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## The role of blockchain technology and smart contracts in enhancing the transparency of fragmented investments in overseas real estate

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### Abstract

As the mobility of global capital is getting higher, more and more investors tend to invest in overseas real estate. However, the conventional model of investing in real estate possesses several disadvantages including high entry hurdles, low levels of market liquidity, and low transparency, particularly for retail investors. This article will seek to establish how blockchain technology as applied in smart contracts can help in the clarification of unclear fragmented investments in overseas property. First of all, this paper begins with the definition and examples of applying conventional and advanced blockchain technology and then describes the work of smart contracts and the comparison between regular contracts and smart contracts. The paper also evaluates the nature of fragmented investment in overseas property and its associated risks before suggesting the use of blockchain and smart contracts for a new institutional structure of the investment platform. This study demonstrates how the technologies can advance data sec, promote trust in transactions, and how investment can be automated. It can be concluded that blockchain technology, and smart contracts, can enhance Overseas Real Estate Investment by increasing transparency and decreasing the investment threshold as well as the instances of fraud. This study also presents an analysis of the potential difficulties that may be encountered in real-world applications and a recommendation of what may be done in subsequent studies. On one hand, this research offers a new perspective to the theoretical world, on the other hand, it offers practical problems and solutions to the practitioners who are a part of overseas real estate markets and businesses by steadily helping the overseas real estate markets to move in the fairer and more transparent direction.

**Keyword:** Blockchain Technology; Smart Contracts; Overseas Real Estate; Fragmented Investment; Investment Transparency.

### 1. Introduction

With the global economy's ongoing globalization and liberalization effort, cross-border investment in real estate has become one of the most rapidly growing means of investment for investors looking to diversify their portfolios and achieve relatively higher returns. The continuation of this trend has been realized as there has been high mobility of capitals across the globe and investors from various parts of the world can access highly profitable real estate markets in other regions/countries than where they originate from. The concept of overseas real estate investment has however been known to present various problems that reduce accessibility and appeal to investors especially those of small and medium equity. Issues include high investment barriers, lower levels of trade, increased levels of information opacity due to information asymmetry, and challenging institutional frameworks prevalent in many markets [1]. These challenges not only reduce the chances of participation of small investors but also exacerbate the complex and risky international real estate investment market. This environment has made it even more mandatory for investors to consider new technologies that can increase transparency, and therefore, reduce entry barriers to all investors.

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Blockchain technology has emerged quickly as a possible solution to these challenges due to the use of the distributed ledger system, decentralization, and immutability of the technology in the system of investment. Technology in general and blockchain, in particular, has been well noted for its potential to disrupt industries including finance, Supply Chain Management, and Real Estate by providing a new and efficient way of handling transactions [2]. Incorporating real estate, blockchain can help in reducing the expenses of the processes, enhance the privacy of the client's data, and enhance the ethical standards that are characteristic of this field. This technology operates by establishing a ledger that contains all the transactions carried out and is distributed among a network of computers and cannot be modified unless all the other members in the network agree to it [3]. Elimination of bias is probably the most significant inefficiency in traditional real estate transactions and blockchain achieves this through complete openness of information. These benefits are even further enhanced by smart contracts that are self-executing contracts written on the blockchain platforms which eliminate the need for middlemen in contract enforcement thus bringing about reduced human intervention, fraud, and improvement in the efficiency of contracts [4]. Smart contracts are digital contracts that are automated in that the code of the contract spells out the agreed terms of the agreements. This code governs the interaction of the contract and it is traceable, and the transaction can never be rolled back so it minimizes the necessity of third-party intermediaries and functions as more effective, transparent, and less costly means for handling transactions. For instance, in real estate, smart contracts can be programmed to release funds when there is a transfer of property ownership and such change is recorded on the blockchain; this eliminates the use of escrow agencies which can be costly and time consuming [5].

There is great potential for using blockchain technology and smart contracts to increase the transparency of overseas real estate investment. When such technologies are incorporated into the real estate investment process, the market can be leveled for the general benefit of investors, even small investors. Performance for value added by massively compounding on global high-value assets in fragmented investment models where great investment value is sliced to manageable investment pieces. For example, tokenization of real estate enables investors to buy a small fraction of the asset, thus, increasing the market liquidity and letting ordinary people invest in expensive properties that were previously available only for oligarchs [6]. Tokenization offers a way of investing in real estate and other kinds of assets by fractionalizing their value and representing it with tokens that are based on blockchain assets. This process not only improves accessibility but also helps to increase the liquidity of such tokens that can be traded in secondary markets, and it remains one of the main issues in traditional real estate investment.

Disclosure is important for overseas real estate investment both for investors' sake and mostly for the sake of the market, which should become less unhealthy and more capable. Redefined transparency lessens information asymmetry that can lead to fraudulent activities and manipulation of the market by providing equal opportunity and correct information to all participants in the market. Embedded in the Blockchain's structure is a record of each transaction and a seemingly immutable and shared digital database platform that is extremely difficult to manipulate and alter [7]. Such a level of disclosure can improve trust from investors, regulators, and other stakeholders hence promoting a more stable and predictable investment climate [8]. For instance, the application of blockchain new approaches allows securely storing all the records of property purchases and sales, records of property owners and permissions to use the property, as well as other due diligence documents to enhance the protection of property rights and to minimize fraudulent activities connected with property dealing [9].

Although the theoretical advantages of the blockchain and smart contracts seem quite resinous, their application in the overseas real estate market is still in its infancy. Experiments have demonstrated benefits as well as the main issues that have to be solved to achieve the full potential of such technologies. For example, the compatibility difficulties between various blockchain systems may make cross-border transactions more challenging; or the disparities in legal systems in different countries may cause the issues of legal ambiguity [10]. Furthermore, smart contracts are also not legally regulated in many countries, which can drastically change their effectiveness in the sphere of real estate deals. In certain countries, smart contracts are considered precedent and thus may not be enforced by law as legally binding contracts [11], which could be an issue for the applicability of smart contracts in real estate investments. Moreover, technical challenges concerning the implementation of blockchain networks and smart contracts are still to be investigated and solved to achieve a reliable and large-scale solution. Some problems such as network overload and high fees for transactions carried out in popular blockchains also pose a challenge to the applicability of such technologies in real estate transactional processes [12].

The second large problem is linked to the implementation of blockchain technology in real estate systems. The existing real estate markets cannot be easily integrated into blockchain markets because they have large and complex systems and processes that are not efficient for top-notch blockchain markets. This is in the areas of interface between blockchain solutions and the conventional databases utilized for recording and storing property details, title deeds, and any other pertinent information. These integration issues can only be solved when the technology supply chain, real

estate firms, and regulatory organizations harmonize to set standard integration protocols and frameworks[5]. In addition, the low level of technical awareness and literacy among the real estate players and investors, alike, threatens the integration of blockchain and smart contracts. Professional development and training education will therefore be required to prepare the concerned stakeholders for when and how to apply these technologies.

Nevertheless, the application of blockchain technology and smart contracts in overseas real estate investment is a revolutionary chance. Through enabling efficient, secure, and uncomplicated transactions, the application of these technologies can bring about cost efficiencies, higher liquidity, and a positive impact on the markets and investors. The objective of this paper is to understand how blockchain and smart contracts can improve overseas real estate investment transparency in fragmented structures; evaluate the effect it can have in the market; and elucidate the difficulties that may occur during its application. As a result, it is aimed to offer meaningful recommendations for further research scholars and professionals in the real estate field by utilizing this study and case analysis to progress toward a more ethical environment in the global real estate marketplace.

To this end, the addresses the following research questions: In what way can blockchain technology, specifically when using smart contracts, be deployed to enhance the traceability of dispersed investments in overseas properties? This raises the question as to whether these technologies can indeed reduce investment barriers while improving market liquidity. What kind of difficulties might arise in the process of implementation and, thus, how can these issues be addressed? Addressing these questions, the study aims at offering practical recommendations for both academic scholars and professionals from the RE industry to enhance the existing models improve the future real estate market's performance worldwide, and become more transparent and fair.

Furthermore, the case studies of the existing platforms, that adopted blockchain and smart contracts with successful examples in real estate, will also be discussed in the course of the study, including RealT, Propy, and Harbor. These examples will demonstrate the benchmark and outline the specific cases in which the technology is used in practice, the benefits that are reaped, and the areas of improvement. For instance, RealT utilizes blockchain to offer fractions of real estate properties whereby investors can directly purchase a certain percentage of specific properties. Propy applies smart contracts in the buying and sales of properties by signing agreements, and property transfer, among other processes, to offer a faster and more secure cross-border service. Harbor emphasizes compliance and implements blockchain to guarantee that tokenized real estate investment complies with the laws and standards, to mitigate legal issues [5]. By this detailed analysis, the study also seeks to contribute to the existing theoretical knowledge about the application of blockchain in real estate while at the same time, providing a way through which the challenges of blockchain adoption can be addressed.

The integration of blockchain and smart contracts offers a harmonized solution to the challenges that have existed in overseas real estate investment in terms of transparency and access. Due to these dynamics in technology and changes in laws and regulations, these tools may serve as the future of investment being inclusive and effective. However, it is not yet smooth sailing in this regard as the integration of these technologies in the real estate business encounters several hurdles. It is for this reason that the stakeholders shall have to come together and establish various means and ways of trying to overcome the technical, legal, and educational hitches that are present and readily available at the current stage. Thus, with the help of blockchain and smart contracts, the effectiveness of real estate investments can be significantly increased, and the market becomes more transparent, thus providing new opportunities for investors and changing the further development of real estate investments.

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## 2. Literature review

To analyze the contributions of blockchain technology and smart contracts to increase the transparency of segmented foreign real estate investments, this section will present a literature review of the blockchain's development in related fields, cases of the application of blockchain technology in other industries, a definition and potential of smart contracts to improve traditional contracting systems and the findings of other literature in the field of real estate market transparency. As well, areas that may have been left uncovered or poorly researched in prevailing studies will also be discussed.

### 2.1. Block Chain Technology and Smart Contracts

Blockchain, as one of the primary technologies underlying cryptocurrencies' development since the inception of Bitcoin, is developing at a rapid pace of attention from all tiers. Blockchain is a distributed ledger technology that organizes information in blocks and streams them to create an unchangeable chronological record. The technology's features, including transparency, security, and decentralization, make it ideal for a variety of application scenarios: They revealed

that it has already been applied in the payment and settlement business, securities business, and supply chain finance. For example, cross-border payments can be cleared instantly through blockchain, clearing the intermediate links of the traditional banking system; Supply chain management, through the use of blockchain technology to establish the origin and direction of products and eliminate opaque supply chains to prevent the spread of counterfeit and substandard products; In the culture industry, through using blockchain technology, artists and creators can prove the ownership of works and protect the rights of works with authenticity [4].

A smart Contract is an automated contract that operates on a blockchain platform; executing specific actions once specific conditions are triggered. The use of smart contracts could help minimize the involvement of the human party in a contract and increase the effectiveness and accuracy of the contract implementation. Moreover, it also has the irreplaceable advantages of traditional contracts: smart contracts have the attributes of being open, unchangeable, and self-executing to ensure that the contract terms are implemented as agreed with minimal default [7]. It differs from the traditional contract accord in that often it functions through intermediaries who control the process of execution, which not only raises the cost but also may cause conflicts. The code of smart contracts allows them to be executed independently, thus eliminating the number of intermediate links and the cost of their implementation.

## **2.2. Various studies were undertaken regarding the real estate market transparency**

The more transparent the real estate market more investors would be willing to invest in the market. Market transparency implies information balance, or parity, in a transaction and appropriate regulation of those transactions. Thus, the increase in the level of transparency of the real estate market can increase investor demand, decrease the level of seen risk, and improve the efficiency of the real estate market as a whole. However, research at present suggests that the real estate industry in many countries and regions still has issues such as information asymmetry, and insufficient supervision. Despite the importance of the transparency of real estate markets, many of the studies carried out have concentrated on more traditional approaches like enhancing laws and regulations and enhancing information disclosure standards (5). Since the integration of blockchain technology and smart contracts in fragmented investment in overseas real estate is not yet prevalent, consequently, there have been limited studies on the use of new technologies such as blockchain and smart contracts. It is highlighted by the absence of comprehensive studies on the utilization of blockchain technology in specific application areas, particularly the integration of the concept of smart contracts in the application of blockchain technology in overseas real estate markets; There is also little analysis of issues likely to arise during the implementation of the technologies such as compatibility issues arising from the use of different techniques and legal issues that relate to the implementation of the technology; There is also scarce experience-based evidence which seeks to.

Bardai investigates the issues of low efficiency and opacity in the real estate market and how they can be solved using blockchain and smart contracts. The importance of the study is in its applicability in improving the way real estate transactions are conducted through the introduction of more secure, less costly, and more effective technology solutions compared to conventional models. The study shows that increased application of blockchain and smart contracts accelerates transaction speed, and decreases the number of intermediaries and transaction costs, providing a safer and more open real estate environment. But it also points out the obstacles like the regulatory constraints, the technological adoption difficulties, and the necessity of an overall market acceptance. According to Bardai, the stakeholders involved in the real estate industry should embark on the use of blockchain literacy, partner with the technology suppliers, and engage with the policymakers to set principles regarding the use of blockchains in real estate. This indicates that through a phased adoption model, there could be a better way by which these technologies can be adopted in the future without a lot of problems as shown in the figure below [14].

Rakha looks into the possibilities offered by blockchain technology to strengthen international legal assurance underwriting investments, filling the void and inefficiencies in the protection of cross-border investment. The study is relevant as it is an attempt to understand how blockchain can offer better legal enforcement thus enhancing confidence in investors, since urging transparency, traceability, and security in cross-border transactions. The work reveals the possibilities of improving the efficiency of the enforcement of investment agreements by 'smart contracts', minimizing the risks of fraud, and providing secure documentation of transactions, therefore enhancing legal protection for investors. However, it also reveals the issues that are still open and waiting for solving, including the absence of unified legislation, the differences in the countries' technological levels, and the necessary cooperation in the implementation of blockchain solutions. Based on the above finding, Rakha advises that the authorities should establish consistent regulations for blockchain in investment operations and promote multilateral relations to cope with cross-jurisdictional issues. According to the study, public-private partnerships and investment in technological development will help to strengthen the adoption of blockchain in the framework of the existing international investment law hence increasing legal certainty for investors.

Jreisat and Mili consider the advantages and disadvantages of applying blockchain in the field of real estate, which focuses on the issue of the low efficiency of real estate procedures that are conditioned by nontransparent and rather expensive processes. The research is novel as it will make a cutting-edge contribution to the literature on how the application of blockchain technology will enable the efficient transformation of the real estate industry by increasing the security of the transactions as well as minimizing the need for third-party services while increasing the accuracy of records. The results suggest that blockchain can reduce the time required to complete property deals while supporting the use of smart contracts and increasing the level of transparency, clearly representing values for both buyers and sellers. However, the study also points out significant areas of problem such as inadequate policies, lack of understanding of the ways of adopting new technologies, and lack of general acceptance within the industry. According to the research, the players should focus on engaging with the rightful authorities to get the legal specifications for Blockchains within the real estate sector. In the same context, the studies propose that more spending should be done on education in an attempt to reduce the resistance towards change and adopt blockchain to fully benefit the real estate sector [16].

Panwar et al. explore the roles of using blockchain in real estate transactions, the problem, and the prospects of this approach. Thus, the problem of high inefficiency, rather hidden and expensive real estate market agents proposed by the traditional real estate market is solved by the research with the help of blockchain. This research further discovers that blockchain presents potential benefits like improving data security, shortening the time required for transactions, and enabling property exchanges decentralized which is good for the markets in general. However, it was also able to find some limitations such as legal restraints, difficulties in adopting new technologies, and issues with data protection. The authors advise that the real estate industry sets guidelines on how blockchain is to be adopted and work closely with lawmakers to come up with favorable regulations. They also recommend that more funding should be channeled towards R&D to solve technological issues while propagating the adoption of blockchain throughout the sector to revolutionize real estate processes in the future [17].

Li and Kassem (2021) explore DLT and blockchain smart contracts in construction projects and solve the issue of traditional construction methods and disputes as well as low transparency. Thus, the research is valuable as it continues investigating the ways to facilitate collaboration and optimize the execution of contracts and project performance with the help of DLT and smart contract tools that also create a safe and transparent environment for sharing information and completing transactions. The paper examines how blockchain IT can modify the payment system to be more effective, reduce administrative work, and improve the level of trust between the parties through the “guarantors” of data accuracy and compliance verification. However, it discussed the implementation issues such as the interoperability of DLT to the existing systems, legal issues on the adoption of DLT, and the necessity of working on the standardization of DLT across industries. Li and Kassem state that the construction industry should use pilot projects to experiment with the purposes of blockchain advance the adoption of DLT with regulatory policymakers; and foster intersectoral partnership. According to them, these are the aspects that have to be resolved in the future to make blockchain useful for construction to the fullest extent [18].

On a similar note, the literature avails that blockchain and smart contracts have possibilities of improving transparency, effectiveness, and security of business areas such as real estate and construction. Though these technologies may enhance transactions and lower costs, issues like, regulations, and adoption amongst others are factors that affect technologies. The application in real estate, particularly in overseas investment is relatively small and there is little research done on them. They include working with the regulators, developing standard procedures, providing sponsorships to education, and initiating pilot schemes. Subsequent studies should fill these gaps and analyze specific practical applications to enhance blockchain’s effectiveness in enhancing market transparency.

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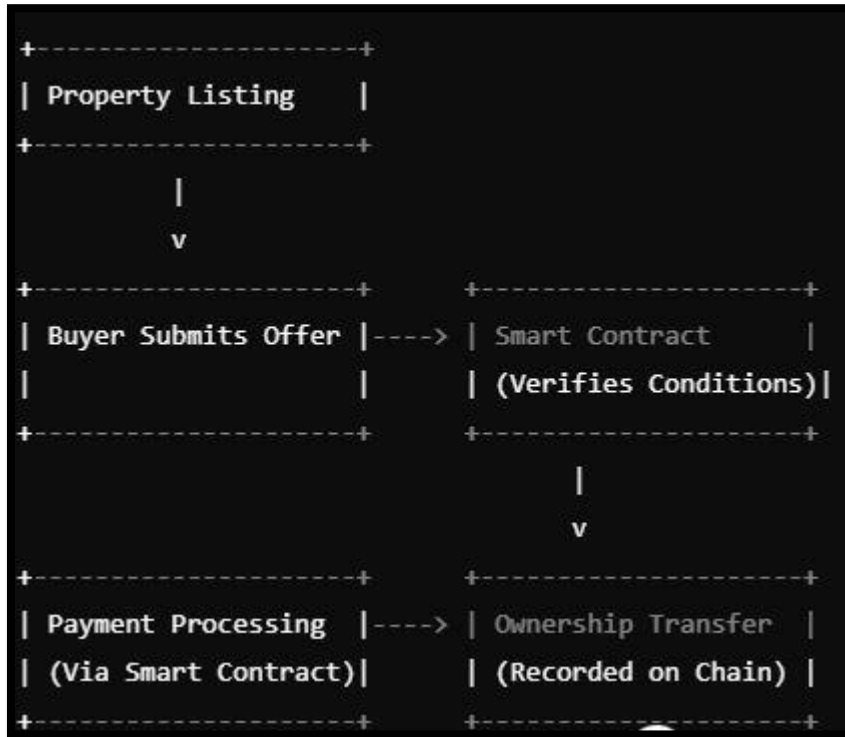
### **3. Overview of blockchain technology and smart contracts**

To better understand how blockchain technology and smart contracts can improve the transparency of fragmented investments in overseas real estate, this section will explain in detail the rationale, features, and advantages of these technologies. By contrasting traditional systems, this section will also explain how blockchain technology and smart contracts can complement each other and be applied to the real estate industry.

#### **3.1. The fundamentals of blockchain technology and how smart contracts work**

Blockchain is a distributed ledger technology that consists of a chain of blocks of data that are linked together. It does not have a centralized control structure and all the members of the network are engaged in providing solution to the network. It is important to note that after data is recorded within the blockchain, it cannot be altered or removed with the exception of consensus of all the members. All the activities are cultivated and it is possible for anyone to access the

data stored in the blockchain. Consensus algorithms like proof of work (PoW), proof of stake (PoS), etc. helps in making sure that all the nodes in the network agree. The essence of blockchain is in the creation of the environment that is safe and efficient, and most importantly, trustworthy when it comes to multi-party interactions. The smart contract is an electronic and an executable contract that runs on blockchain technology and triggers actions when pre-determined conditions are met. Not only does the automatic execution function, but the smart contract will also perform the specific action when the pre-set conditions are met without the involvement of a third party. It also has a trustless function and Smart contracts reduce the need for middlemen and the expenses of the process. Moreover, it has to be said that the code and the status of the smart contracts are available to the public and anyone can see them which also enhances the credibility. The first one is non-reversible – once the smart contract has been activated, the results of the contract’s execution cannot be undone unless there are cancellation plans. According to this evidence, it is possible to claim that smart contracts can enforce legal rules through code to perform contracts and this may result in speeding up the process, increasing the accuracy, and reducing fraud.



**Figure 1** Working Mechanism of Smart Contracts in Real Estate Transactions

This study also establishes that smart contracts are part of blockchain technology. From the aspect of data storage and data check, blockchain technology can record and store all the transaction information and check their accuracy and certainty. Smart contracts execute the conditions contained in the contract using these records. Regarding mechanized procedures, smart contracts can facilitate functions like payments, ownership transfer, and so on; on the other hand, blockchain provides security and accountability for these processes. It is through the use of blockchain and smart contracts that the participation of traditional intermediaries is minimized thereby minimizing the transaction costs. It also enhances transparency since all the details of the transactions are recorded on the blockchain and can be accessed by anyone who has access to the system thus enhancing the transparency of the market. Ensure that there are high levels of transparency and security in real estate investment.

### 3.2. The possibility of application to the real estate industry

The application of blockchain technology and smart contracts to the real estate industry can bring the following improvements: Increase transaction speed and automatically execute contract clauses like real estate sales and leasing using smart contracts; Lower the costs of transactions and eliminate the need for middlemen, hence, creating a direct link between buyers and sellers; Increase security of data as the use of blockchain technology will provide true and accurate property records; Through investment partition, blockchain technology can divide large assets into smaller parts to increase people’s investment participation.

### 3.3. The concept of fragmented investment in overseas real estate

Fragmented investment in overseas real estate refers to the segmentation of large real estate projects into smaller investment shares so that more investors can participate in them. This approach not only lowers the investment threshold but also increases the liquidity and diversity of the market. Nevertheless, the fragmented investment also has some difficulties that hinder its growth such as the legal factors, market risks, and information imbalance.

Sharding of assets in which an asset is divided into multiple pieces such that each piece is tradable is called fragmented investing. This approach has hence spilled the high-end real estate market to the masses which was hitherto the preserve of a few wealthy investors. In essence, a large commercial property or a residential area is subdivided into several small units and each unit represents a certain interest. Through the splitting of assets, investors do not require a huge amount of capital to venture into the real estate industry. The liquidity of the smaller shares in the market is higher than the larger ones; therefore, it enhances the liquidity of the asset. In this way, even retail investors can get the benefits of real estate investments through these small shares.

Fragmentation investment has several merits including the following; diversified investment portfolio, low entry barriers, and high liquidity and this comes with certain risks that are characteristic of the investment. Another factor that complicates cross-border investments is the difference in the regulatory policies on the real estate market in different countries. Further, it is also a legal question as to whether fragmented investments are securities. Another source of risk is the price volatility in the real estate market which is another determinant of returns especially during periods of economic risk. For this reason, investors cannot always get enough information to enable them to make sound investment decisions. The split assets, however, need proper management and maintenance and this may lead to other expenses.

### 3.4. Application of blockchain technology and smart contracts

The application of blockchain technology in the fragmented investment of overseas real estate is mainly reflected in the following aspects: real estate assets through the process of asset tokenization and the creation of digital tokens that can be traded on the blockchain platform. Tokenization helps in the segregation of assets and enhances the traceability and the quality of information on the assets. All the transaction data is recorded on the blockchain which makes the data tamper-proof and unalterable(7). This not only makes the work easier but also lessens the occurrence of fraud. Smart contracts are executed through the help of blockchain technology thus removing the need for third parties to implement the contract.

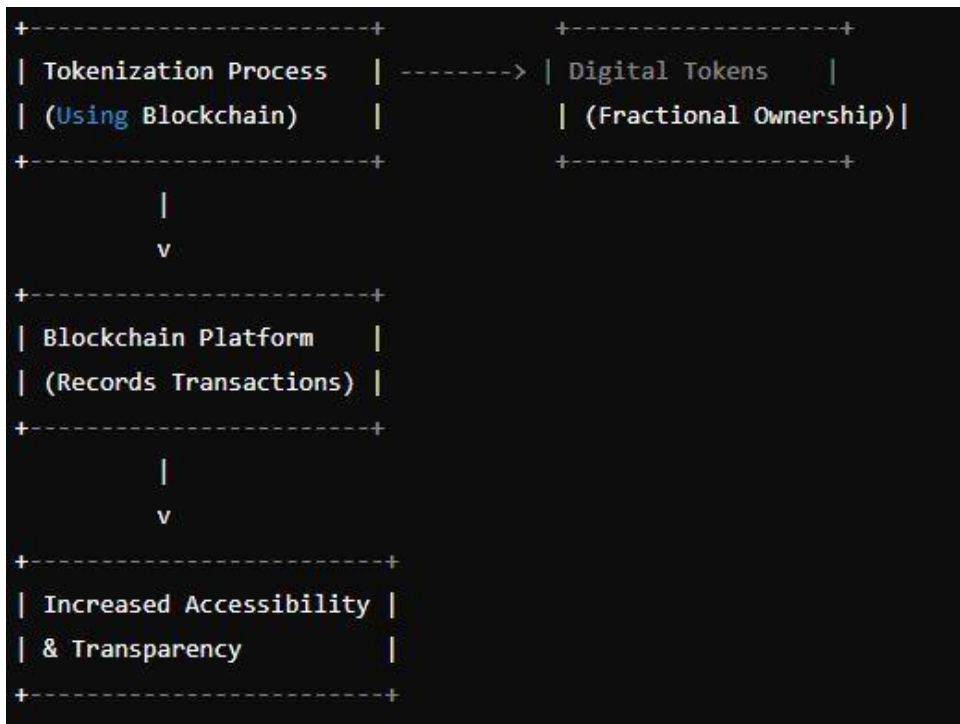


Figure 2 Tokenization Process in Real Estate Using Blockchain

The way that smart contracts help to increase investment transparency is mainly that smart contracts can execute the terms of the contract automatically based on predetermined conditions such as the payment of rent the distribution of profits and so on. This not only increases the efficiency of execution but also can avoid the tendency of errors or fraud. The code and status of the smart contracts are public and can be seen by all the participants thus creating a high level of trust among the participants. Smart contracts eliminate the need for other middlemen in a transaction, cut down the expenditures of a transaction, and improve the effectiveness and feasibility of an investment.

To better understand the application effect of blockchain technology and smart contracts in practice, we can show the following examples: To better understand the application effect of blockchain technology and smart contracts in practice, we can show the following examples:

**Example 1: RealT**

RealT is a firm that deals with the process of tokenizing real estate by identifying properties and dividing them into tokens that are then distributed on a blockchain. These tokens can be purchased by investors and this way they will be able to own a part of the property. As seen above, RealT enhances the levels of transparency in investments, reduces entry barriers, and enhances the fluidity of assets. Every property is split into several thousands of tokens with each token having a certain percentage of ownership. The property’s status and its transaction history are recorded on the blockchain and any investor can check the status of the property at any time. Smart contracts handle the disbursement of rental income without any delay thus investors get their income as required.

**Example 2: Propy**

Propy is an international real estate platform where the buying and selling of properties is done through the use of blockchain technology. The platform employs the use of smart contracts in the handling of the entire transaction process including contract signing, payment, and transfer of ownership. Smart contracts let Propy execute the contract terms without the need to go through many steps of conventional processes. All the operations are performed within the blockchain, which might be considered as the increase of the transaction security and transparency. The Propy platform also enables real estate transactions across the border, which ensures that overseas investors are well-placed to invest.

**Example 3: Harbor**

Harbor is a regulated investment platform that uses blockchain technology to tokenize real estate and guarantees that all activities on the platform are compliant with laws. Harbor employs the use of smart contracts to check the eligibility of the investors and perform other checks. It is important to note that all the transactions that occur within the Harbor platform are governed by smart contracts which carry out immediate compliance checks to determine whether the transactions are legal or not. All transactions are completely clear, and an investor has an opportunity to see the current state and history of the transaction of the asset. Using smart contracts, Harbor guarantees the investors’ rights and interests and thus minimizes legal issues.

This table compares different blockchain-based platforms like RealT, Propy, and Harbor, focusing on key features, benefits, and challenges.

**Table 1** Comparative Analysis of Blockchain-Based Real Estate Platforms

Platform	Key Features	Benefits	Challenges
RealT	Asset Tokenization	Increases Accessibility, Liquidity	Regulatory Compliance Issues
Propy	Cross-border Transactions	Automates Transactions, Reduces Costs	Legal Framework Variations
Harbor	Compliance-Focused Tokenization	Ensures Regulatory Compliance, Transparency	High Implementation Costs

Through the above examples, we can see the application effects of blockchain technology and smart contracts in the fragmented investment of overseas real estate: To enhance the transparency of all the transactions, all the transactions are recorded and made easily accessible, thus solving the problem of information asymmetry; It also fosters trust since



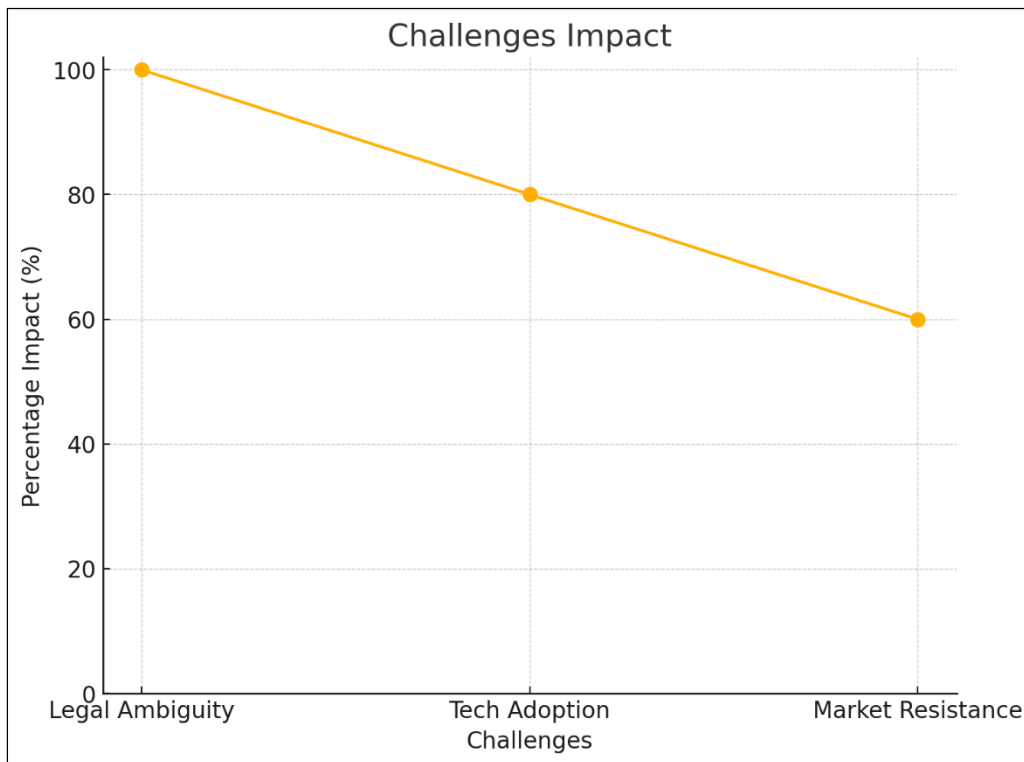
smart contracts execute automatically without intermediaries, thus boosting confidence among all parties involved; It has also lowered the barrier to entry by allowing asset tokenization to enable small investors to invest in various opportunities thus making the market more inclusive; It has also improved the trust, through smart contracts there is the automated execution of contracts which eliminates the need for human interference thus creating trust among all the parties involved; It also improves liquidity, since digital tokens can be easily traded on the blockchain platform, this enhances liquidity in the market.

The following table provides a comparison of the traditional real estate transaction versus the blockchain-based real estate transaction with improvements in transparency, cost, and time.

**Table 2** Impact of Blockchain and Smart Contracts on Real Estate Transactions

Metric	Traditional System	Blockchain System	Improvement (%)
Transaction Speed (Days)	30	7	76.67
Transaction Cost (USD)	15,000	5,000	66.67
Transparency Level	Low	High	-
Fraud Risk	High	Low	-

### 3.5. Challenges and prospects



**Figure 3** Challenges in Implementing Blockchain in Real Estate

While blockchain technology and smart contracts show great potential in enhancing the transparency of fragmented investment in overseas real estate, there are still some challenges in the practical application process. Despite the many advantages brought by blockchain technology and smart contracts, there are still some obstacles to overcome at the technical level: stability and security in large-scale applications need to be further verified; There may be interoperability issues between different blockchain platforms, leading to increased complexity in cross-platform transactions; Current blockchain technology can experience performance bottlenecks when processing a large number of transactions, especially when high-frequency transactions are required (9). Changes in the legal and regulatory environment are also important factors to consider when implementing blockchain technology and smart contracts: the legal status of blockchain technology and smart contracts in different countries and regions is not fully clear, which

creates legal uncertainty for cross-border investments. When using smart contracts for asset tokenization, you must ensure that local financial regulatory requirements are met, otherwise, you may face legal risks. While blockchain technology has increased transparency, how to maintain transparency while protecting personal privacy is also a problem that needs to be solved. In addition to the technical and legal challenges, socio-economic factors are also affecting the application of blockchain technology and smart contracts to some extent: while blockchain technology and smart contracts bring convenience, user acceptance still needs to be improved, especially in markets where traditional investment concepts are deeply rooted. Some emerging markets may not be ready for these new technologies, which will take time and education to change gradually. Traditional intermediaries may resist the adoption of these technologies for fear that their interests will be affected.

Despite the above challenges, blockchain technology and smart contracts still have a promising future in enhancing the transparency of fragmented investment in overseas real estate: As the technology continues to advance, it is expected that the performance of blockchain technology will further improve and solve some existing technical bottlenecks. Governments are gradually developing and improving relevant laws and regulations to provide a clearer legal basis for the application of blockchain technology and smart contracts. Standardization organizations are working to develop uniform standards to improve interoperability between different blockchain platforms. As the market matures, users' awareness of blockchain technology and smart contracts will continue to increase, and acceptance will increase accordingly.

In the future, through international cooperation, unified technical standards and legal frameworks can be jointly formulated to promote the smooth progress of transnational investment. Continue to invest R & D resources to solve technical bottlenecks and improve system stability and security. Strengthen the education of the public and investors to increase their understanding and acceptance of blockchain technology and smart contracts. Through pilot projects, we will gradually promote the application of new technologies, accumulate experience, and lay the foundation for large-scale promotion.

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#### 4. Conclusion

This research shows that blockchain and smart contracts greatly increase the clarity of dispersed investments in overseas real estate. These technologies help to overcome some of the critical problems that include high entry barriers, low market liquidity, and low transparency, especially for retail investors. Thus, applying the principles of blockchain, which is based on the decentralized and unchangeable registry, real estate transactions are less prone to fraud and asymmetric information. Smart contracts also help speed up the investment process and remove the need for go-betweens as well as guarantee that the terms of a contract are fulfilled correctly and within a short time.

Tokenization of real estate assets enables ownership of small parts of properties, thus reducing barriers to entry and enhancing market liquidity thereby opening up opportunities for high value properties to a large number of investors. However, there are real-life problems that are still to be solved, for instance, technical problems like incompatibility of one blockchain with the other, problems of performance, and legal issues since the laws in different nations are not clear on the issue of blockchain. Further, more effort should be made to canvas and align more stakeholders to deal with the backlash from traditional market participants.

Despite these challenges, future developments in blockchain technology, favorable changes in the legal framework, and growing market understanding are likely to increase uptake. This will result in a better integration of the overseas property investment market and provide both the theoretical and practical approach to improving the real estate investment market. Further works should be dedicated to the advancement of the standard for blockchain applications, the development of international collaboration, and awareness of the public concerning these innovations to bring more equity into the investment world.

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