

BLOCKCHAIN AND TOKENIZATION

HOW BLOCKCHAIN WILL IMPACT LAND REGISTRY AND REAL ESTATE TRANSACTIONS GLOBALLY

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INTRODUCTION

The purpose of this paper is to address the integration of a layer-2 blockchain system, built on the Pecu Novus Blockchain Network, into government land registry systems and the integration of a digital tokenization system, as a layer-2 blockchain network, into real estate transactions globally. Putting a spotlight on the inherent issues faced by current processes and systems such as the legal challenges, archaic processes, the complexity of current centralized systems, time constraints and security breaches. FGA Partners has long been an advocate of the use of blockchain technology across all industries, having caused for the development of blockchain enabled systems to enhance security across the communication, financial and commerce sectors. MegaHoot Technologies is developing a blockchain enabled land registry system that any government can use to combat current inefficiencies in current inefficient digital and paper intensive land registry systems.

Transparency International stated that 20 percent of land service users worldwide admitted that they had to pay an incentive in order to register their property or verify land ownership information in certain countries. This reduces the efficiency of service delivery and undermines public trust in the government. Moreover, corrupt officials in an opaque government system can easily leverage their positions to manipulate land title data without risk of detection in a paper intensive or non-blockchain enabled digital system.

According to World Economic Forum, it is estimated that approximately 90 percent of all land in developing countries are "completely" undocumented. Delivering accountable digital land registry systems and particularly increasing validity of land titles is vital for present-day governments in terms of suppressing corruption, eliminating red tape, enhancing transparency, improving speed of the stated public service and eradicating risks of possible disputes. The utilization of the Pecu Novus Network to integrate blockchain technology into current digital system in place and systematically converting paper based systems into digital versions will eventually eradicate land fraud such as land grabbing and various land disputes as it relates to ownership.

We will also outline the value of a blockchain enabled real estate transaction system for commercial use which can work in concert with upgraded land registry systems. This will cause for seamless interaction between all government agencies focused on land registry, the commercial entities in the real estate industry and the general public.

The fundamental attributes of blockchain technology are being leveraged in profound new ways across the financial, government, manufacturing and real estate sectors. It is changing how societies operate, disrupting old archaic processes and creating exciting new possibilities. These attributes present a foundation for value creation, promoting increased investment and providing the potential for significant growth across all industries. Pecu Novus Blockchain Technology provides the technological basis for new avenues of value creation and the disintermediation of legacy systems and processes.

What has evolved over the past two decades are digital payment systems utilizing digital tokens that are layered directly on blockchain technology (layer-1 blockchain systems), which provide transparent, immediate, irreversible and immutable transactions. This has proven that two parties are able to engage in a permissioned or permissionless transaction, over centralized or decentralized platforms, and complete such transactions within seconds or minutes as opposed to hours or in some cases days and weeks. Such layer-1 blockchain systems have the ability to enhance security, speed, and transparency promoting trustless systems that governments, financial industry and the general public can rely on for accuracy and transparency.

Technology has advanced over the years and global markets have widely embraced blockchain technology and digital tokenization across many industries such as the financial industry all the way through to sovereign nations as an alternative to the current archaic systems available today. The integration of blockchain technology and digital tokenization in the real estate and financial industries have streamlined banking and lending services, reduced counterparty risk from fraud and decreased issuance/settlement timelines. It is inevitable that every industry and sovereign nation will be positioning themselves for the future via blockchain technology and digital tokenization.

The integration of blockchain/distributed ledger technology will become essential for government land registry records, record management of real property titles, mortgages / property encumbrances and financial data. Such systems would be held within a bespoke centralized layer-2 blockchain network operated by governments and shared with both financial institutions and the general public as required. Through the utilization of smart contracts, digital signatures and digital documents, property title verification and registration can be made simple, mortgage origination can be streamlined and swift, and the transfer of title can be made immediate at a closing, all of this can be done in a highly secure and immutable way.

This also leads to cost effective and swift processes as it relates to performing due diligence of land records, closing of real estate transactions, verification of identity and much more. The development of bespoke layer-2 blockchain systems for government utility will become crucial for governments to provide accurate and transparent records of real estate transactions, ownership records and financial encumbrances such as mortgages or tax liens. The integration of digital tokenization provides an immutable record of an exchange of value; it provides transparency, swift transactions, prevents fraud and provides governments with an immutable record of such transactions. The addition of the MegaHoot Decentralized Digital Identity System for such transactions promotes the

adherence to current and future anti-money laundering “AML” and Know Your Customer “KYC” laws in place.

LAND REGISTRY PROBLEMS AND SOLUTIONS

What has always been done continues to be done; this is one of the biggest problems that arise from adhering to inefficient methods and systems. Many government land registry systems still rely on archaic paper intensive land registry systems. These are inefficient in many ways, its time intensive, costly and not secure. Such systems are not user friendly and do little to combat land disputes and fraud.

A digital National Land Information Management System has been launched in Kenya named “Ardhisasa”. This provides a digital version of the Kenya land registry system which has been mandatory to use in order to complete land transactions. Although a good effort has been put forward, it is still an inefficient system, still requires a high usage of paper documents, inclusion of many people in the process and has done little to promote confidence in Kenya’s land registry system.

An association of 47 banks has raised concerns about the Ardhisasa System available in Nairobi, Kenya, they have cited delayed transactions which according to the association have denied them billions in transactions. The Kenya Bankers Association have joined lawyers, legislators and the public in voicing concerns about the National Land Information Management System and are lobbying for change.

At the moment the Ardhisasa System is only available for properties in the Nairobi region with plans for the Land Ministry to roll out the Ardhisasa system in other counties. This can be disastrous for the government and general public, thus increasing the lack of confidence in the current land registry system, limiting foreign investment due to the lack of transparency and stunting growth. Lawyers in Kenya have cited that the new digital system has had a crippling effect on their real estate related practices, resulting in loss of income and frayed relationships with their clients.

In a memorandum sent to the Cabinet Secretary for Lands and Physical Planning Farida Karoney, Kenyan lawyers are claiming the electronic system has stalled multi-billion-shilling land transactions in Nairobi, arguing it is complicated to use and has been experiencing constant failures.

Through the Law Society of Kenya (LSK) Nairobi branch chairman Eric Theuri, the advocates also say the faulty online portal also has a ripple effect on the banking sector, in respect of ability to advance and secure loans. In a memorandum dated June 22, 2021, Mr Theuri stated that to date no single transaction has been successfully completed in the Ardhisasa system.

Theuri continues by adding that some of the functions on the digital system are not operational such as change of user and it prevents Limited Liability Partnerships (LLP) from registering on the portal, which prevents law firms and real estate firms from utilizing the system. He continues by adding that the digital system is complicated and not user-friendly at all, especially as it relates to the elderly and non-tech savvy clients. According to Theuri his real estate business has suffered in direct relation to these issues.

These issues are not unique to Kenya, it has impacted many countries throughout Africa, South America, Europe and more. In South American countries such as Honduras, according to findings, some government officials boldly altered the country's land ownership database, stealing properties for themselves including beachfront gateways. Similar actions took place in Ghana, Namibia, Uganda, Nigeria and many other countries across the globe. This has led to government owned property as well as property owned by citizens to be claimed by corrupt government officials.

In many African countries, more than 90 percent of rural land is not registered. In Ghana, 78 percent of land is unregistered, and the country's courts have a long backlog of land dispute cases, which is both costly and time intensive for governments.

In India, millions of families living in rural areas, including farmers, lack legal ownership of their land. They work the land as a living but have no claim to ownership due to the inadequate land registry systems in place. The lack of secure land ownership is a bigger issue as it has been a root cause of poverty, a high illiteracy rate and lack of quality of life.

Brazil, the largest country in South America with robust ports, fertile lands and heavy commerce, does not have a single centralized land registry. Instead, about 3,400 private agents called "cartorios" register and check land ownership. The paper intensive system is confusing, involves many different government and nongovernment related individuals for a single real estate transaction. There have been many instances where there were several different versions of the same document for the same property which lead to an increase in land disputes and fraud.

These fragile and incomplete land registry systems in the developing world can have a global impact. In Brazil's Amazon rainforest, illicit land grabbers forge deeds and use violence and bribery to falsely claim ownership of properties, often under false names, which the locals call "fantasms" or "ghosts". They cut down the trees in the rainforest, which can have a serious global environmental impact. They cloak the action and give it the title of "land improvement for pasture", this makes these land grabbers eligible to register the land as the true owners of record. This has been a cycle repeated throughout history and has led to widespread Amazon deforestation.

There are many hurdles that the government faces with outdated and inefficient systems for maintaining land records and providing the public with current and accurate land data. The local and national level land registries have inconsistent information due to lag time, the various departments often have issues with providing the most current land records

and coordinating information accordingly. This has made the job of the government and the maintenance of land records even harder at its current state.

The integration of a layer-2 Blockchain enabled system, built on the Pecu Novus Blockchain Network, into Land Information Management Systems can be seen as an evolution that can promote transparency in land records keeping, thus preventing land disputes and fraud. This can be seen as a true enhancement to the inefficient digital system currently in place and can create an efficient, cost effective, trustworthy system in both developing and developed countries. Providing a centralized National Land Information Management System that is trustless is key, one that local and national government agencies, real estate lawyers and professionals, as well as the general public can access easily and retrieve the exact same information seamlessly with confidence of its accuracy. This can lead to increased adoption globally, solving those same issues that have plague land ownership for so long. It can increase global investment in the regions thus boosting the local economies, increasing tax revenue and enhancing the quality of life of the countries citizens.

It has been a cause for alarm across real estate lawyers, professionals and investors that potentially some of the information shared on the system is flawed. Reports have come through that pointed to the digital system only bearing plat maps on the system but it did not directly correlate to actual physical lands. This is a vital flaw that a layer-2 Blockchain system built on the Pecu Novus Blockchain network would help to resolve while working with the current system in place.

There are inherent issues with the use of current digital system in place as well as paper intensive land registries, such as:

- 1) **Transactional Complexity:** The complexity of a single real estate transaction involve a number of important and segregated phases such as housing evaluation, document compiling and execution, final contract execution, the transfer of funds for a deposit or full payment, land transfer and registration.
- 2) **Inefficient Record Keeping:** Land registry systems are fragmented, even in digital format, it constitutes the utilization of paper documents across various departments; this opens up the door for land fraud, human error, outdated record keeping and many avoidable inefficiencies.
- 3) **High Transactional Cost:** Transactional costs entail the due diligence of a property, which irregularities and hidden costs are what drive those costs higher. An inefficient digital land registry system can make things systematically worse and not only increase those costs but result in real estate transactional losses for real estate lawyers, professionals, buyers and sellers.
- 4) **Lack of Security:** Paper intensive centralized systems in place today provide little security and makes the verification process time intensive, so it becomes harder to authentic the true land owner. Land records become extremely vulnerable to attacks, fraud, natural disasters such as fire or flooding and makes the entire system very unreliable.

- 5) **Inefficient System:** The irregularities that can take place are extreme, from incomplete records, incorrect ownership data, challenges in navigating the paper intensive and digital systems to locate the proper documents and more. This reduces the transparency and trust in any system by the public, financial institutions and even the government itself.
- 6) **Lack of Transparency:** The current paper intensive land registry system provides challenges for land ownership and lenders; it makes it difficult to buy and sell real estate in an efficient trustless manner; it makes the ability for a financial institution to lease or provide financing for a property very difficult. It suppresses global investment due to the lack of transparency.
- 7) **Land Ownership Discrepancies:** The structure of the regulatory system for land registry is fragmented; it not only is spread out over multiple departments it is also spread out over villages, towns, districts and national levels. This reduces transparency, it promotes potential fraud and land disputes. It makes the job of the government that much harder.
- 8) **Multiple Party Involvement:** During the course of a real estate transaction there are several individuals that are involved in the process, each party is forced to do their own due diligence on a parcel which results in high costs, complexity and delays. Lawyers, brokers, land inspectors, notaries, the government and other parties do not share the same set of documents for transparency, which results in increased service fees.

BLOCKCHAIN TECHNOLOGY IS KEY

The power of decentralized financial technology is only part of the solution. Any layer-2 system that is built on the backbone of the Pecu Novus Blockchain Network accelerates the Internet of Value by incorporating MegaHoot Technologies' proprietary blockchain enabled encryption protocols into such systems to ensure security and encryption levels will be at its highest. The flow of encrypted communication will continue to forge our tomorrow as true global connectivity is achieved. Blockchain technology will spark innovation that will turn the page on global business, redefine industries and in some cases sparking new industries to emerge. The integration of artificial intelligence systems for machine learning will also play a pivotal role in the enhancement of the backend of these systems and promoting a better user experience while autonomously upgrading systems as technology advances.

The lack of transparency, high transactional cost and the inefficiencies represented in points 1-8 have sparked a need for systems that can reduce the complexity of land ownership and land transfers while reducing human errors, fraud and high transactional costs. The integration of a layer-2 Blockchain system built on the Pecu Novus Blockchain Network into current digital systems has the ability to not only rectify these inefficiencies but also make land registry systems more advanced, scalable and simpler to maintain. It has the ability to virtually eliminate high transactional cost, reduce third party involvement, increase reliability and speed while combating land fraud by having immutable records of true land ownership in a centralized and transparent manner. This

also increases the confidence of the accuracy and efficiency of government digital platforms.

We have addressed the inherent issues, now we will address the solutions that blockchain technology can offer in each instance:

- 1) **Transactional Complexity:** Blockchain simplifies the transactional process, the entire lifecycle of a transaction is registered on an immutable block on a virtual blockchain. This gives immutable transparency to all levels of government, the professionals that rely on accurate information and the general public. This all takes place in a secure centralized blockchain system that would be trustless and in the hands of the government.
- 2) **Inefficient Record Keeping:** Blockchain transforms the current land registry and real estate transactional paper intense system into a centralized unified tool that acts as a repository for what was once paper intensive. It can enhance the current digital system in place to make it user friendly and accurate. This will shut the door on potential land disputes and fraud, it will increase efficiencies across all government agencies involved in this process and reduce the legal workload of the courts due to land claims.
- 3) **High Transactional Cost:** The inclusion of a publicly viewable centralized blockchain system for land registry, real estate transactions and many other areas of transactional business reduces the due diligence period. It reduces the fees associated with irregularities and lost documents due to human error, it provides a transparent trustless account of every transaction and true ownership in one place.
- 4) **Lack of Security:** Having a blockchain enabled platform provides a high level of security normally but that is not enough as it relates to government and commercial uses. The development of bespoke layer-2 Blockchain system that can be centralized or decentralized raises that security level very high. The utilization of the Pecunovus Blockchain Network allows for this to be achieved. This eliminates land disputes and fraud that is faced with paper intensive systems, land records are not vulnerable to attacks, fraud, natural disasters such as fire or flooding and makes the entire system very stable, trustless and efficient.
- 5) **Inefficient System:** The utilization of a bespoke layer-2 Blockchain enabled system eliminates irregularities, incomplete records, incorrect ownership data, makes navigation to locate documents efficient and swift. It increases the transparency and trust level in the system by the public, financial institutions and even the government itself. The integration into current digital systems will enhance such digital systems across the country and promote a seamless real estate transactional system.
- 6) **Lack of Transparency:** Blockchain provides an immutable record of any transaction; this is the ultimate in transparency. This makes it simpler for a financial institution to lease or provide financing for a property, it provides a simple path for due diligence. It can promote global investment and participation in real estate development projects.
- 7) **Land Ownership Discrepancies:** The implementation of a bespoke layer-2 Blockchain enabled system will reduce the burden of the regulatory system for

land registry and eliminate the fragmentation that exists today. It streamlines data so that all government agencies and real estate industry professionals see the exact same data. So village land registry personnel will see the same data that personnel on a national level see. This promotes trust and confidence in the government's ability to provide transparency in land ownership.

8) **Multiple Party Involvement:** Blockchain technology reduces the cost of the due diligence process and provides an immutable unified result that lawyers, brokers, land inspectors, notaries, the government and other parties can all see. It allows for multiple parties to see the same information in real time and it simply provides a trustless system that is transparent and immutable. It reduces the fees that normally would be present due to paper intensive inefficiencies and fragmentation.

PECU NOVUS BLOCKCHAIN TECHNOLOGY SOLUTIONS

In 2017 Pecunovus was born with the understanding that traditional global payment and banking infrastructures simply do not meet the demands for global business today. Those legacy systems carry with them high transaction fees, limited privacy and delayed fund transfers. By tapping into the power of blockchain and digital asset technology any global business or government can positively impact the speed, reliability, transparency and cost effectiveness of their transactions such as land transfers, real estate transactions from commercial to residential, business related transactions and others, whatever they may be.

FGA Partners understood the value of a powerful layer-1 blockchain technology system that solves real world issues such as enabling transparent and secure bespoke layer-2 Blockchain systems for government, financial institution and international business use. An immutable centralized trustless system that is integrated into a decentralized network which can combat everything from land disputes / fraud to transparency and security issues in the financial sectors is critical. So building layer-2 Blockchain enabled systems on the Pecunovus Blockchain Network was an important part of the firm's path into blockchain technology as it has provided all of the characteristics required.

There are both decentralized and centralized networks that exist today. Decentralized networks offer very high security due to the number of micro computers validating transactions, this secures the entire network. On the Pecunovus Network the more validator nodes that exist on the network the more secure the entire network becomes. Pecunovus validator nodes will increase over time as various Bitcoin mining operations integrate Pecunovus validator nodes into their operations. Centralized networks can also offer very high security due to the level of cryptography used to secure the network. Centralized systems that are built as a layer-2 Blockchain enabled system on the Pecunovus Network enjoy the security that the entire network brings forward while keeping sensitive data safe and secure.

THE VALUE OF THE PECU NOVUS NETWORK

Pecu Novus is a layer-one blockchain network that was built for global business, the ability to create customized layer- Blockchain enabled enterprise and government level solutions has opened up the playing field. Blockchain is the key to improving global payment and digital transfer services across all industries. Through the scalable Pecu Novus Network both commercial and government use can be achieved, giving them access to alternative digital transfer solutions.

The development of bespoke secure centralized layer-2 Blockchain enabled systems for governments, financial institutions and various commercial purposes that are built integrating encryption protocols utilizing the Pecu Novus Network provides heavy security. This allows such systems to register on the decentralized Pecu Novus Network at inception; this creates a public record of the system being created in the form of a block on the blockchain. In order for a breach to occur on that system then the decentralized Pecu Novus Network along with the hundreds of global validator nodes carrying information, all systems and digital tokens created on the network and millions of transactions would have to be breached. It provides a level of security that is unparalleled and with a proprietary Pecu Novus pinging system, each bespoke system periodically creates a block on the Pecu Novus Network as a Wellness Check, this further enhances security of bespoke layer-2 Blockchain enabled systems.

The integration of the Pecu Novus Blockchain Network and it's ledger technology allow governments and businesses globally to vastly improve how they connect, communicate and complete digital transfers of all types. The utilization of tokenization is a powerful tool, whether it represents an asset, a company or a project in a decentralized manner or if it is just a utility token that represents everything from document transfers to digital identity management on a centralized or decentralized blockchain system. The tokenization for projects, companies and platforms on the Pecu Novus Network are all vetted and approval based, this protects the integrity of the network and all layer-2 Blockchain systems built on top of Pecu Novus. It prevents fraud as it relates to platforms and digital assets built on the network. The general public cannot simply create a digital token or build on the network without approval.

PECU NOVUS SMART CONTRACTS

Pecu Novus Smart Contracts work in a similar fashion as other blockchain infrastructure networks work, with a big difference. The user interface is simple to use, there is no coding that is needed in order to issue a smart contract. The smart contract interface is bespoke and adheres to the need of the government or enterprise; it is made as complex or simple as is required.

The simple user interface allows for data entry to be made simple, swift and transparent. It allows the data related to a transaction for a real estate transaction for instance to simply be typed in and through the use of a blockchain enabled digital document

management system, digital documents can be attached to these smart contracts if required. Such documents would be lodged on the centralized blockchain for the government within the block for that transaction. For more advanced users a platform will be offered that would allow them to program in various programming languages which will automatically convert into a programming language to be utilized on the Pecu Novus Blockchain Network simply.

PECU NOVUS ESCROW SYSTEM

The Pecu Escrow System is a simple smart contract and is proprietary to the Pecu Novus Network. This system is part of what distinguishes this blockchain network from other systems. It was created for global business but it is a very powerful tool that can be used across both decentralized and centralized Layer-2 Blockchain systems that are built on the Pecu Novus Network. It allows for an owner of PECU, a digital token created on the Pecu Novus Network or other digital assets representing documents or other assets, to simply be sent to the receiving party and held in escrow in the receiving party's name. This essentially secures the digital transfer without incurring fees or going at risk transferring any digital asset to the wrong party or in advance for a transaction such as a real estate closing. The escrow system has a multitude of applications that all network members have access to globally. The escrow system is scalable and has the ability to be integrated into bespoke layer-2 Blockchain enabled systems built on the network geared towards government and enterprise level platforms.

THE EVOLUTION OF FINANCIAL TRANSACTIONS

The integration of digital asset payment systems and traditional banking methods are inevitable, this evolution will lead to faster transactions, limited third party involvement, increased transparency, wider acceptance and increased regulation. This will open up paths for swift and transparent transactions as it will provide irrefutable evidence of a transaction, the parties involved and proof of ownership.

In the financial industry the introduction of blockchain technology has provided traditional financial institutions with the ability to reconcile cross border transactions of all types such as fiat currency, transfer of ownership of an asset, corporate voting, financial document filing, shareholder holdings and real estate transactions. This has proven not only be more transparent than traditional methods, it has also been proven to be cost effective, time efficient, trustless and drive new revenue while reducing current costs.

BLOCKCHAIN IN REAL ESTATE

Real estate can be classified as commercial real estate or residential real estate. In addition, real estate investment can be categorized into different investment styles, namely: core, added-value and opportunistic. Core real estate tends to have a lower risk profile and most of the return on it comes from income rather than value appreciation. Opportunistic real estate is at the opposite end of the risk-return spectrum as it tends to be higher risk but offers potentially higher returns from value appreciation.

Real estate has accounted for a significant proportion of wealth for thousands of years. It is generally seen as a good inflation hedge. In addition, real estate can benefit from long-term trends such as urbanization and urban renewal. Real estate also has the potential to be a diversifier in a portfolio of traditional assets such as stocks and bonds. In general, major real estate indices have a low correlation to stock indices.

Private real estate global Assets Under Management (AUM) has risen steadily since the Global Financial Crisis in 2008. Private real estate global AUM have increased to US\$992 billion in 2019 from \$US400 billion in 2009, thus more than doubling in a decade.

Countries such as Brazil, Honduras, India, Kenya, Ghana, Namibia, Uganda, Nigeria and many others have faced tremendous hurdles as far as transparent real estate transactions and integration into national land registries. Some of the problems being faced are solutions that blockchain technology can offer.

Most systems currently being used for land registry in developed and developing countries for real estate transaction in itself are outdated systems. The weak infrastructure and paper based systems in place offer little protection against the law of adverse possession and corruption. The poor workflow and lack of technology integrated into these systems that are supposed to provide transparency have been a breeding ground for unethical practices, fraud and further corruption. It has led to economic retraction and runaway land prices as well as increased bureaucracy. Some governments have commenced the process of digitizing land records, but it is still in its early days and not efficient enough to provide the confidence needed in its accuracy and immutability.

The integration of blockchain technology into current digital systems as well as revamping outdated paper intensive systems currently being used can address and actually resolve many issues. Some of these include unclear zoning regulations, bureaucracy and insufficient government incentives due to transparency of land ownership. One other issue that has held back substantial growth is the difficulty in accessing capital and global investment; this has hampered many real estate developers in developing countries from achieving their goals. It has opened the door wide for other nations such as China to win contracts for various infrastructure and real estate development projects that should be with local companies. This is the process of Soft Power by countries like China in exchange for natural resources of countries they work with.

The integration of a layer-2 Blockchain enabled system for real estate transactions working in conjunction with current systems in place, that are centralized and built on the Pecu Novus Network will combat many issues inherent today.

REAL ESTATE TOKENIZATION FOR GLOBAL INVESTMENTS

The difficulty in raising capital has been a hindrance for many companies in developing countries, especially as it relates to real estate development. The lack of transparency in land records has created trust issues among global investors, this is not exclusive to just global investors, investors based locally face these issues as well. They may have a locally based real estate development project in place that they can touch and see but still have reservations due to the transparency in land ownership.

FGA Partners has determined that digital tokenization and the integration of blockchain technology in real estate related transactions can enhance transparency, increase global investment in developing countries and spark continued growth. The digital tokenization of real estate assets and the integration of a trustless land registry system would spark global investment interest in certain developing countries based projects and promote growth. The byproduct of such growth is a social and economic impact on the areas where the real estate development is taking place and where the growth companies are based, promoting a better quality of life for citizens.

Currently global investments into developing countries projects have been challenging, the digital tokenization of a project or a company can open up borders for many real estate developers and general companies in such developing countries. It can be done in a way that prevents cryptocurrency fraud, promotes true transparency of transactions with adherence to current KYC and AML standards via the MegaHoot Decentralized Digital Identity System.

These are some of the general challenges with real estate as an asset class:

- 1) Illiquidity and lumpiness: Real estate remains one of the most illiquid asset classes due to significant capital commitments, long, expensive transaction processes and limited public markets. Consequently, there is a high liquidity premium.
- 2) Lack of customization and low flexibility in rebalancing: While there are funds listed on exchanges that allow steady income and portfolio exposure to real estate (real estate investments trusts, 'REITs'), they are arguably an imperfect solution for several reasons:
 - a) Lack of customization (limited to shares)
 - b) Low operational efficiency (repetitive processes and siloed data)
 - c) Long settlement times (T+2/3)
 - d) Low data transparency (especially for non-listed REITs)
 - e) Low flexibility in rebalancing exposures within the portfolio (REITs typically cannot be customized)

These are some of the solutions that digital tokenization can provide to such challenges:

- 1) Targeted exposure option: First, it could be applied to single real estate assets, so that investments are not limited to only shares in a REIT or full ownership of a particular piece of real estate. Second, tokenization enables the fractionalization of exposure to a managed or customized portfolio, allowing exposure rebalancing. It promotes inclusion where investors of various levels can participate.
- 2) Cost savings from operational efficiency: Tokenization of real estate unlocks advantages for investors and asset owners in the valuation and liquidity of the asset. Fundamentally, the core cash-generating ability of the property does not change, but tokenization can unlock value via savings in transaction time and administration fees. Digitization results in reduced settlement times, near instantaneous updates on a digital register of members, seamless execution of token issuance and post-token management processes via smart contracts, and automated compliance protocols. Information becomes more traceable, transparent and less siloed with blockchain technology.

Furthermore, with tokenization, the possibility of a secondary market means that tokens can be sold securely, 24/7 around-the-clock. The liquidity premium of real estate can be reduced due to operational efficiencies gained from digitization.

Case Study: Largest Single Asset Digital Tokenization

In 2019 Liquefy was the technology provider in the tokenization of an award winning luxury hotel in Mayfair, London, valued at USD 600 million. 49% of ownership in the hotel was tokenized and sold to investors. Participating investors benefited from lower upfront capital, lower entry barriers due to fractionalization, and operational efficiencies gained in faster, more secure transaction processes. Token-holders will be able to transfer part of or all their tokens on a secondary market, further unlocking liquidity.

REAL ESTATE TOKENIZATION FOR AFFORDABLE HOUSING

Adequate access to affordable housing is a worldwide challenge. Rising costs of key inputs (i.e. land and building materials), widening income gaps and urbanization combine to create a stubborn headwind against which it is difficult to make progress. Simply stated, the number of lower income households is growing on a global scale, but the quantity of affordable housing is not keeping pace in most parts of the world. Responses vary widely by country and region and include direct government subsidies and mandates, market reforms designed to stimulate private investment, self-help programs, and a wide variety of other mechanisms designed to suit unique, local circumstances.

In countries with mature land markets, the shortage of land in high growth regions has contributed to the increase in home prices. England, for example, is heading for a property shortage to the tune of over one million homes by 2023, mostly concentrated in London and the South East. In response, government policies strive to drive up to 60% of new residential developments to recycled ‘brownfield’ sites through proactive planning, land assembly and government subsidies.

Several countries have introduced initiatives to supply affordable housing with more shallow subsidies and private involvement (e.g. England, Denmark, Ireland, Netherlands, Finland and Germany). These mechanisms depend on local government to supply free or low-cost land and the use of the planning system to enable land provision. In Dublin, private developers must transfer 20% of new dwellings on large development sites to the city for use as social or affordable housing. Cities such as Munich are also requiring private developers to include a certain percentage of social housing in new developments. In England, between 20% and 50% of larger new and regeneration developments must be affordable housing. Median house prices in developed countries can often be 2.5 to 6 times the average median annual salary. In Asia, house-price-to-income ratios are higher in many countries.

The affordable housing sector has launched studies in various countries to provide solutions but generally they fall into one of three categories:

Government-owned or public housing with subsidized rent

Government subsidies for privately-owned housing, which can come in many forms, including:

- o Cash subsidies (e.g., for rent)
- o Tax subsidies (e.g. tax credits)
- o Interest rate subsidies

Government mandates or set asides for privately-owned housing, including:

- o Absolute caps on rents and/or rent increases
- o Mandatory low-income set asides for new residential developments
- o Specific low-income set asides for site redevelopment initiatives, e.g. brownfields, industrial re-zoning, etc.

The utilization of an alternative approach that involves digital tokenization to spark private sector led involvement and incentives in affordable housing. Income producing property is generally financed under some combination of mortgage finance plus

equity contributed by investors via an investment vehicle that pools capital and provides investors with rights to cash flow and appreciation. Two key points to digital tokenization in affordable housing are as follows:

The generation of more private capital into affordable housing

Incentivize tenant behavior in a way that helps create value for private owners of such property

An emerging approach to financing real estate involves dividing individual properties or portfolios into ownership interests represented by “digital tokens” rather than shares. The advantages of a digital token approach to financing real estate are many, and include some of the following:

Increased liquidity – trading digital tokens can be accomplished on a peer-to-peer (P2P) basis over a decentralized digital asset exchange where tokens are simply transferred from one electronic wallet to another, a faster way to trade than incumbent structures

Increased transparency – because digital tokens utilize blockchain technology, a permanent record of all transactions are embedded in that blockchain, it is a transparent, immutable and clear record that is accessible publicly

Increased flexibility – because each property has its own specific digital token, it allows investors to design their own exposure in the neighborhoods or cities that they so choose. So as opposed to a predetermined portfolio of properties as seen in a typical managed real estate investment trust “REIT”, the investors have control of their investments. Because the digital tokens will be listed on a decentralized digital asset exchange, investors have to ability to swap their existing digital tokens for others that may be available to diversify their holdings across a country, a continent or the globe if digital tokens are available.

Higher valuations – Due to the fact the bar to entry is much lower than traditional real estate investments, digital tokens become more accessible to retail investors to participate in this asset class. Typically this has only been accessible to institutional and wealthy investors until the advent of digital tokenization.

Reduced costs – Peer to Peer digital token swapping / trading has lower costs associated with it in general, all the typical real estate transactional fees do not exist with digital tokenization.

Time Value - With digital tokenization for real estate the transactions are instantaneous as opposed to the paper intensive, costly and time consuming method of investing in traditional real estate or a REIT.

In summary on the digital tokenization in the affordable housing sector, it is an effective path to increasing the interest of private investment into the existing programs in place with government-led incentive programs available globally. For the reasons stated

above, digital tokenization of affordable housing can be designed with unique attributes to generate value that is not typical accessible with conventional methods. The

emergence of the security token and its acceptance by securities regulators as a unique asset class deserving of regulation has been important. It has enabled the creation of specialized real estate-backed digital tokens and exchanges of such digital tokens, which has been both timely and appropriate.

Enabling the digital tokenization of affordable housing projects can open up global investment into such projects and reduce the burden on governments. The creation of these specialized real estate back digital tokens on the Pecunovus Network allows for increased transparency, investor protection due to government involvement in such affordable housing projects and the ability to integrate each digital token created into the digital land registry if required, seamlessly.

DIGITAL IDENTITY – AML / KYC

The advent of the internet catapulted us into the digital world and, for the past several decades, our identities have become more and more fractured and redundant with each new service provider and authority. Data related to our identities and the number of instances of our identities have proliferated to an unmanageable state.

As digital forms of identity are required to conduct our lives, it is becoming clear that the current approach to identity and identity proofing is incompatible with the way we transact and behave across digital and physical worlds. The mandatory processes used to verify, authenticate and manage an identity throughout its life cycle are cumbersome and repetitive, requiring manual data reconciliation and validation processes in the background. For individuals, this fragmented process has led to daily frustrations with countless usernames, forgotten passwords, ID documents and time wasted waiting to be verified and authenticated to complete a task such as gaining access to a building, boarding a plane or getting a job.

Digital identity mechanisms such as the MegaHoot Technologies Digital Identity System, offer the promise of greater efficiency, security and trust across industries and entities. From the provision of financial services to government issued identification, digital identity enables transactions for the movement of people, funds, goods, data and other resources. Just as instances of digital identity are fragmented, there are a number of different definitions for digital identity across human, legal entities and devices and “things” depending on context and industry.

It is very possible that in the near future a broader definition for digital identity will be required to address identity for corporations, virtual entities, AI “bots”, robots and natural resources to enable a digital mechanism for identification and authentication to foster social and economic growth. Setting the stage with a blockchain enabled Digital Identity System with scalability lays the groundwork for tomorrow.

What forms the foundation of most of today’s identity regimes for people across financial services, travel and borders, public and humanitarian sectors which can be in digital form include the following:

- a) **Physical Identity:** It’s face to face with a digital interface such as a mobile device, it aims to provide the means to determine whether an entity or person is who/what they claim to be through a set of attributes such as a driver’s license, company ID, device serial number, through visual, line-of-sight means and information deemed necessary by the organization, platform or government entity.
- b) **Digital Identity :** This enables for transactions not only in the digital world but across various mediums, whether it is the Metaverse or an ecommerce platform. Through a set of electronic attributes such as a driver’s license, passport, biometric templates, mobile number and other

identifying documents, it allows an entity or person to provide the information required to determine whether they are who they claim to be.

Decentralized and centralized digital identification systems , such as MegaHoot Technologies has developed, can be used in both the physical and digital worlds, solving the issue of fragmentation of identifying information. Such systems can be used for:

c) **Medical Industry:** Where individuals with an active digital identity system on their mobile device can privately share medical information with their physicians, pharmacist, insurance provider or any other medical organization, such as a hospital. Such systems, whether decentralized or centralized would adhere to the United States Health Insurance Portability and Accountability Act of 1996 “HIPAA” in order to adhere to the highest standards of privacy.

d) **Financial Industry:** Where individuals with an active digital identity system on their mobile devices can privately share the required details to a financial institution for a banking account, brokerage account, mortgage or loan and even for closing of a real estate transaction. This would allow an organization to adhere to current Anti-Money Laundering and Know Your Customer laws in effect. This protects the individual, organization and general public while providing the government with the confidence knowing that a financial institution is adhering to current AML/KYC laws.

Digital Identity Systems will become an integral part of our society and the integration at the early stages will allow for scalability, stability and high security. It can have the ability to promote adherence to current Anti-Money Laundering and Know Your Customer regulations that are getting more stringent. The inclusion of a digital identification system will speed up the closing process of a real estate transaction, opening a bank or brokerage account, provide instant proof of identity as required and it can be integrated into corporate platforms, employee related systems and much more. One of the keys is putting restrictions on what an organization can extract or not, this protects the general public’s privacy and provides a much more secure system that can be trustless.

According to Bloomberg news on October 17, 2022, the country of South Korea aims to boost their economy with the integration of a Digital Identification System for the entire country. Citizens of Korea will have until 2024 to transition to a full digital identity system. The Korean government estimates that the economic value of a Digital Identification System is approximately 3% of their entire gross domestic product (GDP). On July 1, 2023 the decentralized digital asset swapping system HootDex will integrate the MegaHoot Technologies Decentralized Digital Identity System.

DIGITAL TOKENIZATION ON PECU NOVUS

The creation of a digital token on the Pecu Novus Network is more than you would find on networks like Ethereum. All token creation is vetted to prevent cryptocurrency fraud at the source, companies are required to present documents such as company registration documentation and certificate of good standing, they are required to verify their identity as well as provide publicly disclosable information that the general public can view. This information would include the owners of the company or project, their address, website information, pitch decks and other information for due diligence purposes. Not all documents would be generally available due to proprietary content that may be involved however there are “Deal Rooms” that are set up for tokenized companies and projects that allow them to provide full transparency to their investors and potential investors.

Incorporating this methodology not only increases transparency but it increases interest from global investors, it alleviates the concern of cryptocurrency fraud globally and has the ability to provide transparency to governments as required.

Digital tokens that are created on the Pecu Novus Network will be onboarded to a decentralized digital asset exchange in order to provide transparency, investor exposure to other projects and over time liquidity for such digital assets.

One of the key points of tokenization on the Pecu Novus Network for companies and projects is that global investors are given an option, their digital tokens provide them with the ability to convert into common stock in the company at a later date so they can enjoy the growth of the company or they can find liquidity for their digital asset. Normally investors are not given an option, they are either locked into a private company or project for years until it bears fruit or they are stuck in a volatile cryptocurrency market filled with fraudulent Initial Coin Offerings “ICO”, Security Token Offerings “STO” and Initial Exchange Offerings “IEO”.

Since digital tokenization on the Pecu Novus Network does not entail any direct offering such as an ICO, STO or IEO, the investors are not subject to bad actors, volatility and potential pitfalls that can befall unwitting investors.

REMOVING BARRIERS AND PROMOTING INCLUSION

Early stage funding is typically reserved for venture capital firms or wealthy individuals and remains off limits to the average retail investor. Through tokenization, companies are able to democratize what has been closed off to the average investor prior to the advent of digital tokenization. The reduction of barriers to entry for global retail investors whilst providing access to a previously unobtainable market through buying and holding a single token. This allows investors that normally would not be able to participate in a private company the ability to do so through the digital tokenization process. This is all predicated on the laws of the land and jurisdictional restrictions that may be in place.

The utilization of digital tokenization coupled with a decentralized or centralized blockchain enabled land registry and real estate transaction system would promote transparency. This would garner confidence from not only global real estate investors but also from local investors in developing countries. It would garner investor interest in more than just real estate but the tokenization of projects and other assets would widen the spectrum of global investment. It would allow local investors to invest in local real estate or company projects and participate in the global evolution which is blockchain technology.

CONCLUSION

Tokenization of Assets: Tokenization of real estate assets and other projects can provide transparency to a global audience if the companies and projects are vetted properly. The vetting process needs to adhere to a certain standard which allows viable startups to attract local and global investment while adhering to regulatory framework. Real estate projects must also be properly vetted to insure full transparency of not only the project but of the company behind the project. This transparency will breed market confidence and allow for locally based companies and projects to attract global investment. This will provide an economic and social benefit for the villages, towns and cities across most developing countries, it will spark growth, generate tax revenue for municipalities to build infrastructure, enhance the quality of life for citizens and assist local companies with expansion globally. It is a multi-prong approach that would be a long term benefit to most developing countries.

Land Registry: The current land registry systems in place are inefficient, even digital efforts are still paper intensive and offers little security to avoid land disputes and fraud. The integration of layer-2 Blockchain systems built on the Pecu Novus Blockchain Network would create an immutable, transparent, trustless and user friendly system that adheres to the current government regulatory framework in place. This is something that has been a challenge with the current digital and paper intensive systems globally. A centralized blockchain enabled system would provide real estate attorneys, professionals, the government and the general public with a true account of all ownership records and transactions records as they occur, wherever they may occur.

Land registry systems must be scalable to encompass land records of every property from the villages to the cities, a true national land registry that people can trust. This would eradicate land disputes, land grabbing and land fraud. This can be massive cost savings to the governments by eliminating the paper, fraud, land disputes and more. Sweden's land registry authority, the "Lantmäteriet" have been testing a blockchain enabled land registry system which they estimate the cost savings to their taxpayers will be in the range of \$US106 million simply by eliminating paperwork, reducing fraud, and speeding up transactions.

This would be a legacy project for the current any administration of most developing countries, it would build trust in local real estate projects, companies and the government

as a whole. We believe that the additional revenue generation for local companies of all types, from real estate developers to agriculture, could be in hundreds of millions of US dollars in the coming years due to the integration of layer- Blockchain enabled projects build on the Pecu Novus Blockchain Network. This all starts with building trust in the land registry system and this entails building an immutable, transparent and trustless system that not only locals can have trust in but also the global investment community can build trust in. This will open the doors globally for these companies and in turn increase commerce, create opportunities, create jobs, offer a better quality of life for local communities and increase tax revenue through growth, as shown in this paper.

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