational Activities (OA); Overall Score (OS).

It is clear from Table 4 that there is a statistically significant direct correlation between the use of blockchain technology and the development of the financial performance of investment projects developed at the Ministry of Sports.

Figure 3 shows the moderation of the distribution of the residuals, and the data are collected towards the straight line, so the residuals follow the normal distribution.

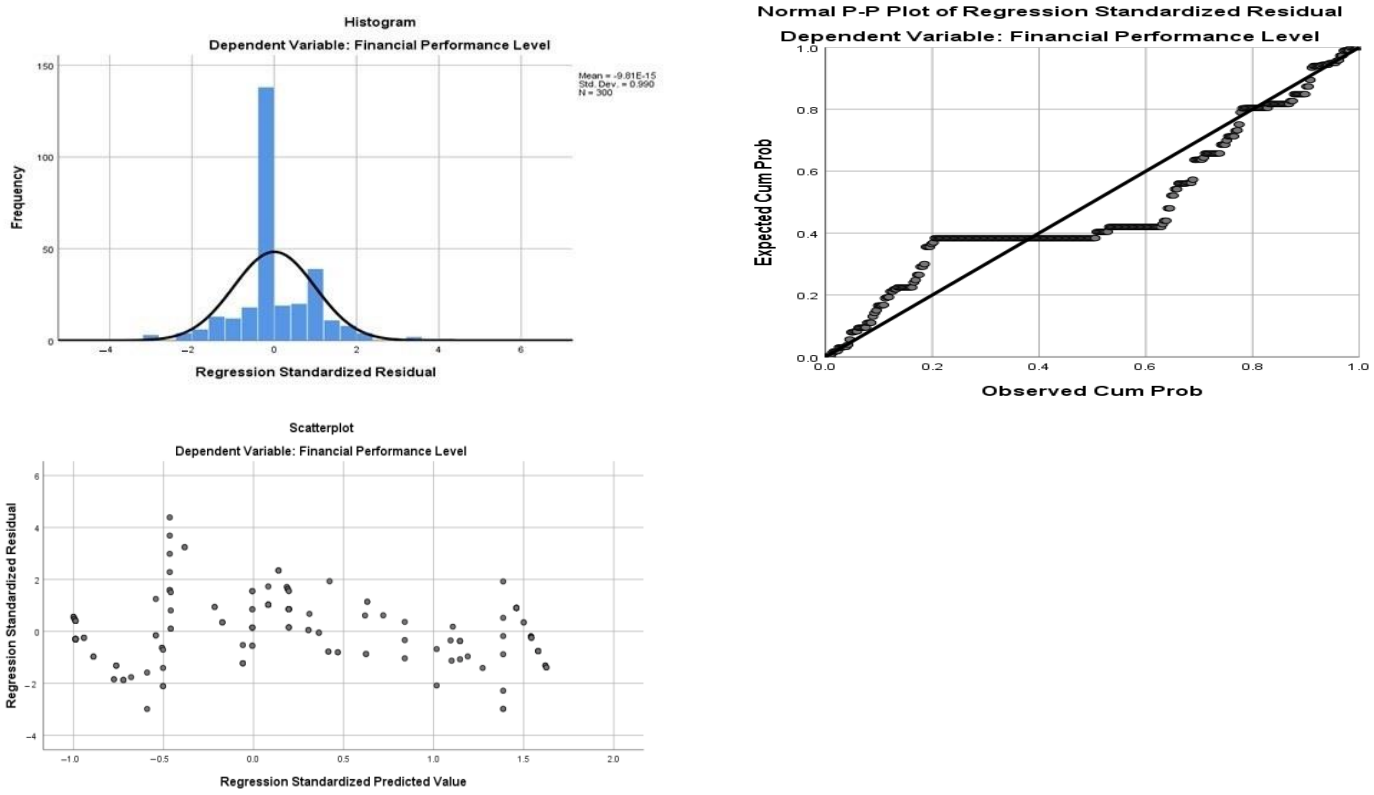


**Figure 3.** Multiple regression analysis.

Table 5 shows the multiple regression analysis between the axes of the questionnaire on the use of blockchain technology and the financial performance development questionnaire for investment projects developed by the Ministry of Sports.

**Table 5.** Regression Results.

| | |
|---|---|
| **R Square** | 0.995 |
| **F value** | 9532.804 |
| **Significance** | 0.000 |
| **Beta of participation** | 0.224 |
| **Beta of Tracking** | 0.237 |
| **Beta of Programmability** | 0.449 |
| **Beta of Digital Services Provided** | 0.349 |
| **Beta of Processes and Systems** | 0.207 |

We sought to understand the relationship between the level of financial performance and the variables of using blockchain technology (training and development, participation, tracking, programmability, and digital services provided). The multiple linear regression model (table) was used, in which the variables (participation, tracking, programmability, and digital services provided) were considered as explanatory variables and the level of financial performance variable as the dependent variable. The results of the regression model showed that the regression model is significant through the value of (F) $p = 0.000$. It can be concluded that the model is valid, and there is a correlation between the level of financial performance and the use of blockchain technology. The results explain that the explanatory variables explain 99.5% of the variation in the level of financial performance by looking at the value of r2, which indicates the strength of the relationship between the level of financial performance and the use of blockchain technology. The value of beta that illustrates the relationship between the level of financial performance and participation (tracking, programmability, digital services provided) $p = 0.000$. At the same time, there is no relationship between the level of financial performance and training and development, as it came as a function other than $p = 0.440$, which is greater than the level of significance (0.05). We can also write the regression equation as follows: the level of financial performance = 0.20 + (0.224*participation) + (0.237*Tracking) + (0.449*Programmability) + (0.349*Digital Services Provided) + (0.207*Processes and Systems) + error term.

*Limitations in Adopting Blockchain Technology*

Although this technology provides many benefits to the beneficiaries or participants, it has not been widely adopted due to various challenges and limitations. Scalability, accounting capacity, productivity, and high cost in preparation are among the main challenges and limitations (Ismail and Materwala 2019). Every transaction in a blockchain network requires peer-to-peer verification before it can be processed. This becomes time-consuming with a large number of users or participants, especially in a public blockchain network, where each user validates the transaction. Hence, the number of transactions per second in is increasing considerably with the current mainframe systems.

The cost involved in creating a blockchain network will be high and complex. In many cases, it is a known challenge to face. The challenges also include a lack of budget, where the technological infrastructure requires a large budget, and also the lack of good and successful use with a lack of technological awareness that requires refinement of the participants or users. In a public blockchain network, where anyone can join the network, there is a lack of central management authority needed to develop a protocol and standard rules for transactions (especially financial transactions), so the trend is towards a private blockchain network, according to Ismail and Materwala (2019).

## 5. Discussion

The results presented in Table 2 indicate that there was consensus among the participants regarding the lack of practice in using digital blockchain technology for investment projects that were developed by the Ministry of Sports. The results showed that the average response to the questionnaire as a whole was 0.58, which is considered less than the minimum level of confidence. The researchers attributed this result to the lack of some of the

officials' awareness of the importance of using technology, particularly blockchain technology. As the nature of the work does not depend on applying digital blockchain technology to provide services and activities, it was not considered to be a basic axis or an important source of income. Furthermore, there was no center for information system technology, and new digital networks were not developed during the provision of services. In addition, the latest information technologies were not used, and there was a lack of digital technologies and communication mechanisms to support businesses and e-commerce. There was also no attempt to establish an organizational culture that relied on digital services in businesses. Due to the inappropriate organizational structure and its practices, an information system was not seen as an important requirement.

It is clear from the results presented in Table 3 that there was consensus among the participants regarding the weak financial performance. The results showed that the average response to the questionnaire as a whole was 0.60, which is less than the minimum level of confidence. We attributed this to the weakness of the actual capacity of sports services and activities, reflected in the financial performance, as well as in the lack of sufficient knowledge and experience of ways to improve the financial performance of services and activities at work despite the economic transformation of sports. Another reason was the inability to invest in such a way that contributed to increasing the rates of economic growth and investment within the various institutions. Furthermore, the financial return from the operation of these facilities was not commensurate with the amount spent on wages and on the maintenance of the facilities.

We also attributed this result to the weak productive capacity of sports services and activities, which was reflected in their economic inefficiency, with the lack of sufficient knowledge and experience among those in charge of managing these sports institutions to improve performance. The efficiency of the financial performance of services and activities through maximizing productivity at work, as well as the lack of increasing diversity in funding sources with weak oversight and permanent follow-up of the approved financial plans. Another factor is the lack of an increase in the size of programs and activities that attract investment, with a lack of feasibility studies when investing as a sports institution, with a lack of interest in technological investment in the field of sports.

This is what blockchain technology is all about, as it has received a lot of attention in financial technology (FinTech). It combines several computer technologies, including distributed data storage, point-to-point transmission, consensus mechanisms, and cryptographic algorithms. Both Guo and Liang (2016) see that blockchain technology represents a major advance in data storage and information transmission. It may lead to a radical change in the current operating models of finance and economics, which may lead to a new round of technological innovations and industrial transformation within the FinTech industry.

The results shown in Table 4 indicate that practices involving the use of blockchain technology are closely related to the extent to which a high level of financial performance of the investment projects developed by the Ministry of Sports could be achieved. This was evident in the existence of a soft correlational relationship between the use of blockchain technology and the development of the financial performance of the projects developed in the Ministry of Sports, where the total score for the transactions ranged between 0.57–0.72, as these institutions have the ability to improve and develop their financial performances. This is indicated by the results of Cangemi and Brennan's (2019) study, which emphasized that the use of trust chain technology did not eliminate the role of accountants entirely but changed how accountants performed their work. We found that most sports organizations currently have a strong presence on the internet and on websites that were designed for various purposes. Therefore, officials must respond to technological developments by understanding and absorbing the capabilities and possibilities of using blockchain technology, as well as how to employ it in activities and services. Blockchains act as a fundamental building block in the shift away from trust in humans toward trust in computers, as well as a shift away from centralized management toward decentralization (Ghode et al. 2020).

The analysis by Umarovic and Natalia (Umarovich et al. 2017) of the risks and benefits of blockchain implementation highlighted the need to balance the risks and benefits of applying the technology and emphasized the importance of using blockchain technology in financial markets. In general, the results in Table 5 revealed that the use of blockchain technology had an impact on financial performance, as the value of $p = 0.000$, as the use of blockchain technology is considered to be an indicator to identify deviations in all types of operations and services. Therefore, paying attention to the processes of improvement and development of the work in institutions that do not use technology has become indispensable, particularly with regard to digital blockchain technology, which ensures the functioning and integrity of operations, as well as financial and administrative documents in the event of errors, thus ensuring the efficiency of financial performances. Blockchain technology ensures the accuracy of the information related to accounting documents that are provided, while the regulatory bodies that contribute to linking the parts of the administrative processes to each other and the absence of the control process lead to the dismantling of various elements, which develop the organization and improve performance in the institution. Therefore, a high degree of skill, sufficient experience, and advanced methods are needed to increase and improve production.

These results are further confirmed by the results of the study by Nguyen (2016): that blockchain technology plays an important role in the sustainable development of the global economy. The new technology is expected to bring enormous benefits to consumers, the existing banking system, and society as a whole. Oh and Shong (2017) suggest reviewing the suitability of Blockchain's distributed architecture for automating a financial institution's business processes, rather than applying it to the entire financial system or individual financial institutions. Blockchain had the potential to improve the existing information processing process of financial institutions. Yeoh (2017) further confirmed the future innovative contributions of blockchain, especially in financial services and related sectors, and towards enhanced financial inclusion.

These findings are consistent with the results of the study by Fanning and Centers (2016), which revealed that the benefits of blockchain technology were its ability to record, store, and retrieve data, to reduce the costs of preparing data in the long term, and to ensure the quality of the stored financial data, as well as the ability to maintain and update financial data continuously. In addition, the results of the studies by Ghode et al. (2020), Van Hoek (2019), and Jamil et al. (2021) provided evidence of the importance of organizations adopting the concept of blockchains to reduce product costs and increase their market share in the current competitive situation; therefore, blockchain technology is seen as an opportunity to exploit existing resources and efficiency due to the ability to provide consistent data. Cao et al. (2018) explained that the use of blockchains would decrease auditors' reporting errors and sample costs and would minimize errors. A study by Bonsón and Bednárová (2019) revealed the need to take advantage of this modern technology and integrate it into accounting information. The study also demonstrated the relationship between green technology innovation and corporate financial performance.

## 6. Conclusions

The study aimed to demonstrate the impact of the use of blockchain technology on the financial performance of investment projects developed by the Ministry of Sports. About 300 participants participated in the study. We used two questionnaires as data collection tools. The results of the study showed the low levels of blockchain technology use and the level of financial performance of investment projects developed by the Ministry of Sports, with a significant correlation between the use of blockchain technology and the financial performance of investment projects developed by the Ministry of Sports. The use of blockchain technology can also contribute to predicting the financial performance of investment projects developed by the Ministry of Sports. It is very likely that blockchain will be important as one of the topics for future research and will attract industry and commercial interest as well as the attention of academic and sports institutions to conduct

more research from a financial and technical point of view. Blockchain technology is basically a distributed ledger, as it is considered one of the basic activities of financial business, and it is considered one of the unique characteristics of blockchain technology that it can help the financial sector to manage its operations efficiently. The time-consuming process of auditing financial results can be reduced to a few hours by providing reliable data. Blockchain technology gives papers and financial documents security and the disposal of third parties through fast and effective processing, which works to maintain records (Hassani et al. 2018; Lacity 2018). The development of the financial performance of investment projects requires the use of unique technology, such as blockchain technology, that can provide the highest level of traceability, transparency, stability and security of data. When it comes to investment companies that adopt new technology, the question that may arise is whether technology can develop the financial performance of investment projects. The answer is "yes". We can summarize some points that add value as improving the tracking process in order to reduce costs while adhering to reputation and providing transparent and reliable information for all participants in order to eliminate errors in financial records while reducing manual operations.

### *6.1. Political Implications*

The political and economic implications of blockchain technology provide relevant theoretical frameworks about the civilizing impact of blockchain technology, which is redesigning human interactions related to transactions of value. Ideas, concepts, and tools to advance knowledge of crypto-economics and decentralized governance are presented in the new distributed trust model. It explores the ethical ramifications and profound political and economic consequences for society, providing insights into business applications focused on the financial sector within sports organizations. In the blockchain era, it is affected by the new nature that mixes politics, economics, and sports (Rodrigues 2021). The results of this study have enormous implications for investment companies and sports institutions that wish to develop financial performance and increase sports investments. The results of this study provide data that can be benefited from and avoid some of the problems that they may face by providing some solutions to take advantage of this technology and its wide application within the Kingdom of Saudi Arabia to benefit from it in all sports and investment institutions. Blockchain technology is a distributed, consensus-based, and secure way for individuals to make scalable, censorship-resistant, and quantifiable agreements. It paves the way for political decentralization, defense of privacy, and simplification of procedures. It has the potential to provide for more careful governance that will hopefully preserve liberty and defend democracy. Therefore, it turns encryption protocols into digital corsets. We noted polarization in questions about perceptions of the distribution of economic power and the external regulation of blockchain technologies. This contributes to economic justice, gender equality, decision-making power, and how to obtain favorable regulations, and the blockchain is linked to opinions on the management and regulation of financial performance. We also find that the political focus of the theory is supported by the data and the investigation of the possibility of other groups of respondents or beliefs emerging from the data.

### *6.2. Limitations and Future Directions*

First: the results of the study are interpreted with a number of important limitations in mind. Indeed, although there are no studies on the use of blockchain technology within the Ministry of Sports or sports institutions, we face some caveats, and the results are not generalized. Therefore, the study used a survey questionnaire, where careful research should be used to explore many factors in the use of these modern technologies in the performance of sports institutions. Bias may arise from the respondents on some of the answers in the questionnaire, and this is considered among the limitations of the study. However, the study targeted all groups within the Ministry of Sports. Not all of the study participants surveyed are sufficiently aware of the pros and cons of blockchain technology,

as they all come from sports or administrative backgrounds. The study did not target the largest number of participants who had sufficient experience in using blockchain technology. They have not had the opportunity to apply or actually use the technology. Also, the people working on this technology are few, and as such, they may not have been able to learn its real advantages and disadvantages. Therefore, the results were quite different as only a few participants working on blockchain technology were included because they are familiar with the intricacies, cost and technological infrastructure. It was more useful to target specific groups, which are the most specialized groups in financial terms and have sufficient scientific and practical experience in the use of blockchains. Therefore, future research should expand on the practical evaluation of the use of this technique. Second: the low level of readiness of the network and the low spread of this technology with the technological cost and the presence of limited expertise of human resources to use this technology. This is avoided through the future preparation of infrastructure within sports institutions to apply this technology with training courses and workshops on the use of this technology. The skills of workers need to be refined and polished with sufficient information on how to use this technology and learn about its advantages and disadvantages. We proposed some future directions, such as interest in preparing, qualifying and refining those in charge of managing sports institutions on how to deal with and use blockchain technology, qualifying leaders in various sports institutions with the skills and knowledge necessary to enhance the practices of using blockchain technology within them as one of the modern administrative entrances necessary to improve financial performance: the need to develop financial performance in sports institutions through the use of blockchain technology. Future research in this field must work to investigate the expansion of the use of blockchain. It also works to evaluate and improve the effectiveness, security and scalability of the framework and to develop solutions to any challenges that may arise and the integration of blockchain technology in the management of sports institutions in the near future.

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**Data Availability Statement:** This study was conducted according to the guidelines of the Declaration of Helsinki, and ap-proved by the Research Ethics Committee at King Faisal University (protocol code KFU-REC-2023-JAN-ETHICS721, approved on 17 January 2022).

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## Appendix A

**Table A1.** Blockchain Technology Survey.

| No. | Ferry | Response | | |
|---|---|---|---|---|
| | | **Yes** | **Kind of** | **No** |
| **The first axis—training and development:** | | | | |
| 1 | Training is constantly carried out to keep pace with modern technological developments. | | | |
| 2 | There is interest in introducing new technological software to improve the quality of work. | | | |
| 3 | A qualified team and associate trainer are available for blockchain technology. | | | |
| 4 | Human capital is relied upon through the development of knowledge pillars. | | | |
| 5 | Specific programs are available to prepare cadres in the field of blockchain technology. | | | |
| **The second axis—participation:** | | | | |
| 6 | The techniques used are modern and commensurate with the requirements of the work. | | | |
| 7 | All transactions can be seen, and cost causes identified and identified. | | | |
| 8 | Blockchain technology is used in the various financial works of the TSU version. | | | |
| 9 | Investments are made in techniques based on self-learning to carry out routine tasks. | | | |
| 10 | Blockchain technology is used in quality control of active production. | | | |
| **The third axis—tracking:** | | | | |
| 11 | Smart contracts are set up for transactions with low fees compared to traditional systems. | | | |
| 12 | Blockchain technology is used to achieve added value. | | | |
| 13 | Through tracking, consistent data is provided, which contributes to resource utilization. | | | |
| 14 | The costs of the services provided are tracked and compared with the costs of competitors' activities. | | | |
| **The fourth axis—programmability:** | | | | |
| 15 | Strong supporting infrastructure (networks, software, internet) is available. | | | |
| 16 | Electronic devices and computerized programs are continuously maintained and updated. | | | |
| 17 | Continuous development of plans and programs supporting blockchain technology is available. | | | |
| 18 | Information is used and developed as a key factor of economic and productive value. | | | |
| **The fifth axis—digital services provided:** | | | | |
| 19 | The necessary technical services for blockchain technology are being developed. | | | |
| 20 | Services are provided and made available through internet applications and smart devices. | | | |
| 21 | Modern technologies are employed to provide services and follow them up continuously. | | | |
| 22 | The latest information security technologies are used. | | | |
| 23 | New digital networks are introduced during the provision of services. | | | |
| **The sixth axis—processes and systems:** | | | | |
| 24 | Blockchain technology is used to determine cost shifts. | | | |
| 25 | The accuracy of financial information is improved, and the chances of manipulation through technology are reduced. | | | |
| 26 | Work is being done to find advanced ways to translate needs into programs that can be implemented. | | | |
| 27 | Work processes are re-engineered and converted to the digital system. | | | |
| 28 | Software is available that actively predicts through data analysis. | | | |
| 29 | Areas of correction and cost reduction are determined through technological techniques. | | | |

## Appendix B

**Table A2.** Financial Performance Questionnaire.

| No. | Ferry | Response | | |
|---|---|---|---|---|
| | | **Yes** | **Kind of** | **No** |
| **The first axis—the rate of development:** | | | | |
| 1 | A periodic study of the size of the economic returns of the programs and activities provided. | | | |
| 2 | Programs and activities offered that do not achieve an economic return are eliminated. | | | |
| 3 | Programs and activities are developed that are expected to have a high financial return. | | | |
| 4 | Quantitative targets are set to challenge the size of the targeted economic return periodically. | | | |
| 5 | There is an increase and diversity in the sources of financing. | | | |
| **The second axis—applicable financial transactions and systems:** | | | | |
| 6 | Spending efficiency is improved by adhering to budget items. | | | |
| 7 | The speed of decision for the process of resource development is available through flexibility in the applicable regulation. | | | |
| 8 | Permanent follow-up of approved financial plans. | | | |
| 9 | Financial regulations are amended in proportion to the services and activities provided. | | | |
| 10 | Mechanisms to attract and encourage investment in activities are available through the applicable regulations and systems. | | | |
| **The third axis—investment opportunities:** | | | | |
| 11 | There is an increase in the volume of programs and activities that attract investment. | | | |
| 12 | The available facilities are invested effectively. | | | |
| 13 | Specific investment objectives are set. | | | |
| 14 | There is an increase in the volume of programs and activities that attract investment annually. | | | |
| 15 | It is an application of some modern investment systems (B.O.T). | | | |
| 16 | Specialized technical elements are available to manage and invest in activities in an economical manner. | | | |
| **The fourth axis—added financial value:** | | | | |
| 17 | Expenditures on revenues are reduced. | | | |
| 18 | Financial indicators are provided to achieve them. | | | |
| 19 | Long- and short-term sources of financing are available. | | | |
| 20 | Human assets, sports facilities and equipment are invested. | | | |
| 21 | Feasibility studies are used in investment as a sports institution. | | | |
| **The fifth axis—operational activities:** | | | | |
| 22 | Clear and announced exchange rules are defined. | | | |
| 23 | There is an automated accounting system. | | | |
| 24 | Programs are provided to rationalize expenses. | | | |
| 25 | Compliance with financial laws and regulations. | | | |
| 26 | Sufficient financial resources are provided to cover the activities and services provided. | | | |
| 27 | A clear financial reporting system is available. | | | |

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