How Blockchain Technology Is Transforming the Real Estate Market?

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1 Introduction

The real estate market has traditionally been considered one with the highest liquidity concerns and is often considered the least liquid asset class. The liquidity concerns in real estate transactions are further aggravated by the paperwork, legal processes, registration formalities, and so on. The investments in real estate market are also characterized by a lack of optimism and lackluster, particularly due to information asymmetry, settlement time, transaction costs, administrative procedures, large capital investment, registration procedures, search processes, regulations, etc. The most prominent challenge for retail investors in accessing real estate investment is the capital constraint or the information on the

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projects. These problems in the real estate sector are increasing the aversion of retail and institutional investors toward investments in the real estate market. As opposed to the suggested optimal portfolio allocation strategies, the institutional investors have allocated far fewer funds to real estate than what the optimal portfolio allocation strategy would suggest (Baum, 2020). While the challenges in the real asset market and property management have been long acknowledged by practitioners, developers, and policymakers, a lot less has been done in transforming the real estate market, probably due to the chilling reminder of the global financial crisis of 2007–2008.

While some of the challenges in real estate investments were, of late, mitigated through real estate investment trusts (REIT) where the investors could buy a fraction of their ownership in a physical asset and enjoy the benefits of the revenues generated by such asset, the governance and agency problems in REITs, yet again, hamper the development and modernization of investment in real estate. The tokenization of real estate and property management on the blockchain could streamline the property management processes and could provide a platform for investors to invest in such assets in a much-simplified manner for a more diversified portfolio. Young and tech-savvy investors have continuously been seeking opportunities to diversify their portfolios away from traditional assets and seek opportunities in non-traditional assets such as cryptocurrencies and other assets on alternative finance platforms (Khaki et al., 2023). Besides providing another asset class in the cryptocurrency ecosystem, it would drastically enhance the liquidity, collateralization, and borrowing mechanism on Decentralized Finance (DeFi) platforms in the real estate markets. Tokenizing physical real estate by using a disruptive blockchain platform is often argued as the future of property management and real estate transactions. Tokenization is described as the issuance of digital assets (referring to an underlying real estate) using distributed ledger technologies (DLTs) on a blockchain platform that aims at democratizing real estate transactions and processes (Chow & Tan, 2022; Swinkels, 2023).

The size of the global commercial real estate market is estimated to be about $35 trillion in 2022; the Asia–Pacific being the largest in size valued at over $12 trillion followed by North America valued at above $11 trillion, EMEA valued at about $11 trillion, and Latin America is just about $1 trillion (*Source* Statista, 2023). The listed real estate market comprises about $3.2 trillion, with North America alone representing about $1.3 trillion (*Source* Statista, 2023). The total value of the

global residential estate has been estimated at more than $200 trillion, exceeding the combined value of equity and bond markets (Savills, 2016). Researchers claim that with such a huge size of the market, tokenization of the real estate sector, and the large-scale adoption of blockchain technology in the real estate sector can bring about a major disruption in the structure, organization, and operation of the real estate markets (Baum, 2021; Cong & Xiao, 2021). Aspen Coin was launched recently in 2018 by Aspen Digital to represent a digital security token for St. Regis Aspen Resort to the value of USD 18 million. Aspen Digital claims to transform the landscape of real estate investment and development by offering a borderless marketplace for investing in real estate by enhancing transparency, liquidity, efficiency, accessibility, and returns on investment (Figs. 1 and 2).

The area of tokenization in real estate is still developing and is gaining traction among developers, policymakers, regulators, investors, researchers, and practitioners. This chapter is an attempt in this direction to examine the landscape of transition to blockchain adoption in real estate transactions and property management and explore the potential of blockchain technology application in the real estate sector beyond the conventional frontiers. The existing literature has largely focused on either Real Estate Investment Trusts (REITs) or the application of

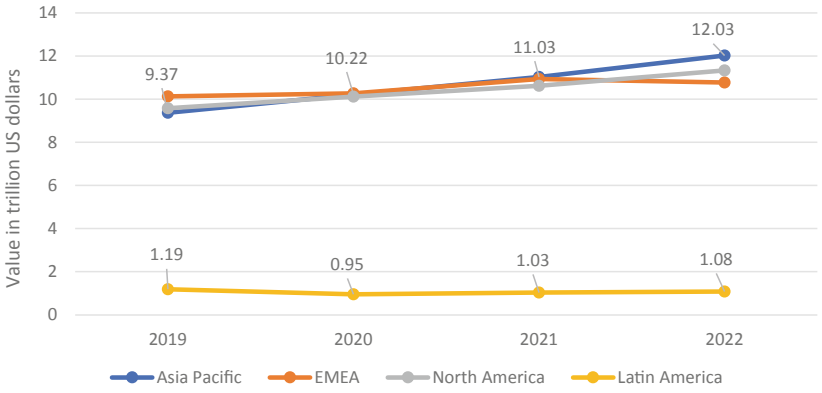

Fig. 1 Value of commercial real estate market worldwide (in USD trillion) (*Source* Statista—2022 [Authors' Illustration]. *Additional Information* Worldwide, 2019–2022, as of December each year)

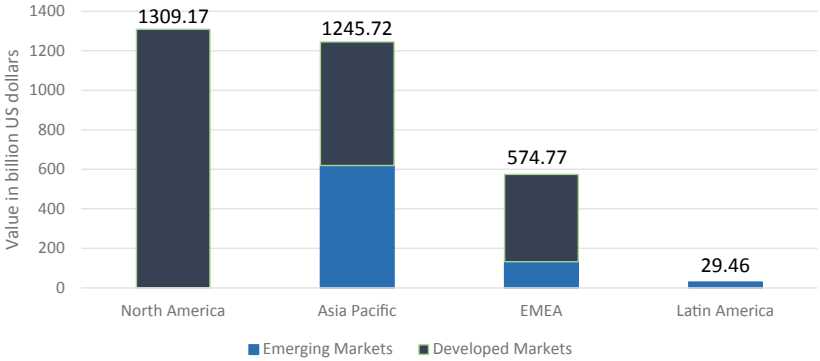

Fig. 2 Value of listed real estate market worldwide (December 2022; in USD billion) (*Source* Statista—2022 [Authors' Illustration]. *Additional Information* Worldwide, AS of December 2022)

blockchain in conventional processes and activities such as property registration, record-keeping, etc. This chapter goes beyond the conventional areas of blockchain application and examines the potential of tokenization in real estate as a solution to the multitude of problems that are paralyzing the real estate markets. The study attempts to shed light on some major challenges in the tokenized real estate market and the opportunities for different stakeholders to explore the advantages of blockchain adoption in developing frameworks, policies, and regulations that aim at enhancing visibility, depth, liquidity, and efficiency in the real estate market transactions. The remainder of this chapter is structured as follows: Sect. 2 presents a brief literature review on the topic, Sect. 3 presents a comprehensive discussion and analysis of the evolution of tokenization in the real estate sector, and a brief conclusion of the study is presented in Sect. 4.

2 Literature Review

The developments in the real estate markets, particularly the adoption of technology have gained considerable interest from researchers, lately. The existing research has largely discussed the conceptual framework for the implementation of blockchain technology, tokenization framework, case studies, and the potential of such disruptions to transform the organization, structure, contracts, administration, record-keeping, etc. in the real

estate market (Cong & He, 2019; Cong et al., 2021; Gupta et al., 2020; Harvey et al., 2021; Konashevych, 2020; Smith et al., 2019; Yermack, 2017). Yermack (2017) examines the application of blockchain adoption on record-keeping and tracking in the real estate market. Cong and He (2019) analyzed the impact of decentralization and smart contracts to mitigate information asymmetry and to enhance competition in the products. Konashevych (2020) supports the belief that traditional real estate has been plagued by poor property management, registry management, and inefficient operations. He argues that decentralization and distributed ledger technologies (DLTs) can considerably enhance property management and registration. Smith et al. (2019) studied the potential benefits to the tokenization ecosystem in real estate by critically examining its potential in the issuance and trading mechanism, representation of real assets by tokenized coins, and the impact/application of tokenization on the real estate investment ecosystem. Zheng and Sandler (2022), in a similar study, support the proposition for tokenization in real estate markets to eradicate the fundamental inefficiencies characterized in the real estate market. They argue that fractionalization has the potential to transform real estate investments by developing mechanisms to provide digital representation to real estate asset ownership and distribution of proceeds from these assets.

A wide section in the existing literature has examined the potential of tokenization in the real estate markets to solve some of the classical inefficiencies in the real estate markets that are hampering investment in the sector, particularly, information asymmetry, liquidity, efficiency, transaction speed, transparency, etc. For instance, Harvey et al. (2021) provide a broader outline of the general applications of DeFi and its potential in solving the fundamental issues of inefficiency, interoperability, illiquidity, and information asymmetry, and elaborate on how blockchain disruption can be scaffolded to drive competitive marketplace with a wide range of applications and benefits. In a similar study, Cong et al. (2021) develop a dynamic asset valuation model to demonstrate the spillover effects of tokenization, particularly, with regard to cost-efficiency, speed, transparency, and subsequent adoption. In a similar study, Krupa and Akhil (2019) support the view that the efficiency and quality of real estate transactions can be considerably enhanced by the adoption of blockchain technology across all its processes. They argue that digitized record-keeping on a distributed ledger improves the speed of transactions and

record-keeping, and facilitates transaction history, rent collection, information dissemination, and distribution of property proceeds. Gupta et al. (2020) examine the issue of liquidity in real estate investments and argue that despite the huge size of the real estate market, the interest of investors is dismal. They further argue that the adoption of blockchain technology could be revolutionary in reviving the sector by enhancing liquidity and transparency in real estate contracts and transactions. In a similar study, Kalyuzhnova (2018) and Pankratov et al. (2020) highlight the potential benefits to the market liquidity, security, transaction volumes, market transparency, and investor interest in real estate assets through tokenization. The impact of blockchain adoption on investors, regulators, issuance platforms, and developers has been studied by Alketbi et al. (2020) and Allessie et al. (2019) and they conclude that tokenization can potentially promote investment in the real estate sector by promoting transparency, regulation, security, trust, and other structural discrepancies, otherwise, so prevalent in the real estate markets. While the literature on the theme is developing to provide a better view of the implementation and adoption of blockchain technologies in the real estate sector, this chapter attempts to contribute to the existing body of literature by further examining the evolving landscape of tokenization in real estate beyond conventional areas.

3 Real Estate Tokenization

3.1 Frontiers of Tokenization in Real Estate

Since the introduction of Bitcoin in late 2018, blockchain-based asset tokens have witnessed explosive growth. Though the legal status of cryptocurrencies is largely debated for numerous reasons, the applications of asset tokenization are poised for revolutionizing the real estate market transactions as we begin to transition and embrace the metaverse in Industry 4.0. Real estate assets are characterized by some prohibitive characteristics that make this sector inefficient, notoriously illiquid, and particularly investor-averse. Recent developments in the tokenization of assets appear to provide a promising prospect to this security class and extend the horizons of the conventional real estate market to explore incredibly novel fundraising mechanisms, enhanced liquidity, hassle-free registration process, tamper-proof ownership and rental history, fractional

ownership, access to broader investor base, streamlined payments, efficient pricing, and a plethora of other benefits. To leverage the benefit of tokenization in commercial real estate, St. Regis Aspen Resort managed to issue one of the very first real estate tokens—Aspen Coin by raising about $18 million through the crowdfunding mechanism. The issue was issued through a special purpose vehicle (SPV) token that represented ownership in Aspen Digital Inc., formed by Elevated Returns LLC, a real estate asset management company, solely for the purpose of floating the issue. Other financial intermediaries in the alternative finance ecosystem were involved in the whole issue with the interactions among other existing cryptocurrencies such as Ether. While the issue offers one of the first examples of tokenization in commercial real estate, it is important to note that the issue offered a wide variety of potential benefits to both the investors and the developers and opened the sector for tokenization.

The current landscape of asset tokenization is still shaping and besides the developers and investors, is characterized by (Smith et al., 2019):

- Issuance Platforms: These platforms allow companies (developers) to tokenize securities (properties) and distribute them as digital assets. They provide the necessary infrastructure to launch tokens and range from private to white-label providers (see Exhibit 1 for some examples)
- Regulation Crowdfunding: The mechanism allows the registered entities to offer and sell securities through crowdfunding through an SEC-registered intermediary. The securities offered through regulation crowdfunding are subject to a 12-month reselling hold, a $5 million cap, and other regulatory provisions (SEC, 2023)
- Compliance Providers: Compliance providers often work together and are integrated with the issuance platforms to provide KYC and anti-money laundering protocols and verification for the investors, streamlining the registration process, and eliminating the whitelist requirements (see Exhibit 1 for some examples)
- Regulators: Regulators are the agencies that provide regulatory oversight over the functioning and classification of securities. In the US, the tokenized securities/assets are regulated by the Securities and Exchange Commission (SEC), while trading in futures and derivatives is regulated by the Commodity Futures Trading Commission (CFTC)

Exhibit 1 Tokenization ecosystem (*Source* Author's Illustration informed from Vertalo [2022] https://www2.vertalo.com/partners/digital-securities-ecosystem [https://www.vertalo.com/partners])

- Broker-Dealers: Brokers and dealers facilitate trading for investors (usually large investors), verify investor eligibility, process deals, and maintain cap tables.
- Trading Platforms: The trading platforms offer secondary trading mechanisms for tokenized securities and are regulated by the Securities Exchange Commission. In order to operate tokenized assets, these exchanges are registered with an Alternate Trading System (ATS) license.
- Legal Firms: These firms oversee the legal arrangement and compliance necessary for the issuance of tokens. These firms act in an advisory role and design special purpose vehicles (SPVs) for token issuance and distribution.
- Custodians: Custodians are the third-party service providers that are meant to safekeeping digital assets on behalf of the investors. Since it is difficult to maintain the custody of digital assets due to complex private key management issues, these providers have evolved to provide custody with keyless operations and without the need for private key management.

Exhibit 1 provides a brief snapshot of the participants in the tokenization ecosystem. The list is meant to provide a general reference to the ecosystem and not an exclusive list of participants operating in the tokenization ecosystem.

3.2 Tokenization: Solutions in Real Estate

Tokenization offers a solution to many prevalent problems in real estate transactions and refers to the digital assets backed by real estate using distributed ledger technologies (DLTs). Each token is identified by and specifies the economic benefits to the holder from the fractional ownership of the underlying physical real estate asset. For instance, the token holders are entitled to the rent income generated on the assets and any appreciation of the value of the property upon realization of the proceeds. Tokenization operates on disruptive distributed ledger technologies and with smart contracts reduces the cost of transactions while incredibly increasing efficiency. While there are still some regulatory drawbacks in upscaling the implementation and usage of tokenization in the real estate sector, without tokenization solutions such as fractional ownership were simply not realizable due to unrealistic administrative processes and transactional costs. Some of the major solutions that tokenization appears to have provided to the real estate transactions so far are listed below:

a. *Fractional ownership*: Fractional ownership has been the major pushback for retail investors to desist from investments in the real estate sector. Real estate assets are essentially indivisible, illiquid, and often require large capital investment; the prohibitive administrative costs deter property owners to offer fractional ownership, and consequently, retail traders are excluded from investment in real estate. The issue of fractional ownership was mitigated through real estate investment trusts (REITs), however, governance problems and agency problems have limited the interest of wary investors in REITs. The evolution of blockchain technology has made it possible to economize on the benefits of fractionalization in real estate assets to tranches and small denominations, which generates a huge interest among investors. The adoption of blockchain technology makes fractionalization possible on an automated distributed ledger with almost no administrative costs.

b. *Customization*: Blockchain technology enables fractionalizing the real asset assets into tokens suitable to investors with different risk preferences and terminal benefit preferences. With fractionalization, the property developers may split the offering into multiple tranches with different minimum investments, rental caps, voting rights, terminal proceeds, etc., for a variety of retail investors. Tokenization takes customization in real estate to another dimension, making it possible for investors to target their portfolios down to a single property rather than the whole sector (Oxford, 2020).
c. *Crowdfunding*: The recent innovation in financing and venture capital has witnessed peer-to-peer lending and crowdfunding as the growing source of financing for start-ups. Crowdfunding has also gained traction in the real-estate markets through the evolution of blockchain technology by raising finance from a broad base of investors beyond geographical boundaries on a distributed ledger. Blockchain technology has the potential to broaden the investor base on real estate projects while also allowing developers to undertake larger and more profitable projects without administrative and agency delays. Crowdfunding in the real estate market has been known to explain about 10–15% of the volumes in the alternative finance ecosystem (Oxford, 2020).
d. *Disintermediation*: Tokenization also offers huge benefits to the project developers, particularly small-scale projects by reducing the floating costs, administrative and regulatory costs, and agency problems as are often remarked in REITs. The benefit of disintermediation trickles down to better proceeds, easy accessibility, low intermediation costs, and better efficiency for retail investors.
e. *Flexibility*: Tokenization has offered and has a huge potential to offer great flexibility to the tokenized securities, particularly by splitting up the characteristically big, lumpy, illiquid real estate assets into customizable units of revenue streams and ownership structures. By fractionalizing an asset can be split beyond geographic boundaries, could be divided and sub-divided where the entitlements could be designed as per the desires and requirements of different investor bases. The tranching arrangements could be designed to provide entitlement interest to rental incomes from the asset, property interest, property usage, joint ownership, syndication, timeshares, etc. with variable rights and legal implications (Oxford, 2020).

f. *Operational efficiency*: The traditional real estate markets have been notoriously popular for 'off-market' deals and administrative and operational inefficiencies. The participants in this sector struggle to give up their dependence on traditional transactional procedures despite huge technological advances, for instance, the purchase of a prime commercial real estate from RFR Holding GmbH in Zurich's Bahnhofstrasse claimed to be among the largest token deal in the real estate transactions supposed to be paid in BrickMark tokens ended up being an off-market transaction (BrickMark Group, 2020). Tokenization in real estate assets has a huge potential to revolutionize transactions in real estate markets and bring about the necessary fluidity, liquidity, transparency, and operational efficiency. The smart contracts supported on the blockchain platform have a tremendous potential to automate processes like pre-issuance eligibility, compliance checks, regulations, record-keeping, history maintenance, KYC/AMC eligibility, collection and distribution, customization of contracts, etc. Automation in real estate through tokenization makes it possible to programmatically distribute proceeds and dividends to investors automatically when due, without any operational drawback.
g. Settlement time: The transactions in traditional real estate assets are subjected to a range of administrative and regulatory processes due to which the settlement time is discouragingly long and the funds remain unnecessarily tied up in the settlement process. REITs resolved settlement time to T+3 to T+1 as in the traditional financial transactions but the funds still remain tied up during the settlement period, thereby leading to some liquidity issues. With the tokenization of real estate assets, the transactions could be instantly settled within minutes or hours upon the corresponding blockchain platform.
h. *Transparency*: Traditional real estate markets are characterized by a lack of transparency. The information about the quality of real estate assets and projects is generally, either outdated or not easily accessible. The unavailability of information and transparency often makes wary investors over-cautious in seeking investment in real estate assets. The delayed and foggy nature of information in real estate projects often makes investors averse to these projects or seek information that is costly and time-consuming to provide. Institutional and professional investors find the information and records

in the traditional real estate assets as spotty and therefore, resort to due diligence in the properties they invest in, which yet again is a costly and time-consuming process. Though REITs resolved some of the issues in the real estate markets such as maintenance history, titles, compliance, insurance, rents, etc., the markets are still far from vibrant and drastically suffer from transparency issues. Blockchain technology has considerable potential in resolving the longstanding transparency concerns in real estate through the tokenization of tiles and deeds, promoting greater visibility of the assets, property management, title history, insurance, rental contracts, debt obligations, and other necessary information, previously impossible in the traditional real estate landscape. The ability to have the information available for investors easily accessible aggregated and integrated within the blockchain platform provides a tremendous potential for governments and developers to leverage their projects a develop strategies for smart cities and communities (Meridio, 2019). The research supports that the cities that rank higher on the transparency index ("Highly Transparent" cities) account for about 75% of commercial real estate investment, globally (Global Real Estate Transparency Index, 2018).

i. *Liquidity*: Despite the huge portfolio diversification benefits of real estate assets in the global portfolios established through the modern portfolio theory frameworks (Baum & Hartzell, 2012), the allocation to real estate by institutional investors has been about less than a quarter of suggested allocations (Oxford, 2020). Real estate assets are traditionally known for illiquidity, slow transaction speed, high transaction costs, and administrative pushbacks, thereby discouraging investors from participating in this asset class. The market is also characterized by what is known as "off-market" transactions which further exacerbates the concerns of fair pricing, democratization, information asymmetry, and demand/supply market forces. Tokenization in the real estate market can potentially benefit the developers in achieving a broader distribution of the offering at an effectively better price. Tokenization may help developers skip the third parties such as brokers and agents as well as secure funding from outside the conventional bank financing, and therefore, raise capital more quickly at a lesser cost and at a much lower risk and fewer covenants (Smith et al., 2019). The tokenization of real estate assets will generate a greater retail investor demand for the tokens

which can further be supplemented by a wider secondary market outreach to enhance the investor demand and the market perception of the asset (and the developer). For instance, Propellr and Fluidity arranged the tokenization of a luxury Manhattan condo with 12 construction units using Ethereum and raised $30 million from a global blockchain platform (Wolfson, 2018)

j. *Access to broader investor base*: The platforms in the tokenized security ecosystem are open and accessible to investors across the globe round the clock, and therefore, allow unhindered access for millions of global investors to invest in tokenized real estate assets without the limitation of geographical boundaries. The platforms also receive huge attention from tech-savvy investors and young investors who are looking for alternative asset classes away from the traditional asset classes to achieve better portfolio diversification benefits (Bakry et al., 2021; Rashid et al., 2023).

3.3 Challenges to Tokenization in Real Estate

Tokenization in real estate has so far been successfully demonstrated by the launch of property tokens by various developers and real estate companies in collaboration with other financial intermediaries like financial advisors, issuance platforms, broker-dealers, etc. Elevated Returns LLC issued Aspen Coin representing ownership of St. Regis Aspen Resort through a Special Purpose Vehicle (SPV). The issue was managed by Templum, a registered broker; Computershare, a custodian; Indiegogo, a crowdfunding platform. The total issue was valued at $18 million. Aspen Digital issue was followed by Blocimmo, Blocksquare, Bolton, Brickblock, BrickMark, etc., demonstrating a huge opportunity and investor interest in this segment. As the regulation around the commercial real estate tokenization infrastructure develops and the inertia to sticking to the traditional practices in the real estate transactions breaks, blockchain technology may potentially impact the commercial real estate landscape in a positively disruptive manner. From crowdfunding, registration, and property management to cryptocurrency-based issuance and secondary market trading, tokenization has a range of benefits to offer to the participants in this relatively lumpy asset category.

A quick reality check on the recent developments in the real estate tokenization ecosystem suggests that after the initial hype in tokenization,

the enthusiasm about real estate tokens has not gained the expected traction among institutional or retail investors. The sluggish demand uptake was further complicated by some failed transactions and issues in the tokenized real estate market. The initial wave of optimism quickly hit the shore when a highly anticipated joint venture between Fluidity and Propellr, a technology provider and the broker-dealer in digital assets, respectively, fell apart. The tokenized commercial real estate market was also characterized by infrequent transaction volumes and undervaluation, despite stimulus from the token developers into their own projects. The market also leads to adverse selection phenomena attracting investors that found no better avenues for placing their funds.

The optimism in tokenized real estate quickly turned into aversion and recoiling to traditional off-market deals with some failed transactions. A student housing project worth $20 million floated by DRW Holdings together with the blockchain partner Harbor and Fluidity and Propellr fell apart. Similarly, the purchase of Zurich's RFR Holding commercial estate by BrickMark took place in an off-market deal in 2020. It has also been argued that many ICOs in the real estate sector were mostly speculative in nature, where the developers were often intrigued to issue the coin before identifying the prospective projects for property development (Smith et al., 2019). The speculative issuance of some real estate tokens has led to some regulatory concerns about tokenization in real estate assets, where the primary issue concerning regulators is about recognizing real estate tokens as digital securities. Besides regulatory recognition, the market is yet also paralyzed by the extreme volatility and turmoil witnessed in the cryptocurrency markets that heavily support the tokenized security ecosystem in real estate. Research suggests that the sentiment in the cryptocurrency market may strongly impact the valuation of real estate tokens (Cong et al., 2021; Kreppmeier et al., 2022; Nadini et al., 2021). The instability in the cryptocurrency markets and the lack of a reliable cryptocurrency to enable smooth transaction mechanism, on one hand, cripples the regulatory agencies from making progress in coming up with regulation that is consistent across different markets and platforms, and on the other hand, discourages investors from exploring this area of investment for portfolio diversification. The recent development, however, insufficient, suggests the position of regulators to recognize real estate tokens as "securities". The regulators are, however, still demonstrating caution by subjecting these securities to stringent listing requirements, legalities, and processes.

The commercial real estate market is also struggling to scale up due to single-asset tokenization. Barring a few exceptions, real estate token fractionalization for a single asset has not yielded successful results and has often been met by unsubstantial demand and liquidity. The exchanges such as the International Property Securities Exchange (IPSX) that has been catering to the initial coin offering (ICO) and offering the secondary market trading mechanism for single-asset tokens have been struggling to engage sufficient participants to achieve the necessary depth, thereby resurfacing the issues of liquidity yet again. Though IPSX has exceptionally performed well compared to other platforms, the single-asset tokens are doomed to be unsuccessful due to the inherent limitations in the structure and limited breadth of such issues. It has been reported that the single-asset tokens demonstrate poor performance with respect to its NAV, particularly, due to the poor expertise of retail investors to appraise the value of the property under management. Dowling (2022) suggests that the prices of the real estate token may not correspond to the true market value of the property and that these tokens and the non-fungible tokens (NFTs) for virtual property spaces in metaverse may be misrepresentative of the real worth of the assets and not represent the fundamentals of the underlying property. This eventually leads to sluggish demand, low trade volumes, high volatility, less liquidity, and diversion to REITs. Furthermore, the regulation regarding the fractional ownership of assets is still too complicated and not formalized, and therefore, to facilitate fractionalization, tokenization in real estate is possible only through an intermediary Special Purpose Vehicle (SPV) that acquires the direct ownership of the property. An exchange mechanism, hybrid tokens, multiple-asset tokenization, and regulatory flexibility are some of the critical areas which still present challenges to the development of tokenization in the real estate market.

4 Conclusions and Suggestions

Tokenization provides a huge promise in the commercial real estate market by offering solutions that are incredibly innovative and goes much beyond the conventional boundaries of commercial real estate transactions. Tokenization has the potential of and has successfully exhibited how the adoption of blockchain-based solutions can significantly transform the real estate market by offering automation in registrations, fractionalization, property management, crowdfunding, investor

outreach, flexibility, customization, administrative simplicity, operational efficiency, greater investor demand, and so forth. The implementation of technological innovation in real estate may be completely revolutionized by the adoption of Proptech—a combination of the Internet of Things (IoT), Big Data, Artificial Intelligence (AI), and Blockchain. It may be implemented to strip assets and split them to conveniently fit into your investment portfolio to achieve an optimized performance, monitor the carbon footprint of the property, and movement of people in the building, update safety protocols, and property valuations, automation of property facilities, etc. While tokenization has the potential to offer a range of benefits in commercial real estate (CRE), it is still in its early stages of development and is yet to be fully accepted by market participants. The regulation around CRE tokenization is still underdeveloped and has many limitations on engagement in CRE transactions and participant whitelisting. The market is also characterized by the overabundance of single-asset tokenization which does not appear to offer a huge promise in terms of flexibility and scaling capability, besides operational and issuance complexities. Retail investors also lack information on single assets and consider seeking such information as tiresome, therefore, only investors who understand property investments are currently actively engaged in such transactions. Crowdfunding has not been successful for small projects either as investors tend to run after established single-asset tokens and avoid less popular assets.

While the tokenized real estate ecosystem is still evolving and though several cases of successful adoption have demonstrated the potential of blockchain adoption in the real estate sector, there is considerable inertia from the market participants to push back on the evolution of tokenization and recoil back to the traditional practices. The sentiment in the volatile cryptocurrency market is also threatening investor confidence in the tokenized real estate, as well as, reinforcing the dilemma of regulators in the recognition of real estate digital securities and the regulation around them. In a world where the Internet of Things (IoT) is commonplace and where younger generations are embracing digital solutions to world problems, the policymakers, regulators, and developers must recognize the need to develop frameworks and solutions that cater to this tech-savvy community of consumers to provide efficient, convenient, secure, and alternative solutions to conduct their business.

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