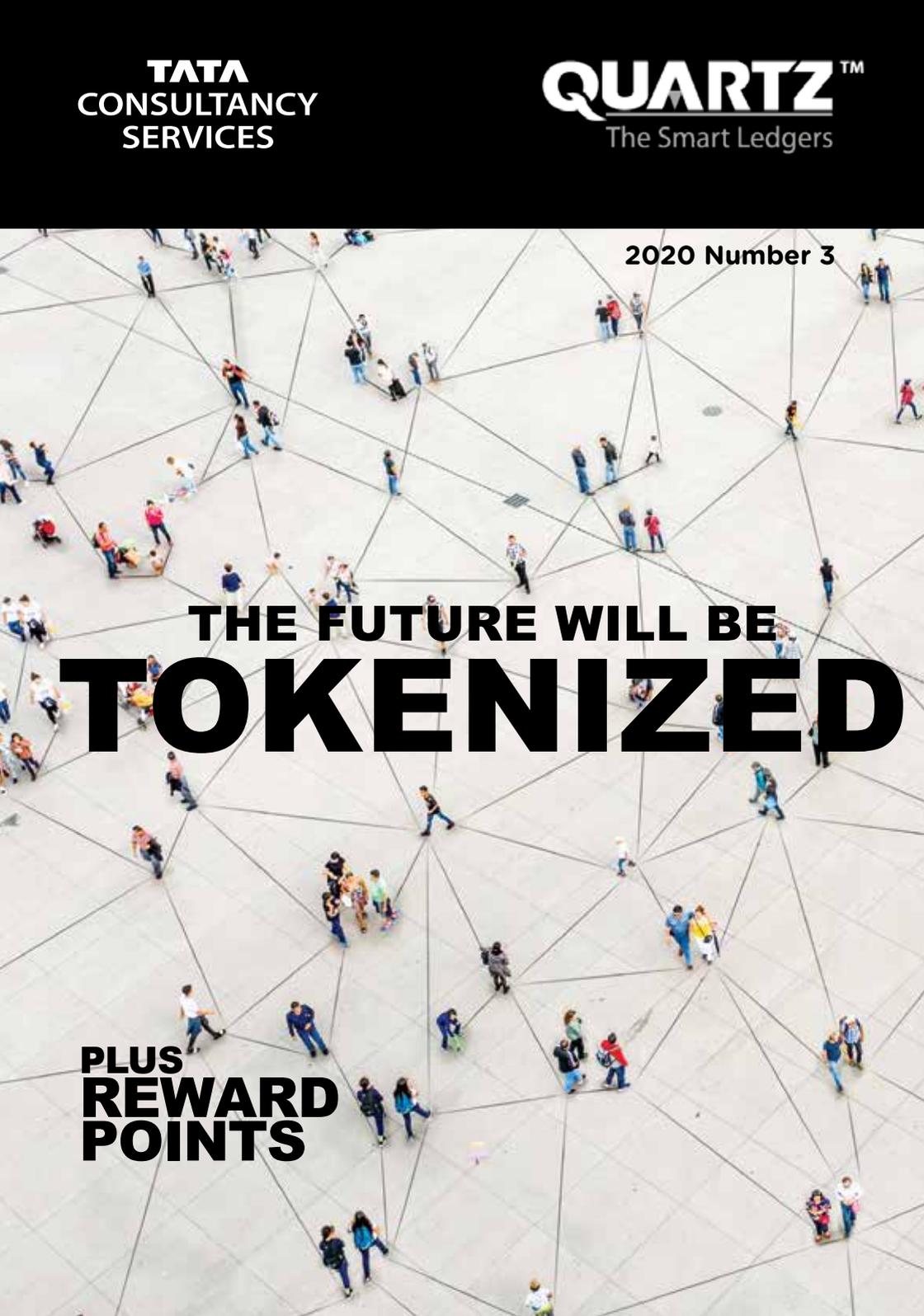


2020 Number 3



**THE FUTURE WILL BE
TOKENIZED**

**PLUS
REWARD
POINTS**

SHARED LEDGERS,

FROM THE EDITOR

Quartz is building ecosystems that bring together participants in industries including energy and utilities, government, financial services and real estate.

Starting with this issue of our redesigned Quartz magazine, we feature our latest thinking about the most promising business opportunities for Smart Ledgers, outline the most innovative use cases being deployed using distributed ledger technology, and showcase the advantages of our new products and solutions. In future issues, we'll share original research and expert POVs that will further enhance your understanding of the potential of blockchain technology.

We're also excited to share stories about what our customers are doing with Quartz: The Smart Ledgers.

One of our customers went live in mid-April with a next-generation Internet of Things (IoT) + Blockchain platform, powered by Quartz. This was in the midst of the COVID-19 crisis, with travel and on-premise work brought to a complete standstill.

The customer is a leading energy, marine and urban development group that operates worldwide as a provider of solutions throughout the energy and utilities value chain. The new Quartz-powered platform allows buyers and sellers to transact in Renewable Energy Certificates (REC), thereby

SHARED STORIES

enabling them to meet their green energy requirements. The platform was developed using Quartz DevKit and integrated with IoT using Quartz Gateway, which allows for the energy generated to be tracked using smart meters installed on solar panels.

The use of blockchain technology ensures transparency and integrity along with real-time tracking and management of every transaction covering a REC's life cycle -- from generation and registration to transfer and eventual retirement.

Our collaborative efforts continued to maintain seamless operations despite the challenges of Covid-19, resulting in an important deployment for the entire energy and utilities marketplace.

We look forward to sharing your stories in future editions of Quartz. ■

Happy Reading,

Anjana Srikanth

Editor, Quartz magazine

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Stay tuned for QuartzCast, our upcoming series of podcasts, videos, and interactive content.

QUARTZ™ CAST

THE FUTURE WILL BE TOKENIZED



Tokenization
democratizes
access to
high-net-worth
asset classes

By **R Vivekanand**,
Vice President, TCS



For retail investors, the typical portfolio consists of a home mortgage on a primary residence; indexed mutual funds held in retirement accounts; cash or cash equivalents in a bank account; and maybe some stock options.

This portfolio is far from ideal. First, the mortgage is overly exposed to the specific risks involved with the property and local market conditions. Second, the investment options are largely limited to financial instruments issued by publicly listed companies, offering only indirect benefits from growth in huge segments of the economy. Third, bank accounts are yielding near-zero (or negative) returns.

High-net-worth investors have a much wider range of investment options, including residential apartment buildings, commercial real estate, illiquid assets, artwork, high-end collectibles, and private equity. These lucrative options provide access to significant opportunities for wealth creation in ways that are largely inaccessible to retail investors.

For example, real estate represents one of the most dynamic segments of the global economy, and yet retail investors are limited mostly to owning shares in listed companies that benefit indirectly from property appreciation. Although retail investors may also buy shares in real-estate investment trusts (REITs), these targeted investment vehicles typically involve high set-up costs, high maintenance fees, and limited choice in investment properties.

The reality is that investing in commercial real estate calls for a level of financial commitment beyond the reach of all but the wealthiest, high-net-worth investors. The same holds true for other large-ticket alternative assets such as artwork, jewelry, or prestige properties. The potential returns are massive, but those asset classes have limited access to all but the wealthiest investors.

It doesn't have to be that way.



What if any investor could invest small amounts directly into any number and any combination of high-value properties and assets?

What if anyone with surplus income, young and old, whether from a developing nation or an advanced economy, could participate directly in the income streams and appreciation of real estate, the world's most popular asset class?

What if direct participation was available for other kinds of valuable assets previously available only to high-net-worth investors?

That's the promise of tokenization.

Tokenization is a streamlined, blockchain-based approach to asset securitization. By making it possible for individuals to participate directly in asset classes otherwise beyond their reach, tokenization will democratize access to investments, unlock the value of sizeable asset classes, and deliver widespread economic and social benefits.

In the current investment environment, you're obliged to involve a whole set of intermediaries for every single trade: an investment bank to assemble and price an offering; a brokerage firm to buy and sell listed assets; and custodians and depositories to keep track of the electronic records.

Tokenization would enable people to invest directly into high-value assets without being obliged to go through the entire chain of intermediaries.

Only minimal infrastructure would be required to create and run a distributed ledger for tokenization, which would be optimally run by a consortium of





trusted and responsible entities as a managed utility-style service, with a high security and provenance guaranty. With a tokenization utility in place, virtually any asset could be securitized. Tamperproof, blockchain-based distributed ledger technology (DLT) makes tokenization quick, easy to manage, and highly secure. Those tokens could be bought and sold in any fractional quantity, enabling frictionless participation in high-value asset classes.

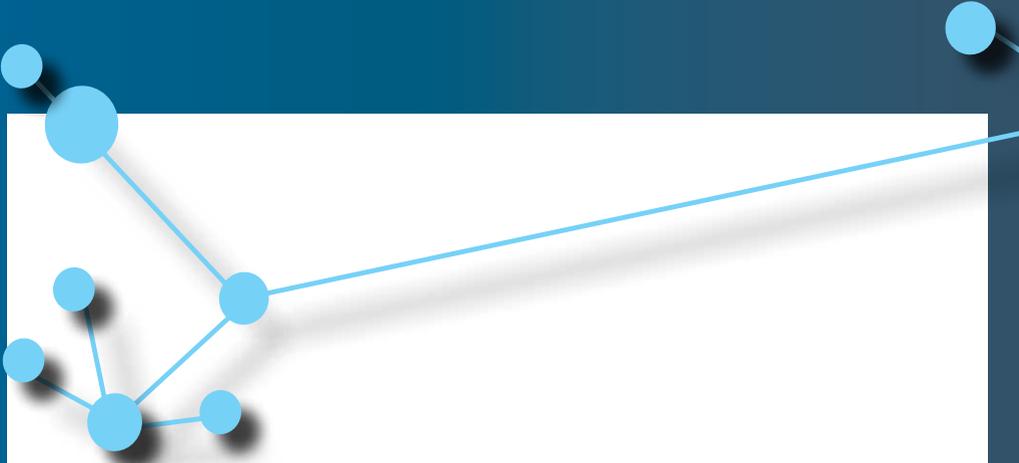
A tokenization utility would allow any type of institution, whether real estate companies, museums, or municipalities, to issue tokens representing ownership stakes in their underlying assets. Moreover, an institution could make its own decisions as to subscription and pricing mechanisms, without needing to compensate investment bankers for privileged access to a small, concentrated group of buy-side investors.

Typically, high-value assets are exchanged solely between a limited pool of high-net-worth investors. With tokenization, the pool of buyers and sellers would expand to include the entire world of retail investors. Investors would participate in a low-friction, high-liquidity marketplace for trading tokens in any national currency and at every conceivable order size.

For the first time, retail investors would be able to purchase shares in high-value assets, in any denomination, with the ability to trade those tokens within a highly liquid, global marketplace. This would rewrite the rules for asset allocation, making it possible to create broadly diversified portfolios with higher levels of safety, appreciation, income, and liquidity than can be achieved through traditional methods.

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The democratization of access to investment vehicles will transform entire economies, and the effect will be transformative in developing countries. All too often, ambiguities and irregularities in antiquated, paper-based recordkeeping systems still in use mean that inheritances and bequests go unclaimed. The transition to blockchain-based DLT will provide immediate benefits through improved recordkeeping for ownership claims, while at the same time, establishing the necessary foundation for tokenization of assets will spur rapid economic growth.

A historical precedent for tokenization can be found in the electronification of financial markets in the late 20th century. From 1970 to 2000, virtually every financial market in the world transitioned from paper to electronic recordkeeping. Those organizations are still with us today, such that if you want to own a share of just about any widely traded financial asset, you're required to go through many of the same intermediaries who had made the early transition from paper to electronic records.

With tokenization, we expect an equally widespread transition, except that this time, a new class of low-cost, consortium-based utilities will enable the largest possible pool of investors to participate directly in high-quality investible assets with the lowest possible friction.

Moreover, tokenization of assets leads the way toward "smart contracts" that will replace expensive and time-consuming business processes such as property transfers and bequests. (We'll talk more about smart contracts in a future issue.)

We are at the beginning of an entirely new cycle in economic history. As we look ahead to how financial assets will be created, held, bought and sold, the future will be tokenized.



ASSETS TOKENIZATION

SMART CONTRACTS

ART

REAL ESTATE

RECORDKEEPING

BLOCKCHAIN
DEMOCRATIZE

customers to visit a separate third-party site where they have to figure out for themselves the best value among a limited menu of pre-approved merchants. Typically, third-party reward programs aggregate a collection of the most high-profile brands in each category, leaving out popular local favorites and the hottest new merchants.

Finally, once a reward has been selected, the customer may face a significant delay in delivery, such as waiting for a physical gift card to arrive in the mail.

The combination of slow accrual, an underwhelming selection, and lackluster fulfillment tends to reduce the excitement associated with a rewards purchase, and these challenges increase the risk of customer attrition.

In other words, reward points aren't worth much to someone who has to struggle to spend them. While the current system for reward points may work well for motivated points collectors who avidly comparison shop for the best deals on card offers and redemptions, a consistently high level of engagement and interest is simply not practical or desirable for most people.

The current system also has serious drawbacks for the card-issuing banks. Each issuer has to maintain expensive systems to track reward points, fulfill reward redemptions, and reconcile customer accounts across an extended settlement period. Furthermore, banks have to carry unused reward points as liabilities on their balance sheets, which can complicate financial results given changes in redemption rates or accounting rules.

It's axiomatic that reward points are a form of currency.

The core problem is that it's a highly illiquid currency that's only exchangeable into airline miles, other reward points, merchant-specific gift cards, or (at a significant discount) cash.

It's also a highly fragmented currency, with each bank issuing its own reward points that cannot be pooled with points from other issuers.

Moreover, each issuer is responsible for the expense of recordkeeping, accounting, and reconciliation of reward points. All but the largest banks outsource their points management to third-party vendors, who in turn offer largely undifferentiated services.



Introducing a new approach for the rewards ecosystem

A common currency for reward points would need to encompass the entire ecosystem, including card-issuing banks, credit card networks, merchant acquiring banks, payment gateway services, and merchants. The overall complexity of this undertaking explains why a common rewards currency hasn't been feasible - until now.

Blockchain technology now makes it possible to create distributed shared ledgers that are robust and scalable enough to support an entire ecosystem without the difficulty and expense involved with traditional database deployments.

With a private, permissioned blockchain, each participant in the ecosystem can perform verified updates on a single source of data.

Issuers will be able to locate their customers' accounts on the shared ledger and credit them with reward points immediately based on real-time spending.

Merchants and their acquiring banks will be able to debit reward points according to real-time customer instructions, whether delivered in-person or online. ■

Benefits for customers:

- Consolidates reward points across issuer relationships
- Improved ability to make higher-value purchases
- Flexibility in using reward points without restrictions
- Vastly superior customer experience

Benefits for merchants:

- Higher customer spending
- Easier acceptance of rewards points
- Custom offers and promotions



Shareholder meetings in the post COVID world

Annual General Meetings, or AGMs, have long suffered from low levels of participation from retail investors.

The present COVID-19 scenario, with meetings happening electronically the world over, opens up the opportunity to shift the paradigm for AGMs. With widespread adoption of online and web meetings, shareholders can participate in AGMs from the comfort of their homes, leading to greater participation in voting and higher confidence in the company.

Our **General Meeting Services** solution from **Quartz - The Smart Ledgers** provides a real-time digital view of AGMs for shareholders, while also significantly streamlining operations involved in conducting such events. Automation makes it simple to set up an AGM, to collect and consolidate votes, and to conduct real-time computation and dissemination of voting results. The Blockchain-based tamperproof ledger ensures the sanctity of votes cast, and the Cloud-ready technology provides real-time access to all stakeholders.

Reach out to us at tcs.quartz@tcs.com for a demo.

TCS BaNCS customers in the banking and financial services industry connect through the global ecosystem of BaNCS Industry Network, with applications in corporate actions, reference data publishing, settlements, and claims processing.

Watch our video at:

<https://www.tcs.com/quartz-blockchain-solutions>

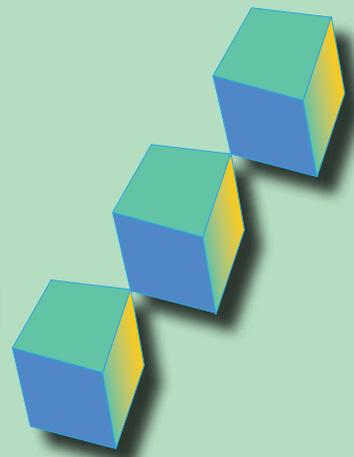
WEBINAR

Blockchain: What's in it for enterprises?

January 28, 2020 — Martha Bennett, Vice President and Principal Analyst, Forrester Research, shared her views from her extensive research on blockchain technology. Bennett outlined how key strategic developments with blockchain (or DLT) are going into production today, how the technology has matured, key success factors for adoption and the outlook for 2020 and beyond.

Listen to the replay: <https://www.tcs.com/blockchain-whats-in-for-enterprises>

QUARTZ™ DEVKIT HELPS ENTERPRISES BUILD BLOCKCHAIN APPS 40% FASTER



New low code development toolkit enables rapid development of high quality blockchain applications on popular blockchain platforms

In December, TCS announced the general availability of its Quartz™ DevKit, an intuitive, low code development kit for enterprises to quickly build and deploy blockchain applications on any popular blockchain platform.

The DevKit abstracts out the complexity of the underlying blockchain technology and provides a low code approach to build and deploy blockchain applications on any preferred blockchain platform – such as Hyperledger Fabric, Ethereum or R3 Corda – while allowing for platform-specific code to be written as an extension over the pre-built templates.

Using its pre-built components for platform setup, administration and deployment, platform security authentication, encryption, and node as well as identity and user management, programmers can write smart contracts 40% faster.

Its intuitive, web-based integrated development environment helps programmers seamlessly design, compile, package, and deploy business code on their preferred blockchain platform. Additionally, the DevKit's integrated code quality analyzer ensures that the smart contracts incorporate best in class coding practices.

“Many of our customers, across industries, are leveraging blockchain technology to establish frictionless transactions across their extended ecosystem. We developed the Quartz DevKit to help their teams rapidly put together high-quality pilots using smart contracts on any platform with reduced coding effort. We have received very positive feedback from our pilot customers, and we are pleased to make the DevKit available for use at scale,” said **R Vivekanand**, Global Head, Quartz, TCS.



Co-existence. Integration. Interoperability.

Quartz DevKit is an intuitive, low code smart contract development kit designed to help software developers introduce blockchain into their business processes, and generate, compile, package, and deploy business code on the blockchain. The Quartz DevKit also comprises a standard set of architectural features covering security, data privacy, access controls, user management, audit trails and logging framework. These are together represented as Quartz Foundation Components.

Quartz Gateway is a single, smart channel that can help integrate applications with various blockchain platforms, industry networks and ecosystems. Using the Quartz Gateway, organizations can connect seamlessly to the blockchain, thereby eliminating the need for large scale and continuous changes to be made to their existing systems. It facilitates interoperability between blockchains and with other messaging networks. It also supports orchestration of services across multiple blockchain platforms.

Quartz Smart Solutions comprise a set of “Designed for blockchain” business solutions across industries, which enable blockchain-driven transformation. Some of the readily available Smart Solutions include Contract Authoring, Reward Points, Trade Settlements, Announcements, Crypto Services, Loan Securitization, Facultative Reinsurance, Cross Border Remittances, Contract Performance Monitoring, and KYC, among others.

