

# Application of Blockchain Technology to Reduce Costs

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## Abstract

The research aims to explain the cognitive foundations of Blockchain technology, clarify its types, characteristics, how it works, its advantages and disadvantages, clarify the applications of this technology in the Real Estate Registration Directorate and the implications of its application, and study and analyze the impact of the technology on reducing transaction costs by presenting a proposed model for application in the research sample unit. This technology is considered one of the technologies that is based on the idea of decentralization by eliminating the role of the intermediary, thus making transactions reliable, secure, and quick in completion, with the accompanying reduction of effort, time, and costs, as through it transactions can be completed in a few seconds or minutes, and do not require many Of the documents and documents that hold the unit responsible for providing a warehouse to store them and providing means of protection for their preservation, the researcher has reached a set of conclusions, the most important of which are: The application of Blockchain technology leads to reducing many procedures, which leads to a significant reduction in the costs of all these steps.

**Keywords:** Blockchain Technology, Costs Reduction.

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## **Introduction**

Blockchain technology is one of the most important technologies that has revolutionized the world of innovation and has received a lot of attention from many researchers in the recent period, This technology was created to facilitate the completion of transactions to improve the infrastructure of services provided by the units, due to the speed of this technology Security, transparency, and reducing the effort, time, and costs necessary to complete these transactions, Given the necessity of digital transformation and keeping pace with technological developments taking place in the world units must work to apply technologies that contribute to reducing transaction costs.

Accordingly, this research came to shed light on Blockchain technology explaining how it works, its characteristics, components, and its role in reducing costs, and creating more trust, transparency, and security in protecting its data, by eliminating corruption, fraud, and the complexity that accompanies all transactions within units by reducing the role of Brokers, required documents, time and effort, which may contribute to reducing costs.

## **Research Methodology and Previous Studies**

### **A. Research Methodology**

#### **1. Research Problem**

Most financial and non-financial transactions require many documents, effort, and time to complete them, as they are characterized by slowness, complexity, and an abundance of paper documents, in addition to the manipulation, fraud, and unreliability that may occur, which creates many conflicts between individuals, and most of them require a third mediator, as well as Institutions need to store many documents and provide the necessary protection to preserve them, and thus require a high cost Therefore, the use of Blockchain technology may contribute to achieving digital transformation, accompanied by all the advantages available to this technology in terms of keeping records and transactions in a decentralized manner and organizing them in successive chains that link the different information of the thing The same, while ensuring that there is no tampering, and allowing the exchange of this information between all parties to the transactions and ease of access and retrieval, making it a safe haven for completing transactions with great accuracy, transparency, and low cost, The research problem can be formulated through the following questions:

- a) Does applying Blockchain technology in the research sample unit contribute to providing more accurate more secure and reliable information?
- b) Can Blockchain technology contribute to reducing the time and effort required to complete transactions?
- c) Can costs be reduced by applying Blockchain technology in the research sample unit?

#### **2. The Importance of the Research**

The importance of the research can be stated through the importance of applying Blockchain technology as a response to the digital transformation in completing transactions which can provide more accurate and secure information free of tampering and fraud by not relying on intermediaries to complete transactions, which contributes to reducing effort and time, and thus reducing transaction costs in the unit The research sample.

#### **3. Research Objectives**

The research aims to:

- a) Explaining the cognitive foundations of Blockchain technology and clarifying its types, characteristics, and how it works.
- b) Explaining the applications of this technique in the research sample unit and the implications of its application.
- c) Study and analyze the impact of technology on reducing costs in the research sample unit.

#### **4. Research Hypothesis**

The research is based on a basic hypothesis stating the following:

“The application of Blockchain technology can contribute to reducing costs in the research sample unit ”.

## **B. Previous Studies**

The study (Cocco, Pinna, and Marches, 2017) pointed out the challenges and opportunities in applying Blockchain technology across the banks that represent the study population and provided food for thought about the possibilities of this experimental technology, the study showed that Blockchain technology can improve the global financial infrastructure and achieve sustainable development using systems More efficient than it is now, and the results of the study showed that by overcoming the shortcomings of the Bitcoin system and then Blockchain technology we can deal with financial operations in a more efficient way than the current system.

The study (J. Marshall, Steven, 2018) attempted to discuss the origin of Blockchain technology its current uses and its application potential in various fields, which can enhance the timeliness, quality, and accuracy of the information provided, the study also investigated the effectiveness of many applied processes in the field of accounting, the study concluded that the emergence of Blockchain technology has the ability to record organize verify and disseminate information.

While the study (Wouda, et al., 2019) indicated that the real estate market in the Netherlands suffers from inefficiency weak transparency and complexity of procedures which increases the time and cost of real estate transactions, so Blockchain technology will contribute to improving future of real estate data management achieving efficiency and transparency and thus restoring Trust between different parties.

As for the study (Uzair, 2018) it investigated the impact of Blockchain technology if it is used to record real estate data, and concluded that its application in that sector will not only create transparency in transactions, but will also contribute to facilitating them and reducing their costs.

The study (Mada and Hana, 2020) also presented a proposal for applying Blockchain technology in managing the real estate rental process in the Kingdom of Saudi Arabia, and concluded that Blockchain technology contributes to managing rental-related transactions, achieves transparency accuracy and reliability in transactions and overcomes centralization in executing transactions through the real estate broker, thus it provides a safe environment for storing, organizing, exchanging and retrieving information, which contributes to reducing costs.

As for the study (Ceyhan & Yılmaz, 2022), it explained that Blockchain technology is a decentralized, transparent, open source, and independent technology, and it also provides a simultaneous exchange of information, the areas of use of Blockchain technologies that appeared with Bitcoin have gone beyond being a repository of financial data, and have begun to be used in many fields, depending on the advantages it provides the study concluded that Blockchain technology will reduce costs as direct communication is established without the mediation of a third party.

## **The Cognitive Foundations of Blockchain Technology**

### **1). The Concept of Blockchain Technology**

It is a distributed database in which records of blocks of data connected to each other are kept, the two basic elements of a blockchain are the “block”, which consists of data, and the “summary information” that links previous elements. Each block contains summary information about previous blocks, and in this way It creates a data structure that is resistant to modification and deletion (Dogan & Ertugay, 2019).

And When one or more blocks are changed or deleted, this interference will be immediately noticed, because the summary information of all subsequent records that should follow each other will be destroyed, the blocks are linked to each other in a sequential manner with brief information similar to regular chain links (Suekinci & Catikkas, 2020).

And the technology is defined as a chronological database that contains transactions recorded by computers on the network, and contains an increasing number of data records and is enhanced to a level that prevents even the creators of the data from tampering and reviewing. each area that contains data in the system is called a block and in order to create a new block, the previous block must be completed, and these blocks containing data come together to form a chain and this chain is called Blockchain (Moll & Yigitbasioglu, 2020).

The researcher believes that Blockchain technology is a platform where people are allowed to conduct transactions of all kinds without the need for a central or trusted arbitrator, and blockchain technology is given this name due to the nature of its work and the method of recording and storing transactions, It is the place where blocks and transactions are collected, and every device in the network has a copy of it, and the distribution feature comes from

copies distributed in more than one device, it records every transaction that takes place within the network in a block and links the blocks with each other.

## **2). Types of Blockchain Technology**

Blockchain structures are divided according to their requirements into:

1. **Blockchain that does not Require Any Approval:** These are Blockchain structures where existing data blocks can be accessed and new data blocks can be added without the need for any approval process, Anyone who meets the requirements of the consensus process can join the Blockchain network without obtaining permission, Examples of Applications that use permission-free blockchains are Bitcoin and similar cryptocurrency networks (Usta & Doğantekin, 2018).
2. **Partially Permissionless Blockchain:** These are Blockchain structures where anyone can access existing data blocks without permission, but participating in the consensus process and adding new blocks requires approval, Examples of documents that must be stored reliably and accessible to everyone are registration records, Land and commercial registry records, and the records are added in a controlled manner (Solat et al, 2020).
3. **Blockchain that Requires Partial Permissions:** These are structures that allow access to existing data, adding new blocks and including them in the consensus system, in these networks access to data and adding new blocks (data) cannot be separated from each other due to the purpose of creating the network, these networks Closed and private for example bank branches create new data blocks by recording transactions and must be able to access data produced in other branches, and those who are not included in the bank's private network will not be able to access this data (Bakos & Halaburda, 2022).
4. **Blockchain where Participation is Subject to Permission:** In these Blockchain structures used in private closed networks permission is required to join the network and access existing data, as well as to participate in the consensus process and add new blocks, blockchains that do not require permission and blockchains that do not are classified as They require partial permission as “public” blockchains, and blockchains that require partial permission and blockchains where sharing is subject to permission are also classified as “private” blockchains (Usta & Doğantekin, 2018), (Moll & Yigitbasioglu, 2020).

Anything of value can be tracked and traded on Blockchain technology, which reduces risks and costs for everyone involved, so it is a way of recording and storing information in a very secure way for all parties although the technology is also called distributed ledger technology and we are looking at possible applications in finance and accounting, It is worth noting that Blockchain technology is not a financial instrument in itself (Nordgren et al, 2019).

Smith (2018) points out that Blockchain is not an accounting platform a journal entry tool or an alternative to accounting software, however it builds on the idea of a traditional double-entry accounting system by adding a third entry to verify the validity of both sides of the transaction in the same block, traditional business situation the two parties keep their own records of the event and their own ledgers, which may give room for error because the records do not always match and there is a need for third party confirmation in the form of an audit, using Blockchain technology the validity of the transaction is first verified by both parties and then the transaction is recorded in A shared ledger, in this way everyone always has the same correct information in real time thus saving time, eliminating errors and not having to reconcile accounts between parties at the end of the financial year (Smith, 2018).

Each block in Blockchain technology is linked to the previous block, creating a chain since blocks cannot be changed the history of the asset or transaction can always be reliably traced. If there is an error in the data, a new block with the correct information will be created instead of removing the block, there are two problems with In this system, the first is that the technology cannot verify the existence of the asset registered in Blockchain technology but once the asset enters the Blockchain, it will remain there forever and the transaction is considered valid, and secondly, Blockchain technology can become huge and slow, as no information can be erased, as It is a decentralized network for storing data that is difficult to hack and is distributed, unlike the traditional centralized method, when a traditional central system is hacked all the data will be destroyed, but to hack the Blockchain technology database you will need access to more than 50% of the network (Nordgren et al, 2019).

### **3). Advantages of Blockchain Technology**

There are a set of advantages to Blockchain technology as follows: (Yu et al, 2020).

1. The distributed nature of Blockchain technology implies openness and transparency of information since each node in the Blockchain contains a copy of the ledger.
2. Distributed storage ensures that it is difficult to attack and destroy all nodes at the same time, ensuring information security.
3. The hash sequence makes sure that once historical information is tampered with, it will be found quickly, so data fraud is almost impossible.
4. The proof-of-work mechanism increases the cost of forgery and reduces the probability of fraud in a new block, ensuring the credibility and reliability of the information.

The ledger is shared between distributed computers (such as nodes) on the network enabling all users to see the ledger from its first transaction in the system until its last transaction as it is not controlled or owned by a central entity, being decentralized, and when a user sends a transaction, The transaction data is encrypted using a cryptographic algorithm before it is verified by miners to check if the transaction is valid, when most miners approve the transaction a new block is added to the chain, The primary advantage of Blockchain technology over traditional technology is that it allows two parties to conduct transactions. Encrypted over the Internet without third party interference (Alkhateeb et al, 2022).

### **4). Disadvantages of Blockchain Technology**

However, Blockchain technology also has multiple limitations that can be stated as follows: (Yu et al, 2020).

1. Current Blockchain technology has limited ability to process big data. For example the Bitcoin Blockchain restricts a block to be a maximum of 1MB.
2. Although the distributed nature of Blockchain technology ensures the openness and transparency of information, it also makes it difficult to maintain the confidentiality of information on the Blockchain.
3. Blockchain is difficult to regulate since nodes in Blockchain are global and anonymous, if some nodes collude and add wrong information in the block, regulators will not be able to contain this action in time and it is difficult to punish them afterwards.

Based on the above the researcher believes that Blockchain technology has several important advantages, however, it is not devoid of defects and criticism, but this may be because it is still at the beginning of its development, and these defects can be avoided by making some changes that will develop the technology.

### **5). Components of Blockchain Technology**

Blockchain technology consists of the following four main components: (Alkhateeb et al, 2022).

Smart contract, consensus, ledger, and cryptography

1. Smart Contract: It is a type of program stored on the Blockchain that starts running when the conditions of the contract are met.
2. Consensus is an agreement followed by all Blockchain nodes to determine what information is added to the next block of the ledger and provide validity and authenticity to transactions on the Blockchain.
3. A ledger is a database that contains all the transactions that have occurred on the Blockchain.

Since the network is decentralized and there is no central authority, the ledger is distributed across the network, and every transaction added to the ledger can never be deleted making the ledger immutable.

In addition, to ensure that all information on the Blockchain network is accessed by authorized users only, cryptography is used.

Public blockchains are not without drawbacks as they are often highly resource intensive and have performance limitations, making them impractical for business applications, Additionally the business community is not comfortable with public Blockchain networks providing access to their data to the public, although the data is anonymous (Horn, 2021), and the table below shows the development of Blockchain technology.

**Table 1: Development of Blockchain Technology**

| <b>Blockchain Generation</b> | <b>The year</b> | <b>Main Characteristics</b>                                                           | <b>Sector</b>                                                                |
|------------------------------|-----------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Blockchain 1.0               | 2009            | Introduction of cryptocurrencies such as Bitcoin                                      | Digital payments and the financial sector                                    |
| Blockchain 2.0               | 2010            | Development of smart contracts and blockchain tokens such as Hyperledger and Ethereum | Financial sector                                                             |
| Blockchain 3.0               | 2015            | Development of decentralized applications through smart contracts                     | Healthcare, IoT, smart cities, financial sector, businesses and supply chain |
| Blockchain 4.0               | 2018            | Integration with 4.0 Industry applications and real-time public ledger services       | 4.0 Industry applications in all sectors and artificial intelligence (AI)    |

Mohamed, A.A.D., Alkhateeb, Y.M., Agarwal, P., & Abdelwahab, A.R. (2022). Characteristics of Blockchain and Smart Services, for Smart Governments: A systematic review of the literature. *International Journal of Information Systems and Project Management*, 10(3), 30-55.

#### **6). How Blockchain Technology Works**

This is done through the five main steps in which these transactions are recorded and displayed as follows: (Hassan et al., 2020).

1. **Definition of the Transaction:** It is considered the first step where the sender creates the transaction, which contains it contains the transaction data, the receiver's public key, the transaction value, and the sender's encrypted digital signature to verify the validity and credibility of the transaction.
2. **Authentication of the Transaction:** When the nodes (computers) in the network receive it the transaction first validates the message by decrypting the digital signature and the message is temporarily frozen until it is used in block formation.
3. **Block Formation:** One of the nodes in the network uses pending transactions to form the new block or add those transactions to an already existing block, i.e. update it. During a certain period of time, the new block is published or the previously existing block is updated to the rest of the nodes in order to verify its validity.
4. **Verifying the Validity of Blocks:** When the nodes in the network, which are managed by people called miners, who are responsible for verifying the validity of transactions, receive a request for new transactions, whether they are within a new block that was created or were added to previous blocks, they carry out an iterative process by requesting approval from the rest of the nodes are in order to obtain ratification of the new block. This verification requires the approval of no less than 51% of the participants in the network, which means that there is no possibility of manipulation. Therefore, this step demonstrates that block chains are essentially similar to the process of keeping accounting books.
5. **Block Chaining:** When all the transactions added to the blocks are approved, the new block is then linked to the current block chain, which means publishing the updated version of the block to the rest of the chain. These five steps may take 3-10 seconds to complete, which gives the block chain an important advantage of The tremendous speed of settling financial transactions, as well as the immediate disclosure of all transactions, in addition to ensuring that the published data and information are not tampered with, as it is not possible to modify any published data except after the approval of 51% of the network participants.

#### **7). Characteristics of Blockchain Technology**

Blockchain technology is characterized by a set of characteristics that distinguish it from other modern technologies, which are as follows: (Wetzel, 2018), (Singh, et al., 2018).

1. Immutability, meaning the possibility of creating permanent data records that cannot be changed or deleted, as the encryption system on which the technology is based is difficult to modify, which indicates that data tampering has not occurred.
2. Time-stamping, so that all chain entries are safely tracked using a time stamp that stamps each block in the chain at the real time in which the transaction took place, which contributes to reducing fraud and errors.

3. Accessibility, so that all participants can access the data recorded on the chains and add data depending on the permissions granted to each participant.
4. Transparency, as anyone can view the data stored on the block chains, making them trustworthy and reliable.
5. Decentralization, in contrast to traditional systems that allow a central authority to control transactions.
6. Speed and efficiency. Transactions conducted through block chain technology are characterized by speed and efficiency, which saves a lot of time, effort, and costs.

The researcher believes that block chain technology is a “decentralized” technology, meaning that no party intervenes to modify its data or organize its work, unlike traditional systems, which record and save all transactions on their own rules, and in return charge customers for the service provided to them, but What decentralized block chain systems provide in terms of transparency, security, and the absence of tampering or changing data, they also provide a free transfer service while enjoying a high degree of stability, transparency, and security, as this data is preserved in the block chain on hundreds of thousands of computers, which ensures a high level Of security and privacy.

#### **8). Blockchain Technology and Accounting Recording System**

The distinctive innovation that this technology provides to the accounting system is that accounting records are created in real time, and the records that have been created can be immediately accessed, records cannot be interfered with from the outside, and records cannot be deleted or changed, and one of the advantages of this technology from an accounting perspective is: (Şuekinçi & Çatikkaş, 2020).

1. **Increased efficiency:** Well-designed Blockchain technology creates fast and powerful databases. Data can be moved in and out of the system more efficiently than interacting with legacy accounting software applications.
2. **Reduce Errors:** The biggest potential for error in using Blockchain is data entry. Once the data reaches the chain, smart contracts will automate many accounting functions and reduce human errors.
3. **Easier Bookkeeping:** Using smart contracts, accountants will automate most of the bookkeeping related tasks reducing the workload at the end of the month.
4. **Reduced cost:** Increasing efficiency and reducing errors in any system leads to cost reduction. After the initial cost of implementation, accounting firms can expect to achieve rapid cost savings compared to traditional accounting systems.
5. **Reducing Fraud:** The immutability of Blockchain technology makes it very difficult to sustain fraud using such a platform. To change a record the changes must be made in all copies of the distributed ledger at the same time which is very impossible.
6. **Increased Compliance with Legislation:** Thanks to the security provided by distributed ledger technology, it will be easier for companies to meet the requirements required by legislation. As more regulatory authorities use Blockchain technology, implementation may become mandatory in some key financial sectors.
7. **Reduce Auditing:** One aspect of distributed ledger technology is the ability to reduce audits.

Thanks to the power of smart contracts, many audit functions can be automated, reducing the time the auditor spends looking at records.

Additionally, the traceability built into Blockchain makes the auditing process quick and easy.

#### **9). Reducing Costs through Blockchain Technology**

The main factor is that Blockchain technology provides a trust-based system that eliminates intermediary institutions. It is expected to contribute significantly to reducing costs within the system (Yener, 2020), and the technology is used in the field of accounting, as the use of Blockchain technology in accounting leads to improving. The quality of information that reaches investors in two ways. The first is that by recording companies' financial information on the Blockchain, the chances of accounting manipulation and fraud can be reduced and costs can be reduced. Second, it makes accounting information more reliable. In addition, the company's internal transactions will be more transparent since keeping By publishing accounting records on Blockchain, every transaction in the company's books is immediately available. It is possible to update accounting information in real time. Also, by publishing the company's business transactions via Blockchain technology, interested parties will have immediate

access to accurate financial information about the company, and anyone can Using data on the Blockchain to prepare its own financial statements without relying on the judgment of independent auditors and the integrity of directors (Dincel, 2020).

The technology is used in encrypted digital currencies, decentralized cloud storage, real estate markets (real estate), healthcare, education, digital voting, electronic security, and banking. Blockchain technology is used to transfer real estate ownership and real-time access to ownership records by stakeholders and agencies. Related, in this way, ownership disputes and the need for documents that require intermediaries to reach the property owner are significantly reduced, and in the private sector rental agreements can also be concluded using this system and in this way individuals and institutions save costs and time (Unal & Uluyol, 2020).

Real estate transactions are cumbersome, opaque and expensive due to the involvement of different intermediaries such as brokers, state databases, land registry transactions, surveyors, inspectors, appraisers and notaries. Blockchain technology will ensure that every property everywhere has a matching digital address that includes its occupancy, financial status, legal status, building performance and physical characteristics, and maintains On all previous transactions, in the event of loss of documents stored in the physical environment, it becomes unknown who has the right to own real estate, and although this information is recorded and tracked in today's e-government system, storing the records in a central place, manipulating the records and making changes Unauthorized are common cases today, and it is expected that Blockchain will be a more effective recording method for transferring ownership of real estate, and transfer transactions between buyer and seller will be faster thanks to Blockchain, as when buying and selling transactions are recorded and tracked using Blockchain technology, ownership of real estate cannot be changed because all Someone in the network will have a copy of the records. In addition, the history of the property and who used it before can be questioned, the accuracy of this information can be confirmed, and the title deed records will be secured (Dincel, 2020).

### **Designing the Proposed Model to Reduce Costs through Blockchain Technology**

Blockchain technology provides new ways of organizing economic activities, reduces costs associated with intermediaries, and saves time by making transactions happen faster. The impact of this technology, which offers many innovations regarding the structure of organizational business models, has not yet been felt because it has not yet been fully implemented. Although there are promising use cases limited to individual initiatives today, it is still in its infancy in terms of research and application in creating new business models. The impact of Blockchain technology on business models is of great importance since the related technology is a concept that has been introduced. Recently and not fully implemented, current research has been mainly limited to the technological aspect of the concept and implementation suggestions.

The absence of intermediaries in Blockchain technology will reduce transaction costs, allowing for a more sustainable use of resources and reducing waste. Blockchain technology also provides solutions that are more secure than current business models and eliminates the need for third-party verification. It provides new ways of organizing economic activities and reduces the costs associated with it. With intermediaries and allows some transactions to be executed faster during regulatory practices.

The technology is applied in various sectors, and the real estate sector comes first among these sectors, as converting all data related to any property into a block and storing it transparently has important advantages, and the main advantage here is stability once it is registered and announced, which is the basic structure of Blockchain technology, and in traditional practice it is Implementing real estate registration procedures, anti-fraud certification procedures, and real estate commission transactions for sale and purchase by intermediary institutions and organizations, and for these transactions large commissions are paid based on the price of the property, and therefore modern Blockchain applications can provide significant savings by creating a transparent and reliable alternative to all these transactions.

All data, such as who owns the property, its information, purchase and sale information, and the transactions that were carried out on it in general, can be stored in Blockchain, and given the pace of change, it is expected that these applications will spread widely throughout the world in the near future, and real estate transactions that take On average, 30 days in one minute using Blockchain technology. The technology can also impact the real estate sector at three different points. It provides transparency in transactions, speeds up trading transactions, makes the system work faster and provides safer and less expensive transactions.

In general, individuals buy a house using a real estate loan, and when using a real estate loan, the buying and selling process takes longer due to the long administrative processes and the long wait until the loan is approved. By using

Blockchain technology, people create a digital ID for themselves and their properties, and through this ID they have the opportunity to follow up on buying and selling transactions. And real estate loan transactions in a transparent manner, and in this case it saves time by shortening the duration of transactions, which contributes to reducing costs.

For many citizens, private housing units are their largest asset. Despite the importance of real estate for both individuals and society, real estate transactions are still based on outdated legislation and take a long time to complete. Registering a housing unit may require many steps, many documents required to be submitted, and multiple entities required. Extracting all these documents from them, and the long waiting times this will require, the large fees required to extract these documents, the necessity of cash payment for these fees, in addition to the necessity of the presence of the concerned parties inside the real estate registry offices.

Real estate registration is considered one of the most important public sectors because it provides services to citizens at the state level, and it represents the fortified fortress for preserving public and private property. Since ownership of real estate is transferred by registering it in the real estate registry, the researcher will review the documents required to transfer ownership of the property, as well as the procedures for transferring ownership and how to transfer it. These transactions are completed as follows.

### **1. Documents Required to Transfer Ownership of Real Estate in the Current Situation**

In order for a real estate purchase and sale transaction to be carried out, some necessary documents must be submitted from several concerned authorities, and these documents are:

- Submitting a statement of knowledge and news, which must be authenticated by the municipality's seal.
- A copy of the ID cards of the seller and buyer, with the need to review the original.
- Attach a recent title deed for the property.
- A decision to disclose the property, specifying the initial assessment of the property's value.
- Legitimate divisions of transfer and sale transactions.
- Attach the execution letter, along with submitting the auction minutes if the sale was made to the executive authority.
- Attach the building license, in the case of added buildings, as well as the restoration license if the property has previously undergone restoration.
- Attach the electricity paper and housing card.
- It is necessary for both parties to the transaction (contract) to attend the Real Estate Registration Department.
- The competent employee reviews the submitted application and signs it with approval for the purpose of publicity.
- Drawing up the final sales contract within the Real Estate Registration Department and having it signed by both parties to the contract.

### **2. How to Complete the Registration and Ownership Transfer Transaction in Light of the Current Situation**

In this paragraph, the researcher will create a simulation of a real estate transfer process, in order to clarify the current procedures and so that the current status of the transaction can be identified. In this hypothetical example, the following is done:

- The unit owner (the seller) wants to sell the unit he owns.
- The seller contacts a real estate agent (broker) and sets the terms of sale.
- The agent puts the unit up for sale (marketing the property).
- The buyer who submits the best offers gets the unit subject to the contract.
- The buyer examines the unit and documents proving ownership.
- A preliminary sales contract (office) is concluded between the seller and the buyer through the real estate agent.
- The contract may be required to be signed in the presence of a specialized lawyer.
- The buyer pays the property amount in cash.
- The unit is delivered to the buyer.
- The procedures for registering and transferring ownership of the property then begin within the real estate registration department in which that contracted unit is located.
- The Real Estate Registration Department decides the amount of fees to be paid (based on the value of the property).

Registration fees are paid as a condition for completing the registration process, which are as follows:

1. A fee to the Real Estate Registration Department of 2% of the property value.
2. Municipality department drawing.
3. The General Authority for Taxes fee based on the value of the property.

From the above, the researcher can summarize the current situation in the real estate registration process as follows:

- The Real Estate Registration Department does not intervene in the process of registration and transfer of ownership except in the final stages, while its participation from the beginning of the process contributes to increasing trust and transparency.
- The process takes a long time, and may be complicated in some cases.
- There are many documents required to complete the transaction, which in turn require examination to ensure their authenticity, and that this is subject to human error and also vulnerable to manipulation and fraud.
- All of these documents must be kept with the Real Estate Registration Department, which means more paperwork is accumulated and requires the availability of sufficient storage space.
- The large number of fees indicates that it is an expensive process, causing many citizens to refrain from registering their property.

### **3. How to Complete the Ownership Transfer Transaction in Light of the Application of Blockchain Technology**

The researcher believes that before applying the proposed model to the process of registering and transferring ownership, the appropriate environment for the application must be created by digitizing the identities of individuals, institutions, and units and issuing codes for each of them, as follows:

- Issuing an encrypted digital key to every citizen through a law issued by the state, specifying a governmental body responsible for issuing the keys.
- Issuing an encrypted digital key for every economic entity in the country (company, hospital, bank, etc).
- Issuing an encrypted digital key for each asset (real estate, stocks, gold, etc).
- Identify the sector that undertakes the task of implementing Blockchain technology.
- It is necessary to link the original key with the owner's key.
- Adopting an electronic payment system.
- Adopting a virtual currency such as Bitcoin or others.

The necessity of linking all concerned parties. To design the proposed model, the following steps are followed:

- Building special block chains to carry out the process of buying and selling real estate, which allows the creation of a smart contract and the collection of amounts automatically, provided that the platform contains the data of the property owners, the data of the properties owned by them, and the electricity, water, tax bills, etc. related to those properties.
- Creating different nodes for the relevant authorities (involving the relevant authorities to automatically represent one of the parties involved in the transaction and allowing these nodes to view and store data on their devices, and verify the validity of the transactions.
- Adding digital identities for all transacting parties (private keys for the seller and buyer).
- Adding digital identities to real estate units, including ownership documents and other data related to the property.
- Digitizing all Real Estate Registration Department data to become safe, reliable, and not subject to modification or tampering.

Adopting electronic payment operations by linking banks through smart contracts, which represent one of the mechanisms of Blockchain technology (block chains). By applying the proposed model to the previous example, it is possible to identify the changes and alternative solutions that block chain technology contributes to solving the problems of current systems, which may occur in each of the following steps:

- When the owner wants to sell, he uses his digital identity to identify whether there is anything preventing the completion of the sale process for the unit owned by him.
- He communicates with the real estate agent to handle the selling process. In the future, this step will be unnecessary because he can handle the selling process himself, thus eliminating the need for intermediaries.

- The seller communicates with potential buyers directly.
- In light of Blockchain technology, the buyer does not need to verify again the validity of the property ownership documents because all data is available and visible to everyone, reliable and secure due to the immutability characteristic of Blockchain technology, which means that the recorded data cannot be modified or changed except with the approval of the majority of participants in the network.
- If the seller agrees to the price offered by the buyer, Blockchain technology allows him to verify whether the buyer owns the price offered or not, through the transparency feature provided by Blockchain technology.
- The transaction is validated by all participants on the network who have access to the data.
- The transaction is recorded with a smart contract on which the conditions agreed upon between the seller and the buyer are recorded, and it is not subject to error due to the immutability of the data under this technology. The contract is available to all participants on the network as witnesses to the completion of the process, which increases the degree of security and at no cost.
- The buyer is granted access to the property by transferring the seller's digital key to the buyer.
- Any service fees, as well as the value of the property being dealt with, are paid using the electronic payment method using the virtual currency used.

In light of the above, the researcher notes the following:

- Using Blockchain technology, all data related to the real estate transaction was stored electronically, and that copy became available to everyone and can be retrieved with ease, and it cannot be changed or modified except with the approval of the majority of participants on the network.
- Through Blockchain technology, the risks of errors, fraud and manipulation are reduced, which increases the degree of trust and security in transactions.
- Manual procedures for obtaining documents have been simplified and made more secure.
- Transactions have become more transparent, more efficient and faster.
- Transaction completion time has been reduced from months to minutes or hours, resulting in increased real estate liquidity.
- The application of Blockchain technology has made it difficult to steal property.
- Reducing a portion of transactions and procedures leads to reducing the cost of those transactions.

Finally, the researcher believes that by using Blockchain technology, there will be no need for all the long and complex processes, and instead the sender (seller) and receiver (buyer) will complete the transaction using a mobile phone or computer, and at a lower cost, as all the costly processes that cause delays in completion will be shortened. The transaction, through some Blockchain technology tools such as the smart contract protocol. This technology will also contribute to solving many of the problems that the transaction may face, starting from submitting the request until the time of receipt and delivery. The work of the proposed model can be explained in the following table.

**Table 2: Case of Using Blockchain on the Process of Buying and Selling a Property**

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Process                           | Buying and selling real estate through Blockchain technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Participants                      | The seller, the buyer, the relevant bodies, the seller's bank account, the buyer's bank account.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Conditions before the transaction | The presence of accounts on the platform for all relevant parties, the presence of digital identities for the seller, the buyer and the real estate unit, and the presence of devices that verify the validity of the data.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Conditions after the transaction  | Concluding a smart contract, collecting the value of the property, and issuing utility bills on the identity of the new owner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Process steps                     | <ul style="list-style-type: none"> <li>• Search for units.</li> <li>• Choose the unit.</li> <li>• Request to negotiate the unit.</li> <li>• Request to conclude a smart contract.</li> <li>• Digital signature of the contract from the seller and buyer.</li> <li>• Data validation by network devices.</li> <li>• Adding a time stamp at the time of issuing the contract to determine the time the transaction was created.</li> <li>• Add the block containing the transaction data to the network.</li> <li>• Confirm the process.</li> <li>• Collecting the value of the property.</li> <li>• Transferring the property title from the seller to the buyer.</li> </ul> |

The researcher believes that some exceptions may occur that hinder the sequence of steps in the process, for example if one of the parties refuses during the negotiation phase, then the step of selecting the unit is returned again, and in the event that the process is not confirmed, the step of requesting the creation of a smart contract is returned again, and so on.

The application of Blockchain technology in real estate transactions contributes to the security and transparency of ownership transfer processes, and the concerned institutions do not require additional documents and means of protection to preserve them. It also provides streamlined work in completing transactions without the occurrence of manipulation and blackmail, which allows citizens to ensure the reliability of transactions, and it does not require time and effort. They are large, as transactions are completed in a few minutes, thus contributing to reducing transaction costs.

Based on the above, “the application of Blockchain technology can contribute to reducing costs in the research sample unit.”

## **Conclusions and Recommendations**

### **1) Conclusions: The Most Important Conclusions Reached Are**

1. Real estate is one of those industries that is slow to adopt new technologies, as it relies heavily on human knowledge and building personal relationships as a basic tool for working with it.
2. Because blockchain technology is a secure distributed ledger technology, created with transaction management in mind, it is ideal for an industry that relies on large-scale transactions based on complex agreements and contracts.
3. The application of Blockchain technology has positive effects as a result of reducing costs, improving the quality of services provided, and achieving transparency and security in completing transactions.
4. The proposed model contributes to the digitization of assets and thus increases confidence in the recorded data.
5. Blockchain technology contributes to simplifying procedures, reducing time, effort and costs, and preventing manipulation and fraud.
6. Implementing Blockchain technology reduces many procedures, which significantly reduces the costs of all these steps.

### **2) Recommendations: In Light of the Conclusions, The Researcher Recommends the Following**

1. Benefit from the current applied experiences of some public institutions, government agencies, and leading companies in using Blockchain technology.
2. Conduct more studies related to the application of Blockchain technology in all fields.
3. Make more efforts to lay the foundations for the transformation of this technology, through cooperation between government and private agencies in all fields to discuss how to benefit from the capabilities of Blockchain in development projects.
4. Holding seminars and workshops to introduce Blockchain technology and teaching it through academic curricula.
5. Applying Blockchain technology in the real estate sector because of its many benefits, including facilitating procedures and eliminating the role of the intermediary, which contributes to preventing manipulation and fraud, reducing effort and time, and thus reducing costs.

## **References**

- Ünal, G., & Uluyol, Ç. (2020). Blockchain technology. *Journal of Information Technologies*, 13(2), 167-175.
- Alrahili, M., & Aldahawi, H. (2020). Developing the real estate rental sector in line with the digital transformation of the Kingdom of Saudi Arabia: A proposed study for the application of blockchain technology. *Journal of Information and Technology Studies*, 1-2.
- McComb, J.M., & Smalt, S.W. (2018). The rise of blockchain technology and its potential for improving the quality of accounting information. *Journal of Finance and Accountancy*, 23(1), 1-7.
- Wouda, H.P., & Opendakker, R. (2019). Blockchain technology in commercial real estate transactions. *Journal of property investment & Finance*, 37(6), 570-579.
- Yu, T., Lin, Z., & Tang, Q. (2018). Blockchain: The introduction and its application in financial accounting. *Journal of Corporate Accounting & Finance*, 29(4), 37-47.

- Alkhateeb, A., Catal, C., Kar, G., & Mishra, A. (2022). Hybrid blockchain platforms for the internet of things (IoT): A systematic literature review. *Sensors*, 22(4), 1304. <https://doi.org/10.3390/s22041304>.
- Ceyhan, E.B., & Yılmaz, O. (2022). Blockchain Technology: Relationship with Current Technologies.
- Cocco, L., Pinna, A., & Marchesi, M. (2017). Banking on blockchain: Costs savings thanks to the blockchain technology. *Future internet*, 9(3), 25. <https://doi.org/10.3390/fi9030025>.
- Doğan, M., & Ertugay, E. (2019). Blockchain and its applications in accounting. *Third Sector Social Economic Review*, 54(4), 1654-1670.
- Hassan, M.A., Al-Ghanam, S.H., & Nermin, A.M. (2020). The impact of the use of blockchains on external audit. *Journal of Financial and Commercial Research, Faculty of Commerce - Port Said University*, 21(1), 85-111.
- Mohamed, A.A.D., Alkhateeb, Y.M., Agarwal, P., & Abdelwahab, A.R. (2022). Characteristics of Blockchain and Smart Services, for Smart Governments: A systematic review of the literature. *International Journal of Information Systems and Project Management*, 10(3), 30-55.
- Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *The British accounting review*, 51(6), 100833. <https://doi.org/10.1016/j.bar.2019.04.002>
- Nordgren, A.I.N.O., Weckström, E.L.L.E.N., Martikainen, M.I.N.N.A., & Lehner, O.M. (2019). Blockchain in the fields of finance and accounting: a disruptive technology or an overhyped phenomenon. *ACRN Journal of Finance and Risk Perspectives*, 8, 47-58.
- Singh, S., Sharma, A., & Jain, P. (2018). A detailed study of blockchain: Changing the world. *International Journal of Applied Engineering Research*, 13(14), 11532-11539.
- Smith, S. (2018). Blockchain augmented audit – benefits and challenges for accounting professionals. *Journal of Theoretical Accounting Research*, 14(1), 117-137.
- Solat, S., Calvez, P., & Nait-Abdesselam, F. (2021). Permissioned vs. Permissionless Blockchain: How and Why There Is Only One Right Choice. *J. Softw.*, 16(3), 95-106.
- Şuekinçi, C., & Çatikkaş, Ö. (2020). Effects of blockchain technology on accounting and taxation. *Journal of Financial Resolution*, 30, 51-65.
- Uzair, M.M., Karim, E., Sultan, P., & Ahmed, S.S. (2018). The impact of blockchain technology on the real estate sector using smart contracts. [https://mpa.ub.uni-muenchen.de/89038/1/MPRA\\_paper\\_89038.pdf](https://mpa.ub.uni-muenchen.de/89038/1/MPRA_paper_89038.pdf).
- Dinçel, C. (2020). The impact of blockchain technology on the accounting and auditing profession. *Istanbul University, Institute of Social Sciences, Istanbul*, 102-142.
- Van Horn, J. (2021). *The Intersection of Accounting and Blockchain Technology: An Analysis of Current and Future Implications* (Doctoral dissertation, University of Oregon).
- Wetzel, L. (2019). A use case of block chain technology in the real estate industry for the rental agreement and accessory charge settlement processes. *Immobilienwirtschaft aktuell*, 21.
- Yener, E. (2020). *The role of blockchain technologies in digital entrepreneurship and a model proposal: blockchain-based second-hand vehicle buying and selling platform (sechandchain)* (Master's thesis, Istanbul Medipol University Social Sciences Institute).
- Bakos, Y., & Halaburda, H. (2021). Permissioned vs Permissionless Blockchain Platforms: Tradeoffs in Trust and Performance. *NYU Stern School of Business working paper*.