

Editorial

Achim Jedelsky Berlin, 15 July 2020



Dear reader

I am very happy and proud to be able to present to you the second FIBREE industry report.

In many situations 'the second' doesn't get as much credit as 'the first'. With last year's FIBREE industry report we entered a white space during a very favourable time: the economies were booming and new technologies were the 'new kid on the block' in the real estate sector. Now, with the second report, we have to compete with the standards we set in the old report. And we find ourselves in an environment that is less sure about blockchain than in 2019. The hype around blockchain that we still felt last year eased off dramatically. This is easily proven with the numbers of blockchain related real estate products we found this year: about 300 - compared to last year when we still

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FIBREE INDUSTRY REPORT 2020

listed more than 500 products. The upside of this development is that we are now able - with less noise around the technology to focus on delivering true value to the industry.

The year 2020 also brought the COVID-19 outbreak that paralysed more or less the whole world, loved ones died, healthcare systems and economies were close to collapse and many things we took for granted a year ago, were suddenly in question or out of reach. We at FIBREE also questioned if we should issue this report now - or if we should wait for things to go back to normal - but what is normal in these times? I am glad that we stuck to our original plan and did not postpone the release. For all we know, this is the new normal.

Both, the ending of the hype and the pandemic demonstrated to us that FIBREE - as a distributed organisation - is well prepared. We are today active in 30 countries at 73 locations with 97 active Regional Chairs at the core of the organisation. Working together remotely already was part of our DNA. We successfully started working groups for topics like tokenisation, land registry, unique object identifier, governance and COVID-19-response that are being run remotely across time zones and countries. We collaborate with associations, universities, companies and startups around the world on all these topics and share the gained knowledge across our network. I'm proud to see that FIBREE is widely acknowledged as a professional and reliable organisation in the field of blockchain technology for the real estate sector.

The continuous support of our sponsors and partners and the energy and enthusiasm of our network makes me very confident that FIBREE will also succeed in future to tackle the challenges of the new normal.

Enjoy reading this report!

Achim Jedelsky President of FIBREE

Imprint

The FIBREE Industry Report is the most important yearly contribution of FIBREE to the market. We provide you with in depth articles and a worldwide overview of the latest developments in the field of Blockchain and Real Estate.

For the creation of this 2020 edition a working group has been formed within FIBREE, consisting of the following people:

- » Achim Jedelsky (Germany)
- » Florian Huber (Austria)
- » Sagar Brahmbatt (Australia)
- » Roland Farhat (Germany)
- » John Dean Markunas (USA)
- » Arnab Paul (India)
- » Emanuele Rizzardi (Italy)
- » Fabian Süß (Germany)
- » Yael Tamar (Israel)
- » Steven Inscoe (Russia)

Also special thanks for their contribution and effort to the editorial team: Jo Bronckers (Netherlands), Axel von Goldbeck (Germany), Ranga Krishnan (USA), Chris Dorian (Australia), Jan Veuger (Netherlands), Ido Shaham (Israel), Alexandra Levin (USA), Walter Strametz (Switzerland) and Alan McNamara (Australia)

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Design and layout



PQ Maximilian Huber / www.eracht.at

Get in touch with FIBREE

FIBREE aims to continue the research and knowledge exchange about blockchain and real estate developments. FIBREE invites product-suppliers, real estate organisations, legal firms, startups, research organizations, press or other interested organizations that want to get in touch with FIBREE to reach out to us by sending your request to: ask@fibree.org

If you'd like to become a participant and eventually take an active role within FIBREE, or if you want to put your startup in the spotlight, please check the connect-part at our website www. fibree.org and subscribe to the engagement of your preference.

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Contents

Articles

- 06 Climate Change vs. Land Governance & Land Tenure Handling Pressures: Upholding Rights with Blockchain Technology, by John Dean Markunas
- Unique Object Identification for Real Estate, by 11 Jo Bronckers, Axel von Goldbeck, Ranga Krishnan, Chris Dorian, Yael Tamar
- Getting Truly Sustainable in Real Estate. How a 14 Blockchain-Based Approach Can Help, by Roland H. Farhat
- 19 Automating the chaos: Intelligent construction contracts, by Alan McNamara
- Blockchain, IoT, and AI are intersecting. 24 Convergence is the keyword. Interview by Anne Hurenkamp with Jan Veuger

Global Network			
42	Featured Companies		
44	Global Network		
46	Country Analysis		
106	Product Database		
114	Global and Regional Sponsors		

26	Real estate tokenization for uncertain times, by Yael Tamar
28	Tokenization: Superpowers for property values, by Yael Tamar and Ido Shaham
30	U.S. Blockchain Law 101: Tokenization, by Alexandra "Sasha" Levin
34	The future of FIBREE governance, by Walter Strametz
36	The state of blockchain in real estate, 2020, by Florian Huber

- **115** Partners
- **116** Executive Board
- **118** Academic Board
- 120 Chairs

Climate Change vs. Land Governance & Land Tenure Handling Pressures: Upholding Rights with Blockchain Technology

John Dean Markunas (Regional Co-Chair New York City, Chair Land Registry Working Group)

ccording to a 2018 U.N. climate report, the world has only Aabout 12 years to reduce carbon emissions, global warming and the worst impacts of climate change. The impacts are affecting many aspects of earth's ecosphere: on land, sea, and air. It is affecting human health, livelihoods, safety, and society -especially in developing countries, where those who suffer most from climate change have done the least to cause it. [1]

Climate change phenomena include rising sea levels from melting ice caps along with changes in temperatures, rainfall patterns, and water availability. Climate destabilization from extreme weather events such as drought, flooding, mudslides, dust storms, and wildfires are occurring with increasing frequency and intensity. Also contributing to climate disruption are human land invasions which contribute to deforestation, considerable land use changes, (intentional) fires, increased cattle ranching, uncontrolled use of fertilizers, water poaching, and other activities. These usurpations (likely illegal) occur mostly in areas with unclear land rights.

Most devastating is the impact climate change is having on the planet's land sector. Under the land sector umbrella -- land use. land governance and land tenure -- climate change is bringing about risks we haven't considered before, such as forced human displacement. This has created a new type of refugee - the climate refugee.

The Global Humanitarian Forum Human Impact Report estimates that climatic disasters impact 375 million people every year and that, by 2050, climate change will have forced up to 750 million people to emigrate. A report produced by the Environmental Justice Foundation (EJF), ^[2] highlights that since 2008, an average of 21.7 million people have been displaced each year by extreme weather-related disasters - the equivalent of 41 people every minute! 95% of this human displacement has occurred in developing countries.

In Bangladesh, tens of millions of people live and farm at sea level. They will be forced to move as their land is inundated with salt water. In Indonesia, around 300 million people live in close proximity to the coast and are vulnerable to sea level rise. Some island nations such as Tuvalu, the Maldives, and Vanuatu are set to disappear altogether. Entire nations forced to flee.

"Beyond Borders: Our Changing Climate – Its Role in Conflict and Displacement", Environmental ustice Foundation, February 11, 2017

Developed countries are not immune to human and business forced migration

In the United States, shoreline states and their counties contain almost 50 million housing units. At least US\$1.4 trillion worth of homes and businesses sit within about 1/8th mile of the coast.

Low-level scenario projections indicate that the frequency, depth, and extent of both high tide and more severe coastal flooding will increase rapidly in the coming decade. This is likely to destroy, or make unsuitable for use, billions of dollars worth of property by the middle of this century. There are 13.1 million people potentially at risk of needing to migrate due to a sea level rise of six inches by 2100. These market indicators have the potential to heavily influence the thinking and practices of land administration officials, investors, property developers, appraisers, surveyors, lenders, servicers, mortgage insurers, and the mortgage-backed securities industry. And, of course, these indicators will have an extreme impact on the people living on land susceptible to coastal flooding.^[3]

In Europe, with a long-term forecast of melting sea ice, increasing heat waves, heavy rainfalls, and decreased water resources in its semi-arid regions, the regional impacts of these climate changes will put Europe at higher risk of inland flash floods, more frequent flooding and erosion, greatly reduced snow cover and winter tourism, extensive loss of species, and reductions of crop productivity in southern Europe.

Snow skiing in Norway? Not for long. Global warming has threatened winter sports in general, and skiing in particular, around the world. But nowhere is that felt as strongly as in Norway. For many Norwegians, skiing is a combination of personal passion and patriotic identity.

Another unseasonably warm winter this year has left much of the country without snow. The Norwegian Meteorological Institute reports that the City of Oslo's winter temperatures have hit a record high, with average temperatures in December, January and February (2019-20) about 1.6 degrees Celsius (almost 3 degrees F) higher than normal.^[4] For several years now, the Norwegians have been busy creating a new industry: artificial snow and indoor ski arenas.

Climate change and lack of trust are the most pressing threats to humanity.

Only two years ago there was little global discussion about climate change and blockchain. Increasingly, blockchain, along with other new technologies that make up what is being called the "Fourth Industrial Revolution,"^[5] are now being discussed as one of the latest solutions to combat climate change.

The biggest obstacle in effectively fighting climate change is lack of trust. "Trust in business is the expectation that the other party will behave according to the four principles of integrity: honesty, consideration, accounting and transparency."^[6] We know that blockchain is a decentralized and distributed censorship-resistant electronic ledger system that provides immutability, accountability through time-stamping, auditability, and nonrepudiation via digital signatures. By design, it interlinks a continuously expanding list of records or data stored securely across a peerto-peer network. Every participant with access can simultaneously view information with no single point of failure, creating trust in the system as a whole - the trust machine.

The Paris Agreement

Blockchain is perfectly and unequivocally adaptable for use in the historic Paris Agreement, ^[7] negotiated and signed by 196 nations in 2016. The Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C, recognizing that this would substantially reduce the risks and impacts of climate change.

At the complicated intersection of climate change and trust, the Paris Agreement established a universal reporting and mitigation related system of measurement, reporting and verification (MRV), which serves as a metric for a variety of somewhat complicated and opaque domestic and international purposes.

According to the agreement, each country must determine, plan, and regularly report on the contribution that it undertakes to mitigate carbon emissions to levels agreed to in the agreement. In turn, developed countries had committed to mobilize \$100

Developing countries suffer from over 90% of climate change's effects. The 50 least developed countries contribute less than 1% of global carbon emissions. (Global Humanitarian Forum, Human Impact Report)

³ The National Climate Assessment Report, 2018

Oslo is the capital and most populous city of Norway. It aims to cut emissions by 36% from 1990 levels by the end of 2020, and 95% by 2030. To achieve this, the city council has intro duced its own climate budget – possibly the first of its kind in the world. Oslo holds the title of European Green Capital 2019.

⁵ Building on the widespread availability of digital technologies that were the result of the Third Industrial, or Digital, Revolution, the Fourth Industrial Revolution will be driven largely by the convergence of digital, biological, and physical innovations. Along with blockchain it includes new technologies such as the Internet of Things (IoT), Artificial Intelligence (AI) and the emergence of Big and Open Data.

This definition was developed in The Naked Corporation, Don Tapscott and David Ticoll (New York: Free Press 200.3)

The Paris Agreement signed in 2016 is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), dealing with greenhouse-gas-emissions mitigation, adaptation, and finance

Blockchain is the perfect climate change solution to quickly, easily and inexpensively trust but verify that a country's actions, recorded on the chain, meet the predetermined Paris Agreement goals. In turn, the chain can be used to monitor fundraising and climate financing and ensure that once committed, the funds are spent in accordance to agreed-upon terms.

Blockchain innovations and adoption can also lead to 1) smart contract energy deployment, 2) smoother international climate finance transfers, 3) fraud-free emissions management and 4) better green finance law enforcement ^[8]. Overall, blockchain and smart contract deployment offer recording, tracking, management, and sharing solutions across a wide area of energy markets and climate change related activities.

Blockchain, Climate Change and Land

Blockchain is also perfectly suited to help us mitigate and adapt to changes as they pertain to the socioeconomic implications of physical climate risks. These risks are affecting land use and governance, land registration and tenure, financing and global real estate investment strategies.

The benefits of blockchain adoption in all sectors of a globally fragmented real estate industry have been thoroughly explored. The sectors include mortgage financing, investing, transactional (buy-sell-lease) and title and deed recording, etc.

The friction or pain points in real estate stem from centralization and fragmentation where information, documents and data are contained and managed in siloed environments. And there are many pain points. Here are a few:

- » Government bureaucracy
- » Non-interoperable/proprietary software
- » Human error
- » Incomplete and insecure property data
- » Unnecessary third parties
- » Expensive due diligence & high transaction cost

- » Process inefficiencies
- » Fraud/Collusion

Land Governance, Land Registry and Land Tenure

Climate change disruption has exacerbated the friction in real estate. It has exacerbated the problems and challenges already associated with land registry, land administration and land tenure, creating new risks requiring new solutions.

These new risks include changing land uses (highest and best use), availability of land suitable for human settlement and agricultural production, growing competition for access rights to productive natural resources such as water supply, decreased food production, greater potential conflict over the legitimacy of existing property rights, forced displacement, short-term and long-term migration, land and resource degradation, and alterations in the valuation of land, built property, and natural resources. Climate disruptions will most likely increase fraud and collusion in land registration especially in developing countries which are still dependent on paper-based and/or digital registry recording systems.

Fighting climate change and its effects on the land sector with blockchain takes on dual channels or sources of information and data. Both channels are dependent on the decentralization and unification (via blockchain) of data. With the build-out and deployment of these two data channels, (not mutually exclusive) land administration officials and other stakeholders in the land sector will be able to more efficiently aggregate and study the data.

The first blockchain channel contains climate change information; climate data, geo-spatial data, reports, research and studies. There are many global sources of information which, if deployed on-chain, would be accessible for land governance officials to devise and integrate new or revised land policy measures for a particular geographical region; village, city, province, state, rural land, etc.

The second blockchain channel contains land and property data to improve land registration systems and bolster land tenure security - which in turn helps combat climate change.

Land Registration is a process of officially and legally recording land or built property rights through deeds or title certification. It publicly shows that there is an official record of ownership with inherent rights through that ownership.

The land registry office in virtually all countries is typically where:

Matters concerning ownership, possession, or other rights of real property are recorded and preserved;

Records are maintained regarding land and other real estate to properly assess its value and to collect property taxes;

Internal confidence among the people, commercial enterprises and government within the region are manifested and promoted (However, this is not always the case. It is too easy to pick a country which does not have the trust of its people);

The documents and data that are recorded usually show legal ownership and provide individual and enterprise protection.

Land Registration Benefits

The benefits of legal ownership are many. It provides us with a bundle of rights indispensable to economic development and our social wellbeing. We can build on our land, make improvements, mortgage it, lease it, exclude others from it, sell or give away or even abandon it among other ownership rights.



Bundle of rights

Land Governance or administration involves institutions which require effective policies and processes that can determine, record, and disseminate information about the tenure, value, and use of land. It is guided by policy and enforcement. Sound policy is built on interpreting quality information. Sound policy provides transparency, strengthens accountability and creates a clearer path to enforce regulations. Land administration depends heavily on data.

"The production, availability and accessibility of reliable data and statistics are of fundamental importance in monitoring and in taking evidence- based decisions for good and governance. The demand for data as evidence is increasingly focused to monitor global and national developmental status and targets. Data has a potentially revolutionary effect on economic analysis and policy

making." [9]

However, in many areas of the world developing sound policies is hampered by the lack of access to quality data. The current legacy methods, solutions and techniques are fragmented. They don't perform well in creating and mining data. A starting point towards institutionalization of proactive climate change and land data integration into the land policy and governance space is blockchain.

The use of blockchain, as we've learned, creates permanent records and histories of transactions from property and land transactions and the people who live there - supplying us with an abundance of reliable and secure data.^[10] Stakeholders and policy makers using this technology will be able to leverage both the climate change and land and property data by analyzing it to improve land governance policy formation and policy enforcement - effectively providing solutions for climate-induced human and business migration, changing land boundaries and uses.

Land tenure represents the relationship that individuals or groups (e.g. indigenous tribes) have with land and land-based resources such as water, pastures, minerals, trees, etc. Its rules or customs define the ways in which property rights to land are allocated, transferred, held, used, or managed.

Land administration issues and policies are key considerations for adaptation planning so as to strengthen land tenure. When tenure is secure, land can be a cornerstone for economic development and an incentive for investment. When land rights

The book "Transforming Climate Finance and Green Investment with Blockchains", Academic Press, 2018, provides in-depth analysis into each of these four areas.

⁹ Choudhury, Behera, Sharma, Haque; "Combining Administrative and Open Source Data for Ionitoring Land Governance", Centre for Land Governance, India, March 2018)

¹⁰ Data on raw land, built property, ownership data, geospatial, population statistics, demographic ends, gender identification, land use, zoning, status of mortgages, sales history, etc.

are insecure, they can lead to conflicts, corruption and collusion, instability and the exclusion of vulnerable groups, such as women, indigenous people and the poor.

The fight against climate change also depends on secure land tenure. There is a strong and compelling environment and development case to be made for securing indigenous and community lands i.e. preserving forests and natural habitats which combat carbon emissions.^[11] Securing collective land rights offers a low-cost, high-reward investment for developing country governments and their partners to meet national development objectives and the United Nations 17 Sustainable Development Goals. ^[12] The Intergovernmental Panel on Climate Change (IPCC) agrees with the land tenure and climate change linkage and states in its 2019 special report that "land tenure is a key dimension in any discussion of land-climate interactions." ^[13]

The degree of success that can be attained in securing and manifesting legal ownership is highly dependent on blockchain technology and its ability to create a history of permanent records, guarding against data manipulation and corruption.

The link between land use and tenure and the climate is complex.

Below is a framework for assessing land and climate change linkages. Assessment success relies on the highest levels of *shared* climate change and land data integrity, security and validation which only blockchain technology can provide.

Blockchain, in and of itself, will not "solve" climate change. There is no app to fix climate change. However, as the technological backbone for quality data aggregation and data sharing, it presents a unique opportunity for multiple partners and stakeholders to cooperate on matters of industry-wide and system-level importance. In short, when it comes to our planet and the finite resources of land and water, blockchain adoption will provide land registry and land administration officials the tools to develop solutions and improvements in land registration systems, land administration policy formulation/implementation and land tenure to counteract the onslaught of climate change and the challenges it is bringing. •

11 Indigenous people and other rural communities inhabit more than 50 percent of the world's land, across all continents except Antarctica.



13 IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V.



Framework for assessing land and climate change linkages. ^{[14}

Unique Object Identification for Real Estate

Technology that works for the people / Authors: Jo Bronckers (Member of the Board/ Regional Chair Amsterdam, Co-Chair Unique Object Identifier Working Group), Axel von Goldbeck (Regional Co-Chair Berlin & Coordinator Germany/DACH), Ranga Krishnan (Regional Chair San Francisco, Co-Chair Unique Object Identifier Working Group), Chris Dorian (Regional Chair Perth), Yael Tamar (Regional Co-Chair Jerusalem)

The Problem

Buildings play an important role in our society. But what do we actually know about the buildings we live and work in?

While there is extensive information available on real estate, it is usually inaccessible, static, out-of-date – i.e., unreliable – and often difficult to locate because it is stored in different databases and paper files of different parties, and at different levels of detail and quality. Moreover, each user approaches the information from his or her own perspective. As a result, we know little about a building and its surroundings. This causes problems when it comes to tracking, wellbeing, pollution, and fire and construction safety. Beyond this, there are more difficulties in tracking the impact of existing, transforming, and new buildings on climate action.

This lack of useful, reliable information is a global problem for the real estate sector. Creating a universal digital infrastructure for the built environment has become even more urgent today for achieving climate objectives. That's why both public and private organisations from numerous countries are working together to develop a Unique Object Identifier to standardize and streamline building information.

¹⁴ IIED (International Institute for Environment and Development) and Natural Resources Institute, University of Greenwich.

UOI System

The Unique Object Identification for Real Estate (UOI) system serves as the key for interoperable access to databases that are updated in real time with information on buildings and/or their built environment. The UOI lets users view building information that can be specific to a floor, room, or window frame, based on users' role and access rights. Selected information from different databases can be connected and integrated into a comprehensive overview for any given user.



Unique Object Identification

By retaining information in source databases, the UOI system captures data as it is generated, and allows other databases and applications to link to this data in real time and allow the databases to link back to them. Thus the UOI system improves the granularity, accuracy, and currency of data for the entire building life-cycle.



Video – Unique Object Identification

See the 3 minute animated explainer video at: https://fibree.org/UOI

This interconnected system enables the transformation of current centralised and non-transparent data structures into distributed network structures with multiple nodes, each representing partial results of the larger whole. Non-personal data become available and re-usable on granular levels for more efficient and more sustainable products and services. For example, during the design or construction phases, components can be compared individually in terms of details like the origin of source materials used, price, durability or carbon footprint, including the carbon cost of manufacturing and assembling that particular building component. This system also creates opportunities for supervising, benchmarking, providing sustainable incentives, or implementing a carbon tax. Trustworthy digital technology contributes to a fair and competitive digital economy that works for people in an open, democratic, and sustainable society.

Meeting Global Policy Objectives

Taking action on climate change has become urgent. The creation of the UOI will broadly impact climate action, since real estate and the built environment directly affect how people live, work and play.

Real estate and the built environment are responsible for:

- » 60% of all asset investments (vulnerable to climate change),
- » 50% of all raw material usage,
- » 40% of all greenhouse gas emissions (including embedded emissions of materials), and
- » 20-30% of all traffic flows on road, rail and water.

Given this huge impact, immediate development of the UOI is key to realizing many European Green Deal objectives. By filling a global gap, the UOI can become a model of a "triple-win" global initiative: benefiting citizens, businesses and the planet.

The UOI can enhance the lives of citizens by:

- » Providing access to transparent and verified information about buildings they live and work in
- » Removing the risk of buying and selling property through transparent and trustworthy data sources
- » Creating personal dashboards presenting climate effects of individual behaviour

The UOI will also provide better services for public authorities by:

- » Facilitating dynamic, responsive, and integrated spatial planning and building regulation
- » Identifying at-risk public and private buildings (such as those without climate adaptive or mitigation features for projects, education, and funding)
- » Enabling disaster response planning for buildings with features such as flammable materials, hazardous materials, emergency accessibility, installation specifications, waterpermeable ground floors, and other relevant information for emergency services during fire, flooding, or other emergencies
- » Informing city planning and service delivery through results of

multidisciplinary data analysis via UOI at various scales (e.g. neighborhood, village, town, metro)

» Incentivizing climate adaptive elements, such as improved handling of circular economy principles, carbon-footprint taxation or Vulnerability Reduction Credits (VRCs)

Finally, local and global business can benefit in a number of ways as the UOI improves services by:

- Enhancing reporting quality (e.g. construction safety, maintenance history, material specifications, energy usage) through improved analysis of buildings and their direct environments
- » Verifying a building's climate risk profile to aid lenders and insurers
- » Easing management burden for owners through access to transparent and verified information about specific building features, materials and suppliers
- » Improving productivity across the board in multi-stakeholder processes through use of data that is current, validated and trustworthy.
- » Democratizing competition by enabling SME's to access information that was previously only obtainable by larger firms, letting them be more competitive in an open digital business environment

The UOI will create opportunities for entirely new applications. Real time metadata captured by the UOI system will indicate the currency and availability of building information. With this metadata available, processes of validation and assessment of real estate information can be re-engineered to be more efficient, creating a lower carbon footprint. The UOI itself can drive process innovation for a more sustainable real estate sector.

UOI : Working for the People

Information about buildings and their composition (which isn't restricted due to privacy considerations) shouldn't be the privilege of a few organisations. And this information shouldn't be hoarded for private use in proprietary databases, utterly inaccessible to the people who are the actual residents and users of these buildings. The UOI system, being based on a decentralized landscape of stakeholders, can guarantee the security, quality, and role- and purpose-based access to building data. This allows all participants, not only dedicated data aggregators, to both contribute to and access information, enhancing the UOI's value to the real estate sector as a whole.

Global Connections

Together with the Climate Chain Coalition, FIBREE is leading a growing international Data and Digital Innovation Infrastructure Initiative (D2I2) for Climate Action, a fast growing consortium of more than 50 organizations and initiatives. These organizations and initiatives are focused on real estate, climate action, and technology around the globe. They have expressed their support for the development of the UOI in an international setting. Our D2I2 consortium includes International Association of Trusted Blockchain Applications (INATBA) and the Alliance for the Internet of Things Innovation (AIOTI), leading international blockchain and Al interlocutors to governmental bodies like the European Commission.

If you would like to know more about the Unique Object Identifier standard, or would like to join this international D2I2 consortium, please let us know.

Get connected, join the UOI-initiative!

For more information: UOI@fibree.org

Getting Truly Sustainable in Real Estate How a Blockchain-Based Approach Can Help.

Roland H. Farhat, MBA (Regional Chair Frankfurt/Main)

Forward – As of this writing, in mid-April 2020, the coronavirus pandemic is still ravaging the world. It is truly too early to draw any consequences of such an unprecedented disruption of the economy in modern history, especially for the real estate business. Yet it is already clear that there is a need for ecological, tamper-proof, secure sources of production, along with the necessity of trusted, sustainable ways of extracting, processing and end-using them. The saying "from farm to fork," a motto of the sustainable food industry can, in terms of real estate, be turned into "from brickearth to building", if the property business wants to be part of the global climate solution.

Introduction

he real estate business is marked by a constant lack of data. Even when data exists, its authenticity is often in doubt due to different existing sources, which can be faulty and susceptible to misuse. On the other hand, regulation is getting serious about sustainability, and real estate cannot and should not miss the show. Regulatory bodies around the world are expected to get tougher when it comes to establishing authenticity and reliability criteria for data (ex-post) and the ability of real estate management to weather future volatility and sudden shocks to business (ex-ante).

This article will focus on the new regulatory framework for sustainability in the real estate investment business and the ways blockchain can help real estate investors and asset managers in reaching their goals.



The Sustainable Development Goals (Source: UN)

Sustainability – and the looming challenges

Sustainability is not just a buzzword. Hans Carl von Carlowitz (1645-1714), a German tax accountant and mining administrator, is considered the father of sustainable-yield forestry. He urged his fellow citizens to consider durable but lasting ways of using timber - knowing, we can only take as much timber out of the wood as the wood itself can grow again.

Back in September 2015, 193 United Nations member states adopted the 2030 Agenda for Sustainable Development, a plan for achieving a better future for all. At the heart of this resolution are 17 sustainable development goals (SDG) and 232 related indicators that address the most important economic. social, environmental and governance challenges. Under the 2030 Agenda, several goals apply to real estate, including responsible production of building materials, and conscientious use of buildings.

The 2030 Agenda can be a powerful tool for improving our world as it shows us where we need to move and how to get there. For it to succeed, it is crucial that all players commit themselves to its goals. And real estate, with its cross-sectoral reach, can play a major role. To fulfil this potential, real estate investment and management must act with increased climate responsibility and become more sustainable - throughout its entire life cycle.

A 2018 study conducted by the United Nations Global Compact. a large corporate sustainability initiative and RICS, a professional body, shows the sustainability impact at every stage of the real estate life cycle and its relevance for implementing the SDG. ^[1] Land-use patterns, planning and design, and construction practices and materials are major determinants of greenhouse gas emissions and affect the environment and built communities. The construction sector and real estate development help foster economic growth. While corrupt practices take a social, political and economic toll, the availability and quality of housing is a major quality-of-life determinant. Out of the 17 SDGs, 15 are affected by activities in real estate, whether in the development, use, or recovery phases of the sector. Furthermore, the remaining two goals, Quality of Education (SDG #4), and Industry Innovation and Infrastructure (SDG #9) can also impact and be impacted by real estate. Innovative techniques – like blockchain technology - and educating the workforce to use them appropriately can help make processes leaner and more reliable and business more sustainable, transparent, and efficient.

Since 2015, several other initiatives have followed in the footsteps of the UN's Agenda 2030. Many of these aim to re-shape the asset management industry and the future of real estate investment. On a global scale, COP21, better known as the Paris Agreement, is one of the most ambitious climate projects. The Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board, aims to

United Nations Global Compact & RICS, Royal Institution of Chartered Surveyors (2018). "Advancing Responsible Business in Land, Construction and Real Estate Use and Investment – Making the Sustainable Development Goals a Reality". [online] RICS. Available at: www. unglobalcompact.org. [Accessed January 14, 2020].



The Real Estate Life Cycle

develop voluntary, consistent climate-related financial risk disclosures companies can use to provide information to investors, lenders and other stakeholders. At the One Planet Summit held in Paris in December 2017, eight central banks and supervisors established the Central Banks and Supervisors Network for Greening the Financial System (NGFS). The NGFS's purpose is strengthening the global response to meet the goals of the Paris Agreement and enhancing the role of the financial system to manage risks and mobilize capital for green and lowcarbon investments in the broader context of environmentally sustainable development.

Regionally, in 2011 the European Commission adopted a renewed strategy for corporate social responsibility (CSR). A 2019 EU review of implementation progress showed that a number of regulations had been put in place for sustainable finance. Beyond this, the EU markets in financial instruments directive (MiFID) regulation has increased transparency across EU financial markets, making it one of the most prominent regulations for investment companies. A recent amendment known as MiFID II, aims to make environmental, social, and governance (ESG), considerations an integral part of the investment process.

The corporate world has begun to adopt ESG criteria in the investment process. For example, the UN's Sustainable Real Estate partnership in Switzerland aims to achieve a boost in energy efficiency and reduction of CO2 emissions in 1000 Swiss properties. The goal of this 5-year programme^[2] is to reduce CO2 emissions by an average of at least 10% across all buildings, equivalent to about 13,000 tons of CO2. Real estate investment management companies across the globe are setting up criteria to reduce the ecological footprint of investments in their property portfolios^[3]. JPMorgan Chase, a global lender and asset manager, has stated that it is "on track" to meet its goal to source renewable energy for 100 percent of its global power needs across its buildings, branches and data centres by the end of 2020. Meanwhile, a majority of executives and investment professionals (57 percent) surveyed by management consulting firm McKinsey & Company agreed that ESG programs create shareholder value^[4]. Nevertheless, investment professionals report that available data are insufficient for a comprehensible implementation of sustainability strategies. Not surprisingly, McKinsey & Company identified the following criteria as "the most important features of ESG reporting systems": (1) quantification of the financial impact of ESG programmes, (2)

4 Koller, T. et al, (2020). "The ESG premium: New perspectives on value and performance". [online] McKinsey & Company. Available at: https://mckinsey.com/business-function our-insights/the-esg-premium-new-perspectives-on-vaalue-and-performance. [Accessed March 03 20201

measurement of business opportunities and risks, and (3) a consistent set of industry-specific metrics.

Blockchain – and possible outcomes

Blockchain-based solutions have been progressing in different industries, but not so far in real estate. To better understand the possible fields of application in sustainable real estate it can be worth mentioning some of the proposals and results blockchain concepts already achieved in other industries. In supply chain management, for example, blockchain is helping with product tracking, non-tampering, and isolating and solving discontinuities when they emerge, thus enhancing authenticity and verifiability, and improving transparency. If applied to real estate, these features could help track building materials, their production, their transport to the property, and application onsite. Sustainability-oriented real estate developers can therefore check and verify the implementation of green standards by tracing property components back to their origin. Consequently, certificates of green production and sustainable provenance of building materials are expected to belong to the initial proofs of a sustainable property.

Another use-case example from a different field is digital identity. in identity management. Blockchain offers the advantage of one single identity across multiple platforms, immunising data against breaches and reducing reliance on physical documentation. In the real estate industry, blockchain property identity management systems could be used to solve problems with current information and documentation techniques such as



Blockchain-aided integration of sustainability risks and opportunities in real estate

inaccessibility, data insecurity and fraud.

In order to achieve sustainability in real estate, we must start by making real estate digital: that is, giving every single property its digital footprint. Unfortunately, this is easier said than done, due to the lack of complete and reliable data, even within investable and arguably professionally managed real estate, all compounded by the tremendous scale of the market. But data availability and quality is the be-all and end-all of digitisation. Creating a unique property ID for each property could help solve the problem of digital accessibility of real estate, and create a trusted, sustainable identification mechanism. A blockchainbased mechanism can help achieve both.

Let us start with the "basic" data of a property, namely:

- » relevant information needed to explore and construct the property.
- site constitution characteristics, >>
- » measurements of the building to a recognised measurement standard, and
- » information on the sources and origins of deployed materials.

For the purposes of investing in real estate, more information is required, including:

- » all information needed to operate the property,
- » all information delivered from operating and maintaining the

² United Nations Partnerships for SDGs platform, (2019). "Sustainable Real Estate". [online] United Nations. Available at: https://sustainabledevelopment.un.org/partnership/?p=11013. [Accessed September 04, 2019].

⁷² percent of institutional investors in Germany take sustainability criteria into account when esting capital. Union Investment, (2019). Zahl nachhaltig anlegender Investoren erreicht Rekordstand [Number of sustainable investors reaches record level]. [online] Union Investment. Available at: https://unternehmen.union-investment.de/startseite-unternehmen/presseservice/ essemitteilungen/alle-pressemitteilungen/2019/Zahl-nachhaltig-anlegender-Investoren-er reicht-Rekordstand.html. [Accessed April 15, 2020].

building,

- » financial and capital market conditions, and
- » sources of financing.

The complex task of gathering and irrevocably storing all these data and making them available on a historical basis for all stakeholders of the property, and upon different access criteria, can be achieved through a blockchain-based system. Using technologies based on a trusted ledger to record data of all properties securely and irrevocably can potentially benefit an investment organization in a number of ways:

- » increasing consistency and confidence in decision making,
- » decreasing the risk of regulatory fines,
- » improving data security,
- » maximizing the income generation potential of data,
- » minimizing or eliminating redundancies,
- » optimizing workforce effectiveness, and
- » establishing process performance and improvement baselines.

Blockchain can not only help identify a property and its initial ecological footprint, but can also monitor its ESG performance and investor green behaviour throughout the property's life cycle. A blockchain-based data management and governance system can help control the property's climate impact – to what extent the property and its investors have met their sustainability commitments – and report in a trusted way about any risks that might arise.

When it comes to climate and environment, the risks of sustainability can be divided into physical and transition risks. Physical risks arise both from extreme weather events and their consequences, and from long-term changes in climate and environmental conditions. Physical risks can affect the price of raw materials needed for reconstruction and substitution of the property. Transition risks exist in connection with the change to a low-carbon economy and can negatively influence the value of the property^[5]. Mapping all potential sustainability risks with the specific data pertaining to a certain property and enabling scenario planning in a secure and trusted way can increase management's ability to verifiably steer the ecological footprint

of each property investment as well as the contribution of the portfolio as a whole to clean climate conditions.

Previously, investment decisions were based on manual recordkeeping and years of industry experience and market knowledge. These alone won't be enough to grapple with the complex new ecosystem conditions of the future. Blockchaintrusted data will be crucial for accurate and fast investment decision making when it comes to sustainable investments.

Here are a few ways these data will be needed for decision making:

- » Real estate developers can use historical property data to estimate site related costs and construction schedule risks and delays.
- » Loan underwriters can minimize sustainability risks by assessing borrowers' ecological behaviour in real estate and ESG history in new ways.
- » Property managers can optimize building systems performance and reduce operational costs and climaterelated negative effects.
- » Institutional and private investors can find acquisition opportunities that truly fit their green investment strategies.

Ultimately, blockchain can give each property an official, unique, and genuine digital identity, and ensure a trusted report feed. Visionary real estate investors who endorse the creation of these digital ecosystems in real estate before they become a reality – particularly those which integrate artificial intelligence – will be better prepared and more resilient in times of uncertainty or disruption. This in turn will lead to more sound financial performance.

Conclusion

The aim of this paper isn't to offer a detailed technical solution for integrating sustainability components in the digital world of real estate. It rather aims to show how a blockchain-based platform can offer benefits by bringing together the complex worlds of real estate and sustainability regulation. We already know from previous research that strong performance on ESG issues can improve growth and productivity, minimise regulatory and legal interventions, and focus investment and capital expenditures. Real estate investors today would be wise to toughen up their businesses for the new era of sustainable investing in a volatile world. A blockchain-based solution that tracks all relevant data throughout the entire life cycle of a property will give investors a remarkable competitive advantage in the future. •

Automating the chaos: Intelligent construction contracts

Alan McNamara (Regional Co-Chair Sydney)

From paper to smart to intelligent contracts

Smart contracts are considered a key influential development that will support Britain's achievement to becoming a digital economy as set out in the government report - Digital Built Britain^[1]. Smart contracts have the potential to remove the need for a trusted third party to administer a contract in a truly autonomous state by integrating Building Information Modelling and the Internet of Things, to inform the smart contract of actual progress and performance. The general objectives of smart contract design are to satisfy common contractual conditions, minimise exceptions both malicious and accidental, and minimise the need for trusted intermediaries (Li et al., 2018).

Smart contracts translate the legal terms and processes into software code, therefore any contractual response is the outcome of the programmed code. Once initiated, it typically cannot be stopped or reversed once commenced without built in protocols allowing for alterations. Artificial Intelligence (AI) also has the opportunity to be included in smart contracts to assist with decision making as the technology develops^[2]. There are several levels of smart contract models, ranging from a fully autonomous contract where the conditions are entirely in code, to a semi-automated natural language contract where only the payment mechanisms are encoded.

Intelligent Contract (iContract) is the term used when a contract's purpose is to manage itself^[3]. An iContract will set out the requirements and decision inputs (hold points) in order to start a series of if/then that will execute the terms of the contract between the client and different members of the project team; main contractor, subcontractors and any consultants or specialists involved. The iContract clauses are executed when the coded contractual conditions are met allowing digital transaction information such as performance criteria, physical existence of materials on-site and works completely to verify a payment amount to be embedded and automatically transfer among the contracted parties once the agreed parameters are met^[4].

The 'black and white' or '1 or O' execution of an iContract is a huge obstacle to overcome in adopting the potential technology due to the complexities of the construction process requiring judgment and discretion which would normally be handled through subtlety and refinement in the language of traditional contracts.

⁵ BaFin, (2020). "Guidance Notice on Dealing with sustainability Risks". [online] (German) Federal Financial, Supervisory Authority, BaFin. Available at https://www.bafin.de/SharedDocs/Downloads/EN/Merkblatt/dl_mb_Nachhaltigkeitsrisiken_en.html;jsessionid=5BE86ED2637CB2D-179CB43407B5F40BF.1_cia393?nn=866146. [Accessed March 17, 2020]

¹ HMG, Digital Built Britain: Level 3 Building Information Modelling - Strategic Plan, in, HM Government, London, 2015.

C.D. Clack, V.A. Bakshi, L. Braine, Smart contract templates: foundations, design landscape and research directions, arXiv preprint arXiv:1608.00771, (2016).

³ J. Mason, Intelligent Contracts and the Construction Industry, Journal of Legal Affairs and Dispute Resolution in Engineering and Construction, 9 (2017) 04517012.

⁴ A. McNamara, S.M. Sepasgozar, Barriers and drivers of Intelligent Contract implementation in construction, in: 42nd AUBEA Conference, Singapore, 2018, pp. 281-293.

Benefits and applications

Optimised contract formulation and negotiation

An evolution towards the automation of the contract formation and negotiation process could not only reduce the expenditure of resources, but it would also alleviate the ambiguous nature of current contract drafting as the iContract would be more logical in nature. The possibility for a digital database of clauses and terms to be automatically recommended by the technology, based on criteria set by the user, would offer the opportunity to greatly reduce the drafting and negotiation period.

Contract administration efficiency

An iContract solution would alleviate the onerous contract administrative tasks currently handled manually allowing greater speed and accuracy of the process while diverting the effort of management to project delivery.

Improved communication, collaboration and trust

Through automation, processes are clearer and more transparent by their nature allowing the trust between the contracting parties to improve. The idea that collaboration is part and parcel of the automated process and that, far from being a casualty, is part of the DNA of a potential iContract is something that could finally demand what has been sought for decades. The construction industry may well have exhausted its ability to collaborate through traditional mechanisms due to the human-based factor which will allow for digitalisation to disrupt.

Supply chain efficiency

The digital integration of real time analysis along with efficiency of the process through the digital procurement process that an iContract would drive could achieve an optimisation of the supply chain in an industry that is seen to be heavily fragmented. The possibility of actually removing intermediaries from the construction project supply chain has also been proposed by



iContract conceptual process - The iContract will access data from a Blockchain protected Database (or Data Lake) where all project data is transferred to and from. This enables an



Work is carried out and/or service provided and/or product supplied by the Contractor/Consultant/Vendor (CCV). The CCV then makes their claim through the iContract platform Inspection of the work is verified via a number of possible mechanisms that assess the claim against the contract requirements, scope/schedule/budget etc. The main iContract will then assess all data against the agreed contract clause and executes the terms accordingly. As all CCV's would have seamless back to back iContracts plugging into the main Client/Principal iContract, an immediate waterfall of payment can be made from the client's project bank account to all parties upon execution of the iContract terms

Digital Delivery Environment

Live Bim Model (As built), Communications, Actual WBS, Actual Budget, Variations, Actual Schedule, Warranty Info

some commentators^[5] as the structure of the British construction industry is shown to be dominated by main contractors who are essentially intermediaries between the owner and the lower supply chain relying solely on cash flow for profit.

Real Time scenario analysis

An iContract could run scenarios for any scenario, be it legislative changes in requirements impacting on construction methodology or materials, to any number of events that arise on a construction site daily. By having an intuitive and sophisticated digital contract engine, a user could run a scenario, either as a simulated possibility or based on a real event. The iContract could then inform the user what the contract consequence on all parties will be with the iContract then acting in either an advisory or automatic fashion in the execution of the workflow to remedy the situation. Optimising change management through the speed and accuracy of a digital solution would be extremely benefitable to the decision-making process in any construction management team.

Performance analysis and forecasting

The capture and analysis of performance data could capture upward or downward trends in contract performance immediately, or even before, the fact allowing the project team to address the situation.

Increased traceability and accountability

Traceability of every contractual transaction would be far more accurate and easily found due to the digital nature of the iContract. Not only would data of any project be searchable, but the prospect of missing or incomplete data due to manual input would also be minimised due to the automated nature of the administration process. Through blockchain technology, an iContract could create an immutable record adding more transparency to every transaction of a construction project.

Stability of Payment Process

Through a central iContract system payment could automatically flow, not only to the head contractor, but also to subcontractors, consultants and suppliers, where cashflow is critical to the survival of construction businesses. An iContract would dictate when, where and how a party is being paid and what for based on a more accurate digital process. The capability for the iContract to be central to automated payments is something that will be a huge benefit to the industry as the capability for 'pay for work' becomes an instant process resulting in 'inch-stone' payments as oppose to the traditional longer milestone payment terms that are extremely onerous to many players in the industry^[6].

Reduced Dispute

The immutable nature of an iContract system would present a contract environment where facts are harder to dispute due to the optimised and efficient data management leading to less disputes. The onerous nature of human administration in any construction contract dispute is something that could be potentially alleviated through automation of the process.

Challenges and barriers

Innovation Adoption in the Industry

The construction industry is seen to be typically slow at adopting new technologies and historically resistant to change. Some commentators offer the opinion the sector is not yet ready for the level of collaboration and information exchange required for a digital automated contract to be successful^[7]. Some believe that due to the technological state of the industry being insufficient, the implementation of blockchain and other digital solutions is likely to be costly^[8]. Generally, digital technologies are presumed to increase productivity, but this is not always the case as, if it is not combined with efficient and streamlined processes or when organisations lack a collaborative environment, it can struggle to make an impact.

Handing Decision Making to an automated process

An element of surrender to an automated system has been identified as a limitation to the industry^[9]. Traditional construction contracts require judgment and discretion which is extremely different to code. The benefits of iContracts are diluted by the logical '1 or 0' process it must rely on. The alternative is that computers are a tool and can perform a good deal of the repeatable aspects of construction whilst allowing for human input on the more sophisticated tasks or act as a hold point for any critical decision. This is the semi-automated position advocated as likely to be the work around in the short to medium term.

A phased based approach, much like the BIM levels, appears to be the likely roadmap with a semi-automated process being developed using existing contractual procedures. Identification of the processes that would achieve the greatest cost/quality/ time saving, while achieving confidence in the process by giving an element of human control, should make the concept more appetising for the industry.

Technological and Data Requirements

BIM's establishment in recent years has laid the foundation for iContracts to operate. The counterargument that iContracts would not need to align so closely with the BIM agenda due to basing themselves as not one multiparty contract but a collective of possibly thousands of contracts is also something to be considered.

Given the embryonic stage of the iContract concept and the lifecycle of new technology in general, it is expected that many of the challenges highlighted will be solved as existing technologies evolve. Through cloud computing, it is possible to access and combine data from various emerging construction software applications through data virtualisation and an Application Programming Interface (API) that allows data from one application to be used by another.

Perceived legal Inflexibility of a digital contract

Manual construction contracts deals with the uncertainty by containing wording allowing a flexible approach to be taken when situations arise. One of the main perceptions of automated contracts is that they will be incapable of dealing with the 'wriggle room' that exist in traditional contracts. A computer programme is made up of algorithms that are essentially 'if x = ythen z' and the ability for iContracts to deal with change and uncertainty will be a major barrier preventing their adoption. The difficulty in replacing subjective 'loose' wording with computer code is a huge challenge in order to cover the multitude of variables encountered on any construction project but this is again where a semi-automated human-interaction hybrid model may ease sceptics of the technology.

Conclusion

Technological innovation is occurring at a growing pace as society has entered the digital age, and the construction industry is in a race to catch up with the digital capabilities of other sectors. Unfortunately, the construction industry has a historically short-sighted view on innovation with investment relying on immediate value. Knowing the antecedents of usefulness for any technology gives organisations the tools to present the case for adoption more effectively and convincingly. The iContract must present value to its users through the identification of the repeatable processes that it could be applied to. By the careful targeting of the technology to address the 'low-hanging fruit' problems of current contractual practices, the iContract can gain acceptance and begin to push the boundaries of digital automation into the contract process.

The notion that iContracts will be autonomously controlling construction projects based on data from advanced sensors acting as a certifying authority will not be achieved overnight. The advances in BIM, in multi-party contracts, in project insurance can all be seen as a pre-cursor for the type of paradigm shift required to achieve autonomous construction. Ultimately, addressing the current technological barriers is a waiting game for the iContract concept to reach the stage of maturity where it is indisputable from a legal perspective.

The iContract concept would bring enough disruption to reform contract practices within the construction industry and support its advancement into the digital revolution. This would allow the industry to better manage resources, reduce costs, reduce project durations and reduce disputes. As the iContract concept evolves, many of the challenges identified would be addressed and further opportunities will become apparent as trust in digitalisation increases. •

The author is currently carrying out the next phase of his research to develop the iContract concept and invites any professionals with experience or knowledge of construction contracts to participate in an online survey found at:

https://unsw.au1.qualtrics.com/jfe/form/SV_6WGXSk9ITe8rfEN.

For more information on the iContract concept, please visit www.icontract.ai

⁵ J. Li, M. Kassem, A. Ciribini, M. Bolpagni, A Proposed Approach Integrating DLT, BIM, IoT and Smart Contracts: Demonstration Using a Simulated Installation Task, in: International Conference on Smart Infrastructure and Construction 2019 (ICSIC) Driving data-informed decision-making, ICE Publishing, 2019, pp. 275-282.

⁶ J. Mason, BIM Fork: Are Smart Contracts in Construction More Likely to Prosper with or without BIM?, Journal of Legal Affairs and Dispute Resolution in Engineering and Construction, 11 (2019) 02519002.

⁷ J. Mason, H. Escott, Smart contracts in construction: Views and perceptions of stakeholders, in: Proceedings of FIG Conference, Istanbul May 2018, 2018.

⁸ J. Li, D. Greenwood, M. Kassem, Blockchain in the built environment: analysing current applications and developing an emergent framework, in, Diamond Congress Ltd., 2018.

⁹ J. Mason, H. Escott, Smart contracts in construction: Views and perceptions of stakeholders, in: Proceedings of FIG Conference, Istanbul May 2018, 2018.

Blockchain, IoT, and AI are intersecting. Convergence is the keyword.

Anne Hurenkamp interviews Jan Veuger, Blockchain Professor at Saxion University (Regional Chair Groningen, President of the Academic Board)

n February 2019, lecturer Jan Veuger began creating the Netherlands' first blockchain professorship at Saxion University of Applied Sciences. On January 17, 2020 he was officially installed in the role by the university's Executive Board.

This heralds a new phase of blockchain technology in which the keyword is convergence, according to Veuger: "Blockchain is the cement between artificial intelligence and the Internet of Things [IoT]."

As a technology, Veuger sees blockchain as constantly evolving and finding its way into an increasing range of applications and industries. "Convergence will play a major role in the field of information and communication technology. Different technologies and market players will converge and intertwine. I see that happening between blockchain, artificial intelligence and IoT."

Convergence isn't without its downside, according to Veuger. "An IoT network can connect a large number of devices, but is therefore vulnerable to hackers, fraud and theft. We can use blockchain and artificial intelligence to protect such a network on a deeper level against attacks. Blockchain prevents illegal access and modification of data. These three stand-alone technologies have each undergone their own development, but will continue to evolve together in the coming years."

What does convergence demand of us as a society?

First of all, that information transfer must remain very pure. We will soon be able to guarantee that purity much better. Think of the exercise with the chain story in which you pass on a message from ear to ear. At the end, the message has completely changed. With technology, we will be able to rule that out in many areas. In addition, you see that our society is becoming borderless. We communicate and consume in a different way than we were used to. My children no longer watch television, but plug in when they feel like it. Our way of living and working has already changed. Organizations are changing too. It is becoming more and more normal for a colleague or partner to participate in team meeting from another location or part of the world. We live globally, think bigger, but at the same time we are faced with bigger and bigger challenges. The CO2 problem is not only in the Netherlands."

So everything becomes literally and figuratively borderless?

"Yes, we once agreed on boundaries, but human nature doesn't really recognize those boundaries. For centuries, according to a certain development, institutions determined our borders and frameworks. On balance, it went fairly well, but that too is changing. Our society is changing and technology has increased almost exponentially, both in speed and in volume. Look at what's happened in just a short time, with your smartphone and devices communicating with each other."

If that curve gets steeper and steeper, where do we end up?

"Each curve has a maximum, after which we start a new curve, on a higher level. That's the way you have to see it when we talk about technologies. Blockchain and related technologies are our fourth technical revolution. In addition to the fact that these technologies are becoming more and more intertwined and taking us further, it is also up to us to find answers to new questions."

What are these new questions?

"For example, how these new technical possibilities relate to our current laws and regulations, to our institutions, but also to ethical issues. We see that dataism is gaining a bigger role: in the meantime we rely more on data than on what we can still hear, see, smell, feel or taste ourselves. Algocracy is also a growing phenomenon: our trust in algorithms. But can a technical expert, with the help of an algorithm, fathom an ethical issue? In other words: we are on a higher technological level and this raises new issues that we cannot ignore. It asks us to keep looking, thinking and interpreting carefully and critically: what exactly is happening here, how do these developments fit in with our current times and what should we do with them? It is good to answer these questions in an interdisciplinary way."

Do you think we're ready for this new way of thinking?

"You can see that many governments want to force these new developments into the mold of current laws and regulations. That's not going to work. Legislation and regulations always come later, certainly in the Netherlands, where the government is a little more cautious and chooses to first make room for new developments and then offer frameworks and adjustments. In Germany, too, the government is showing how it deals with these developments from a certain point of view."

If blockchain, AI and IoT are going to intersect, how can we predict what effect that will have on our lives?

"With this professorship, we are continually researching patterns. We don't have a crystal ball, but look at how these kinds of technologies develop and to what extent we can extend that line into the future. Convergence is therefore a clear scenario that we foresee. In the field of blockchain, I am now working with a number of PhD students who are investigating the implications of blockchain in the fields of ethics, complex organisations, and ecosystems. It is and remains necessary to continue doing applied research, because we don't know what we don't know yet. Nevertheless, with these patterns and scenarios we are trying to gain insight into what we need together as a society in order to be able to make room for these changes."

What changes are we already seeing?

"If you look at the Internet of Things, a lot of devices are already collecting and sending data. The trick is to connect that data in service of a larger whole. For example, here at Saxion we organize our building management more on the basis of data. Beijing's newest airport already connects 5G technology with Al, blockchain and IoT. An entirely different example is that you can buy digital clothing, for your own digital alter ego. In the art and design world we see these kinds of special developments. A new, digital economy is emerging. We also see, for example, that blockchain is being used to jointly purchase valuable works of art and to register that possession. With the internet you share information; with blockchain you share value. The value or urgency of blockchain technology can also be highly culturally determined. A lot is already well and securely regulated in Europe, but consider how you could shape a voting process in a dictatorship more securely with blockchain or how the phenomenon is now leading in China, in combination with IoT and AI. Closer to home, we can use it to make our own health care claims system more efficient."

It sounds as if your research group has its work cut out for it ..

"Yes, we're constantly trying to understand and interpret how these kinds of future developments are going to change our lives. It is certain that major technologies will become increasingly intertwined. And together, they can be of greater social value. Convergence of technologies, including blockchain, is going to take off."

Real estate tokenization for uncertain times

Yael Tamar (Regional Co-Chair Jerusalem)

What's holding the real estate market back? With everything going on in the world today, it's easy to understand why investors might be hesitant to invest in real estate – at least the way real estate has been done so far. But there may be a better way which actually offers investors a secure life raft to safely ride out market uncertainties.

While the real estate market is huge, it hasn't always been the most accessible. Recent estimates put the total value of all the real estate on the planet at up to \$217 trillion. In fact, real estate is the world's largest asset class, outstripping every other category, including stocks, shares and securitized debt, put together.

However, like the market itself, which tends to be monolithic and conservative, real estate investments tend to be very large and illiquid. And that can make investors very uneasy. Not all of that \$217 trillion is prime investment real estate, of course. Those estimates include areas like forests and agricultural land which aren't necessarily feasible for investment.

But given that \$33 trillion of that massive pie consists of commercial property, there's still plenty of room for investment. And with exciting new ways of investing that are coming soon, the market is poised for massive growth.

Securitizing real estate

When the Aspen St. Regis Resort in Colorado was looking to raise funds for renovation, they called in SolidBlock to help them break new ground. Using a blockchain backbone let us tokenize the \$18M offering, breaking it up into smaller digital securities which could then be bought, sold, or traded by qualified investors. By making an asset available as a digital security, it's suddenly that much more aligned with the way ordinary people want to invest. And with the way they're already investing today.

All over the world, securities are hotter than ever. According to the latest World Bank data, there are currently over \$68 trillion in stocks alone being traded worldwide. That number has gone up more than ten-fold from the \$6 trillion in stocks being trated in 1990.

What's behind this trend? Well, the internet helped open up securities to a broader market, creating platforms and making it easier than ever for just about anyone to start investing. And now, the same thing is about to happen in the world of real estate investment.

Changing the rules of the game

In the old world, investing in real estate was a slow and bureaucratic process. It was also limited to large, mainstream institutions and qualified investors, usually high net worth individuals or organizations.

Tokenization changes all that. How?

Well, first, tokenization makes assets inherently more appealing, and can even increase their valuation.

As SolidBlock discovered with the Aspen St. Regis deal, digital securities create excitement around a property-based asset, in the same way that an IPO creates excitement around claiming a stake in a public company.

But it goes far beyond that. The tokenization process actually involves issuing a security, fully compliant with local securities regulations. Global securities markets are gradually embracing blockchain-based investments. For example, in Cyprus, the SEC has embraced crypto, and Russia's Central Bank just successfully completed one of the largest blockchain tokenization trials. Even in the U.S., traditionally one of the most reluctant markets, there have been promising developments over the last few months.

Regulatory compliance offers investors increased transparency and regulatory insight. Plus, it demonstrates that the project is serious and that the asset owner has performed a fair amount of due diligence through the regulatory disclosure process.

Second, tokenization lowers the barriers to investment and potentially opens up investment to a broader range of individuals and companies.

Diversification and liquidity

Investors interested in real estate used to be forced to invest large sums in a single project — essentially putting all their eggs into one basket. Because tokenization breaks the project up into smaller pieces, with a lower minimum investment, individuals and institutions can now invest smaller amounts in a wider range of projects, building a comprehensive and customized real estate portfolio or fund.

But what's most exciting of all is that the value of a token isn't fixed. And that means the sky's the limit. When it's first issued – during a phase known as the Security Token Offering – a token price is based on the actual appraised value of the underlying real estate asset.

But because tokens are true securities, in digital form, they can be bought, sold, and traded in registered, fully-regulated exchanges, just like stocks.

In general, the more liquid an asset is, the more accurate its price. By enabling secondary trading, the value of assets can rise, not wildly, but probably around 5% to 10% during stable situations and 20% to 30% during crisis situations. Because real estate is inherently stable, token prices won't plummet drastically as with stocks.

Staying afloat – and turning a profit

Tokenization offers the best of both worlds: enough flexibility to create a reasonable profit for investors, plus appealing opportunities to recruit equity.

Plus, tokenization lets investors get out any time – they're not tied in for the length of the project. That's how most financial products operate today, which is totally natural given how uncomfortable investors are at having their funds locked in. With the technology already in place, there's no reason real estate can't work this way, too.

We've experienced some radical financial ups and downs so far this year. That will probably be the case for the foreseeable future. But smart money managers have known for a long time that diversification is the key to staying afloat in uncertain times. Up until now, that hasn't really been feasible when it comes to real estate.

With tokenization opening up a massive untapped global market, lowering barriers to investment, and enabling diversification and liquidity, real estate could prove the best way to stay afloat in today's economy.

Tokenization: Superpowers for property values

Yael Tamar (Regional Co-Chair Jerusalem), Ido Shacham (Regional Co-Chair Jerusalem)

We've all heard that tokenization is the wave of the future. According to a recent article by Deloitte^[1], tokenization will "fundamentally change" the investment world. And those who aren't prepared, they warn, "risk being left behind."

Most articles make tokenization sound as exciting as taking vitamins – something you should probably do, even if you don't want to.

That's a shame, because tokenization is so much more than just taking vitamins to stay financially healthy. Tokenization is like taking a pill that gives you superpowers. Awesome, twentyfirst century superpowers like liquidity, transparency, and democratization.

Who wouldn't love that?

One reason real estate is the killer use case for security tokens is that its value is relatively easy to appraise in the real world. But the value of a real estate asset isn't static — there are so many factors that can drive it up. And tokenization is one big boost most of us haven't considered.

The unexpected bonus of a security token offering (STO) is that the property's value could increase with tokenization. A milliondollar home today could increase in value well over one million following tokenization.

1 https://www2.deloitte.com/content/www/lu/en/pages/technology/articles/tokenization-assets-disrupting-financial-industry.html

How does tokenization boost liquidity?

There are a few reasons for this. There are four major factors that can send property values soaring into the stratosphere. Here's how tokenization could boost each one:

- » Supply and demand obviously, investors won't want to invest in real estate, tokenized or otherwise, that isn't in demand. This factor must be carefully considered before initiating an STO. However, thanks to new algorithms and machine learning mining the data from thousands of transactions, tokenization platforms will soon gain the ability to gauge both current and future demand with a much higher degree of accuracy and granularity.
- » Location to some extent, this factor is out of our hands. However, because tokenization is relatively new on the market and will attract interest, it's entirely possible that the presence of multiple projects being tokenized in the same geographic area will drive up interest in properties there, increasing values.
- » Property market drivers many of these are also external factors that are out of the owners' hands, like municipal transportation lines. But some are entirely within reach, like plans for development and redevelopment. With a ready infusion of investment into a property asset, owners can undertake projects that will drive up the value of the underlying property.
- » Cost of borrowing when borrowing cost is high, property values go down. Typically, the cost of borrowing has been in the hands of banks and large institutions. But because blockchain-based investment has the potential to democratize investment and can help determine a fair market rate for borrowing, there's a very good chance that the cost of borrowing on a tokenized property will go down, driving up property values in turn.

While some of these factors are speculative, there's also already evidence out there in the real estate industry to indicate that these estimates are not an exaggeration.

Proof #1 - Asset values for REIT properties

One factor not yet discussed, but also pointed out in the Deloitte article, is the "liquidity premium." Greater liquidity gives investors more freedom, which is also likely to boost the value of the underlying property. Talk about a win-win.

We can already see this happening today in REIT-based properties, where asset values tend to go up due to the properties' liquidity. According to the investment guide Fisher Investments on Financials^[2], "Due to REITs' more liquid nature, they often have an associated liquidity premium relative to property prices—investors are generally willing to pay more for a more liquid investment."^[3]

And in case you think it might be a coincidence that the value of properties associated with REITs is consistently higher, recent academic analysis has shown both that REITs are significantly more liquid, proving their status as a preferred investment vehicle. Concretely, this translates to a premium of a 12-22% increase in the firm value of a property simply by turning relatively illiquid property assets into a more liquid type of security, such as a REIT^[4].

What that means, practically speaking, is that the value of the stock – and in the case of a REIT, the value of the firm itself – are heavily dependent on the liquidity of the real estate itself^[5].

This makes sense if we look at it from the other direction: when real estate assets are illiquid, investors are only willing to come on board if they are offered some type of discount or added benefit for doing so.

This demonstrates clearly that investors care deeply about liquidity vs. illiquidity and expect to be compensated for investing their money in ways that will lock it in for any period of time. Investors pay less and demand greater returns from illiquid assets.

Therefore, by increasing the liquidity, these penalties for illiquidity can be eliminated and the value of any digital security based on the property will very likely experience a corresponding rise in value as well.

- 3 Alex Moss & Nicole Lux, The Impact of Liquidity on the Valuation of European Real Estate Securities, Journal of European Real Estate, 2014, www.emeraldinsight.com/1753-9269.htm
- 4 David D. Downs & Bing Zhu, Property Market Liquidity & REIT Liquidity, The Kornblau Institute & FIRE Department School of Business, Virginia Commonwealth University, https://www. aeaweb.org/conference/2020/preliminary/paper/6S8F69Fk
- 5 David D. Downs & Bing Zhu, Property Market Liquidity & REIT Liquidity, The Kornblau Institute & FIRE Department School of Business, Virginia Commonwealth University, https://www. aeaweb.org/conference/2020/preliminary/paper/6S8F69Fk

Proof #2 – Asset values in more liquid markets

The more liquid local real estate markets are, the more liquid shares will be in REITs based on assets in those markets. To follow up on the liquidity premium mentioned above, demand for assets within a specific sector or geography greatly influences the asset value: how fast the underlying asset can be sold for optimal level of profit is an important factor in determining asset valuation. Thus, when assets get additional avenues for liquidity, either through placement on online platforms or exposure to new investors, these value-determining factors may place the asset in a different, more liquid 'market.'

Proof #3 - Attractive loan-to-value ratio

The loan-to-value (LTV) ratio describes what percentage of a property's value is leveraged in a particular loan. Real estate is usually highly leveraged, yielding a higher LTV. The sum total of all loans on a particular property is known as the capital stack. The largest component of the capital stack is usually taken up by lenders – institutions grabbing the biggest piece of the pie.

However, it's in property owners' best interests to replace high-interest lenders wherever possible. With the introduction of liquidity through tokenization and the possibility of faster repayment of the debt, the higher turnover could attract investors and ultimately drive up the value of the asset.

Beyond that, the vastly greater transparency and accessibility of tokenized investments will undoubtedly drive increased real estate investment. This includes micro-investments currently impossible today.

There's a very good reason tokenization is the next big thing. These are changes most of us have been dreaming about for years. Right now, we're on the threshold of creating something great, making this literally the most exciting place in the fintech space. Yet most articles about STOs still sell the potential of this technology short.

Embracing tokenization isn't just about keeping up – it's about getting ahead. Getting much more out of existing assets. Tokenization isn't just another way of investing, it's a way of making what you already own more valuable than ever. And there's not a speck of kryptonite in sight.

Up, up, and away! •

² Jarred Kriz, Fisher Investments on Financials, Wiley, 2012

U.S. Blockchain Law 101: Tokenization

Alexandra "Sasha" Levin, (Member of the Board/ Regional Co-Chair New York City)

1. Introduction

While tokenization of real estate may be a relatively new innovation, it will likely have legal ramifications and costs in all jurisdictions. Therefore, it's important to address them, with a focus on U.S. federal and state (known at the state level as "blue sky" laws) securities law for the purposes of this article.

Currently, tokens which represent a particular interest in real estate, such as debt, equity, right to rental income, etc. are generally not structured as a right to a property directly but rather as an interest in a corporate entity which holds title or other rights to a particular property or portfolio of properties. This often mimics the structure of a traditional Real Estate Investment Trust (REIT) which offers tax benefits, and the shares of which can be privately held or publicly listed. As such, in the United States, such tokens are very likely to be considered securities and are therefore subject to federal and state securities laws.

Obviously, the U.S. market is large and robust (notwithstanding the current COVID-19 related economic challenges) and many sophisticated parties are aware that all tokens that are sold in the United States or to "U.S. Persons" must be compliant with U.S. securities laws, as the U.S. Securities & Exchange Commission (SEC) considers most (but not all) tokens to be securities. Additionally, the U.S. Commodity Futures Trading Commission (CFTC) may consider some tokens to be commodities, the U.S. Treasury Dept's Financial Crimes Enforcement Network (FinCEN) considers some tokens to be currencies and the U.S. Internal Revenue Service (IRS) considers some tokens to be property and therefore taxable. Other regulations such as anti-money laundering (AML) and countering the financing of terrorism (CFT) rules and the Foreign Investment in Real Property Tax Act (FIRPTA). There are also state-specific virtual currency license requirements which tokens may need to comply with, such as the "BitLicense" in New York and the Uniform Regulation of Virtual-Currency Businesses Act which has been enacted in Rhode Island and has been introduced in California, Oklahoma, and Hawaii.

However, it may come as a surprise (and often as a frustration) to many entrepreneurs and investors outside the United States that the reach of the U.S. regulators is very long and may affect them, notwithstanding their best efforts to avoid U.S. markets. Please refer to the discussion of the Regulation S safe harbor below.

2. U.S. Securities Laws

After the U.S. stock market crash of 1929, Congress enacted the Securities Act of 1933 (as amended, the "Securities Act") and the Securities Exchange Act of 1934 (as amended, the "Exchange Act."). The general rule of U.S. federal securities laws is that *all securities offered or sold in the United States using the means and instrumentalities of interstate commerce (including the internet) must be registered with the SEC or comply with an exemption from registration.* Registration exemptions were offered because Congress believed that some investors are "sophisticated" enough to conduct their own due diligence regarding the purchase of securities without government protection and the additional disclo*sure of a full registration (which was implemented to prevent a future stock market crash caused by a lack of disclosure to "unsophisticated" investors).* Issuing a security using an appropriate exemption is less burdensome than pursuing a full registration.

Following is a discussion of the basic mechanics of how this all works in practice.

Is your token a security at the time of the sale?

The definition of "security" is broad and includes stocks, bonds and many other standard investment instruments including an "investment contract." According to U.S. securities law, under the "Howey Test" (in SEC vs. W. J. Howey Co. (1946)), a token is considered to be an investment contract if it meets the following criteria: (1) it is an investment of money, (2) in a common enterprise, (3) where there is a reasonable expectation of profits; and (4) any profits will be derived from the entrepreneurial or managerial efforts of others. However, not all tokens are securities, as the evidenced by the SEC's No-Action Letter to TurnKey Jet, Inc. on April 3, 2019. Additionally, timing is crucial. On June 14, 2018, SEC Director William Hinman stated that bitcoin and Ethereum are currently not securities, because "if the network on which the token or coin is to function is sufficiently decentralized - where purchasers would no longer reasonably expect a person or group to carry out essential managerial or entrepreneurial efforts - the assets may not represent an investment contract [and therefore may not be a security]." On February 6, 2020, SEC Commissioner Hester Peirce proposed Rule 195, a safe harbor period for token sales for 3 years from their first token sale to become "sufficiently decentralized" and therefore not likely to be a security.

If the token is a security, below are the options to comply with law (and again, please consult with U.S. legal counsel in all cases). The SEC has also provided a helpful comparative table with the requirements of the most common exemptions for offerings in the United States.

A. Registration with the SEC, i.e. an Initial Public Offering ("IPO")

Registration with the SEC is expensive, complex, and time consuming. It involves filing many forms with the SEC and preparing, submitting, and revising a full prospectus. However, the primary benefit of an IPO is that the securities are not restricted and can be traded. To date, there has been no IPO of a token declared effective in the United States.

B. Regulation CF

In the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act"), a new Regulation Crowdfunding (CF) was adopted which permits a public offering to any investor using an approved "funding portal" for primary solicitation and disclosure, up to a cap of \$1.07 million. There are several such crowdfunding portals which have hosted token sales on their platforms.

C. Regulation A/A+ Offering

This is sometimes referred to as a "mini-IPO" in the sense that it requires SEC approval and is a public offering to any investor so that, as with an IPO, the securities are not restricted and can be traded. However, there is a cap on the amount that can be raised (\$20 million or \$50 million depending on tier) and this exemption excludes asset-backed securities. Securities may need to register under the Exchange Act unless a registered transfer agent is used in the offering. On July 10, 2019, the SEC qualified the first Regulation A+ tokenized offering by Blockstack for \$28 million.

D. Regulation D

Regulation D under the Securities Act provides an exemption from registration for a private placement (i.e. no public marketing) where purchasers are limited to investors who meet the definition of "Accredited Investors." There is no SEC approval required, although formal notice (Form D) must be provided. There is also no cap on the amount that can be raised. However, tokens are restricted for at least one year following the original token sale (or for six months if the issuer is an SEC-reporting company). Additionally, Exchange Act registration may be required if there are over 2,000 holders of record of equity securities or 400 non-accredited holders. Under the JOBS Act, a new Regulation D provision, Rule 506(c), was adopted which permits public marketing but requires the issuer of securities to verify (i.e. review documentary evidence) that the purchasers in fact meet the definition of "Accredited Investors." Please note that recently the SEC has proposed to amend this definition to include other investors based on their "knowledge and expertise." Unlike an IPO or Regulation A offering, Regulation D lowers the paperwork burden by requiring no mandated disclosure. However, in 2017, SEC Chair Jay Clayton issued a list of "Sample Questions for Investors Considering a Cryptocurrency or ICO" which is recommended for token issuers as a guide to provide disclosure.

Given that Rule 506(c) under Regulation D is currently the most common structure for token sales in the United States, the following is a list of actions that token issuers should, at a minimum, take in collaboration with their attorneys:

- » Conduct a Howey Test analysis (if you suspect that your token is not a security)
- » Consider which jurisdictions apply to the token sale for tax and regulatory purposes
- » Apply for state-specific virtual currency licenses (e.g. New York's "BitLicense") or exclude residents of those states from the sale
- » Form a U.S. corporate entity, if necessary
- » Draft a disclosure document (including risk factors, term and conditions and other disclosure such as SEC Chair Clayton's list, referenced above) – this is to attempt to prevent violations of securities laws as well as defend against future investor civil legal actions
- » Draft a token purchase agreement (personally, I would not recommend using a Simple Agreement for Future Tokens ("SAFE") but that discussion is beyond the scope of this article)
- Insert disclaimers into your website, whitepaper and any other marketing presentations, solicitation materials and other related materials
- » Obtain Accredited Investor verifications from token buyers
- » Perform "Know Your Client" ("KYC") checks on token buyers for purposes of AML/CFT
- » File a Form D with the SEC within 15 days of the first sale of a token
- » File Blue Sky filings in each U.S. state where token purchasers are located
- » After the restriction period is over, receive a Rule 144 Legal Opinion (see below)

E. Regulation S

Regulation S represents a "safe harbor" from SEC registration for security offerings and sales that are made offshore, with sales prohibited to all U.S. Persons, as the term is defined by the Securities Act. Among other requirements, the token issuer must verify that the token sale is made outside the United States to non-U.S. Persons and ensure that there are no directed selling efforts made in the United States by the issuer, a distributer, any of their respective affiliates or any person acting on behalf of any of them. Additionally, tokens issued under Regulation S cannot be re-sold or transferred to investors or token purchases in the United States or to U.S. Persons for at least one year following the original token sale (or six months if the issuer is an SEC-reporting company) and then only if the tokens are registered or comply with an applicable exemption from registration. The issuer must make use of every available mechanism to block U.S. sales and resales, which can include blocking U.S. IP addresses from accessing the token issuer's website. It is common for some issuers to do a concurrent Regulation D offering for U.S. Persons and a Regulation S offering for offshore sales; however, as each of these types of tokens have their own restrictions, it may be difficult logistically to keep those two tokens independent.

Because Regulation S affects all non-U.S. token issuers who exclude U.S. Persons, they should consider discussing the following suggested non-exhaustive list of actions with their attorneys:

- » Conduct a Howey Test analysis (if you suspect that your token is not a security)
- » Consider which jurisdictions apply to the token sale for tax and regulatory purposes
- » Form a U.S. corporate entity, if necessary
- » Draft a Regulation S Private Placement Memorandum
- » Draft a Regulation S Subscription Agreement and Confidential Purchaser Questionnaire
- » Code into the token the prohibition of sale or resale to U.S. Persons, if possible
- » Insert Regulation S disclaimers into your website, white paper, and any other marketing presentations, solicitation materials and other related materials (and notify your U.S. attorneys when they are updated to ensure that the issuer's descriptions and disclosures on its website use plain language, are transparent, and are not misleading)
- » Block U.S. Persons, to the greatest extent possible, from the issuer's website and token sale (or if doing a concurrent Regulation D offering to U.S. Persons, consider creating a second website for this offering)
- » Implement restrictions of the resale of Regulation S tokens to U.S. Persons
- » Perform KYC checks on token buyers for purposes of AML/ CFT

F. Rule 701

A private offering of tokens that qualify as securities to employees, consultants and advisors may be exempt from registration under Rule 701 of the Securities Act. This exemption applies if the tokens are offered under a written compensatory benefit plan or written compensation contract for the participation of an organization's employees, directors, general partners, trustees, officers, or consultants and advisors, and their family members who acquire such securities from such persons through gifts or domestic relations orders. Tokens issued under Rule 701 are not integrated with any other offering, but they are restricted securities that cannot be resold unless they are registered under the Securities Act or are exempt from its registration requirements.

G. Rule 144

Rule 144 under the Securities Act provides an exemption where a restricted security token (e.g., under Regulation D) is eligible for resale after the purchaser has held the security for a minimum of one year following the original token sale (or six months if the issuer is an SEC-reporting company) and satisfies other requirements. Traditionally, while not required, the custom and best practice of securities issuers is to receive a written opinion from U.S. legal counsel stating that the securities may be transferred in the manner contemplated without an effective registration statement under the Securities Act or applicable Blue Sky laws. This further shields the token issuer from liability but such legal opinions for tokens are difficult and expensive to receive.

3. Conclusion

The SEC works with a variety of international organizations to set global standards and try to protect investors, including The International Organization of Securities Commissions (IOS-CO), The Financial Stability Board (FSB), Council of Securities Regulators of the Americas (COSRA), International Financial Reporting Standard Foundation Monitoring Board (IFRS), International Federation of Accountants Monitoring Group (IFAC), Financial Action Task Force (FATF) and Organization for Economic Cooperation and Development (OECD).

While the laws and regulations regarding token sales and virtual currencies have evolved significantly since the first SEC Investor Alert on Ponzi Schemes Using Virtual Currencies in 2013, token issuers are strongly advised to consult with legal counsel in the United States and abroad as early in the process as possible to ensure compliance with all the laws of all jurisdictions in which it intends to sell tokens.

Disclaimer:

Nothing in this article constitutes legal advice. This is a general conceptual and theoretical high-level overview of virtual currency, blockchain, token sales, tokens, the U.S. securities laws, some of the registration exemptions which might be available, real estate and blockchain and related topics. Nothing herein is intended or related to any particular factual situation. Nothing herein forms an attorney-client relationship. You are advised to consult with your own lawyer, accountant and other professionals before making any decisions. The comments and opinions expressed today and in this article are of the individual author and may not reflect the opinions of her firm.

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The future of FIBREE governance

Walter Strametz (Member of the Board/ Regional Co-Chair Zug)

Since its founding, FIBREE has experienced exceptional and unexpected growth. Yet we still see ourselves as a grassroots organization, bringing together real estate professionals with an interest in blockchain. Reflecting on this development, we have already welcomed new board members representing FIBREE participants from the U.S. and Australia, with China soon to follow.

As we our organizational structure grows, we face certain challenges, some of which we aim to tackle by "eating our own dog food," meaning with blockchain. When considering blockchain and organizations, what usually comes to mind is a decentralized autonomous organization (DAO). A DAO typically implements democratic (decentralized) processes as smart contracts. A good example of this would be a voting process.

This project is taking place within the Future FIBREE Governance working group, and any regional chair or sponsor may join this group on the FIBREE website.

What kind of processes are we running on the blockchain?

We are looking at implementing two processes at the moment. The first is a simple voting process, which is actually needed for our board meetings. Additionally, we are exploring blockchain-based possibilities to support our funding process. The goal is to make FIBREE's financial flow more transparent and compliant with anti-money laundering (AML) regulations

The first of these which we'll be investigating more closely is our voting process for general assembly and board meetings. In juris-

dictions we are familiar with (for example, Switzerland's Article Art. 701c-f Obligationenrecht, the Netherland's Article 2:117a Dutch Civil Code, and in the EU, § 134 - AktG for joint-stock companies), the electronic voting process for a general assembly meeting must meet the following criteria (among others):

- » The digital voting process must be expressly permitted by company's articles (or statutes) and clearly communicated otherwise votes can be voided.
- » The identity of the participants must be clearly established.
- » The result of the vote cannot be falsified.

These requirements generally apply in jurisdictions worldwide. Commercial products are available to help meet these requirements (for example, Board Effect, a board of directors portal application), however, these are not only costly but also do not serve the target of this working group. We want to make use of decentralized solutions while remaining within FIBREE's limited budget.

Let's take a look at what we need: As FIBREE board members become more spread out all over the world, physical meetings become increasingly onerous, creating legal problems for the FI-BREE voting process. Should we choose to hold voting remotely online, we must create a new digital voting process. Giving that voting processes are one of the great strengths of blockchain, and that there are ready-to-use platforms available for free, creating a digital voting process will also provide the opportunity to expand the voting process to all FIBREE stakeholders.

Exploring the toolbox for digital decentralized voting

One potential candidate we are exploring to implement voting processes is the Aragon platform. Aragon is a fully decentralized web application (dApp) on the Ethereum blockchain that allows anyone to create and manage a decentralized organization. Aragon's platform provides a web interface to configure how we want to run our board votes. As a dApp, Aragon assumes that users already know how to work with blockchain wallets and tools like MetaMask, an extension for accessing Ethereum-enabled dApps through the browser.

Since a blockchain wallet is basically just a large number, similar to a bank account number, the wallet's address can be used to serve as identification (or login name) for FIBREE's voting app. And just as in the real world, you sometimes need to use a bank payment to prove identity (for example, when buying cellular phones in some jurisdictions, you need to send a transaction from a domestic bank account in order to prove your identity), this login method uses a transaction from your "bank account" (in this case, your wallet address/number) to prove that you really are who you claim to be.



Exploring Aragon's smart contracts toolbox as a potential aid to FIBREE's voting process.

However, one difference is that in order to open a bank account, you must either enter a bank in person and show other identification or identify yourself online. Blockchain wallets, on the other hand, are anonymous. A blockchain wallet can be created in a fraction of a second, by anyone, free of charge. And an individual can hold as many blockchain wallets as they like. Therefore, since a typical blockchain-based application — such as FIBREE's potential voting app — needs wallets to function properly, we also need a way to identify the people behind those wallets. Otherwise we wouldn't know who's eligible to vote and we could not prevent "double voting."

For our voting solution, we plan to set up an additional process to map wallet addresses to (FIBREE) identities. Currently, we are exploring this area and testing initial solutions. Solutions we're working on right now involve the use of ethereum name service (ENS) as well as online identification and AML platforms. In our current implementation, a wallet is only allowed to vote if it also holds a FIBREE token. Implementation is simple: we ask board members for their wallet addresses and then send a FI-BREE token for the vote. For our scenario, this is currently sufficient. This mechanism also scales for voting during an annual general meeting, as long as we send new voting tokens each year.

Next Steps

The final recommendation of our working group will be submitted to the FIBREE board meeting. If they have created an approach that is feasible and scalable, we will consider scaling it in future for regional chairs and to enable other types of voting within the FIBREE community.

From there, we'll also begin to tackle the second process mentioned above — FIBREE's funding process — using smart contracts. Legally speaking, this creates a much harder problem, but we are on track and already testing implementation. For an example of what our solution could ultimately look like, check out Aragon's own smart contracts implementation at their site. Stay tuned for further details, or contact me at walter.strametz@fibree.org for more information. •

Links & Sources:

Aragon Integration:

- Voting process on Rinkeby Testnet: https://rinkeby.aragon.org/?#/fibreetest/Oxeaf68e46288e Od086ebf9417a40a6f741465f97d/
- b) Funding Process on Mainnet: https://mainnet.aragon.org/?#/fibreefunding/0x9477bb6b58f b3e08ad08ba30c8116ac3ac728ee9/
- c) How Aragon uses its own platform: https://mainnet.aragon.org/#/budget/Oxcec16a4046dd2d1 dd0b57019609e86d5d49b655d/
- d) How it can be used with EURO: https://examples.e36.io/src/index.html

http://www.dutchcivillaw.com/legislation/dcctitle2244bb.htm https://www.nautadutilh.com/en/coronavirus/corporate-governance-how-to-deal-with-board-and-shareholder-meetings https://www.fuw.ch/article/neues-aktienrecht-regelt-den-einsatz/

The state of blockchain in real estate, 2020

Florian Huber (Member of the Board/ Regional Co-Chair Vienna, Chair Industry Report Working Group)

This years working-group started it's research within the real estate industry at the beginning of 2020 finding start-ups specifically using blockchain technology. The working group itself embraced 10 FIBREE regional chairs from 9 countries covering the global appearance of the network.

Additionally we gained input and support by our local representatives being present in more than 30 countries and more than 70 locations with 97 active regional chairs. A view on each country and the current state of blockchain technology for the real estate industry can be found on the country pages itself.

Based on the common goals creating a clear image within the industry we splitted the research into the content part and the database part. The following results are part of the database analysis.

Methodology

The outcome is based on last years research where approximately 500 products could be found globally using blockchain technology within the real estate industry.

Within the first step we verified whether these start-ups were still in business, thus checking if they have an active web presence or any other signs refer to activities within the industry.

Surprisingly we discovered that more than 50 % of those

companies being in place last year are not accessible anymore. No further research has been made to find out what given reasons were there in particular.

Approximately 240 start-ups remained in the database. Within a second step we have then matched them with the the same sources of last years research. Via desktop research different platforms were scanned e.g. BUILT World Network, Crunchbase, ICOBench and LinkedIn.

Additionally our regional chairs contributed by adding known start-ups within their proximity to the database and products which actively have been added via the FIBREE website through start-ups themselves.

By the end of April 2020 the global scope of database showed roughly 280 start-ups. Using this set of data we reached out to those companies via e-mail, asking them to take part in a detailed survey to gain deeper insight within the industry. 24 fully answered questionnaires returned helping us to strengthen the results of our analysis which you find further below.

To finally verify whether any additional changes in the product database could have been observed we left the desktop research open until the end of June 2020. By 1 July 2020 we can announce 297 start-ups dealing in the real estate industry are using blockchain technology.

Broad database insights

In order to provide a clear picture we splitted the database into major categories to understand how the start-ups are spread globally within our five main FIBREE regions and secondly in which countries and cities the most products can be found.

In total we discovered that blockchain products for the real estate industry are being offered in 50 countries and in 131 cities. In 25 countries it was not specifically stated in which city the start-ups where incorporated.



With a number of 142, most of the companies in the database (47,81 %) have their headquarters in Europe. Latin America is the least represented with only 1,35 % of all products.

In itself, this does not say much about the geographical markets the products are targeting, as many blockchain products are targeting multinational or fully global markets. Nor does this rough division show where in the world the real ,hotspots' are located or which countries are at the forefront of the development of blockchain products for the real estate industry.

Furthermore we created a top-10 ranking of countries that are at the forefront of the development of blockchain products for real estate.

The result of this ranking show a very clear picture and which again is not really a surprise. Compared with last years analysis no major changes could be detected. Despite Singapore, which lost a few positions but still finds itself under the top-10 and Russia, which dropped out of the top ranking. Instead Australia climbed up a few positions and Canada, which was not in the ranking last year, jumped in and now ranks under the top-10.

Perhaps the presence of Singapore, Switzerland and the Netherlands is most striking in this top-10, as they are relatively small countries compared to the others. However, their leading position is not surprising from a blockchain perspective, since these countries have been developing state-of-the-art digital infrastructure and are well known for their open mindset towards digital innovations.

Additionally, each of these countries, show strong support for their respective governments. The Canton of Zug in Switzerland (50 % of the Swiss start-ups in this years research are located there), for example, is known throughout the world for its liberal approach to blockchain on the part of its government infrastructure. This has contributed to the fact that this region, which is often called Crypto Valley, has been able to attract the largest concentration of blockchain companies and investors in the world.

Rank 2020	Country	Number of listed BC/RE-pro- duct-supply
1	USA	72
2	UK	24
3	Switzerland	20
3	Germany	20
4	Australia	15
5	Netherlands	14
5	Canada	14
6	Spain	12
7	China	9
8	Singapore 8	
9	Italy	7
10	Belgium	5

Looking at the most important cities and regions, we can see a slightly different picture to last years outcome, but still come to the same conclusion that most products are found in the global financial centers of New York, London and Singapore. Just the Swiss city of Zug kicked out the latter of the top-3 ranking. Looking at the remaining cities in a top-20 ranking we can see that they are equally spread between Europe and the USA.



Top 22 blockchain & real estate capitals in the world according to the used product database

Melbourne and Brisbane are the only two cities from the Asia and Pacific region which made it into this years's ranking.

Additionally we looked at the main fields of the start-ups activities within the real estate industry. On a global view we divided them into the following focus areas:

- » Plan and Build services and products within the field of architecture and construction
- » Manage and Operate services and products within the field of facility management
- » Platforms and Markets services and products connecting stakeholders of the industry
- » Smart City Solutions services and products creating a digital infrastructure for its inhabitants
- » Building Technologies services and products for the industry through tech providers
- » Invest and Finance services and products with a clear financial focus
- » Research and Valuate services and products taking industry data into account





When compared with last year's findings, we notice a shift away from "Invest and Finance" towards other use cases for the real estate sector. Out of the total of 297 start-ups found this year 44,1 % offer their services and products within the field of "Invest and Finance" followed by 23,23 % offering "Platform and Market" services. It turns out that most of these online platforms are often service providers for the industry e.g. white label solutions for tokenization of real estate. 47 services or products (15,82 %) can be added to field of "Building Technologies". In the area of "Manage and Operate" (6,40 %) and "Research and Valuate" (6,06 %) nearly the same amount of products could be found. In the area of "Smart City Solutions" and "Plan and Build" we only could research 13 products and services globally.

We clearly can see, that from last year's investigation the picture has changed dramatically, as the product database nearly halved. We assume that most of the start-ups where too enthusiastic using blockchain for their start-ups backbone, faced unforeseen complexities to develop a solution for the signalized problem or opportunity, or they didn't find sufficient engagement in the market. Last year the majority of products (58%) and services where dealing in the field of "Invest and Finance" and probably there might be a connection to the missing regulatory measures of most countries thus providing those start-ups the necessary safe environment. Because most of these startups disappeared, it is difficult for us to find out the true reasons that led to ceasing of their activities and we can only give our assumptions.

Specific industry insights

To get a better understanding and deeper insights on the market we created a survey and reached out to the startups of the database. 24 returned the survey which gives us a representative response rate of approximately 8 % in relation to our global database.

48,1 % stated that they are already in a growth stage, which is a significant increase compared to the 7% for this category in last year's survey. Another 33,3 % are currently in a seed-stage, 22,2 % see themselves in a start-up stage.



Growth stage of products according to survey responses (n=24)

We assume that those in growth stage might have been incorporated in the years 2016-2018 which equal almost three thirds of the respondents (62,9 %). 25,9 % have incorporated in 2019 and 11,1 % just this year in 2020 finding themselves mainly in seed- or start-up stage.



Year of incorporation according to survey responses (n=24)

If we look at the global database we can see that most of the products lie within the field of "Invest and Finance". Those findings correlate with the survey as the majority of start-ups (59,3%) which took part are dealing in this sector.

In comparison to the overall database the results of the survey show that products within the field of "Manage and Operate" (22,2 %) and "Research and Valuate" (22,2 %) are stronger represented than "Markets and Platforms" (14,8 %), which rank at second place. Also "Smart-City Solutions" (14,8 %) show a high percentage within in the survey.

Interestingly we did not receive any answers from start-ups in the field of "Building Technologies" which are strongly presented in the global database.

Overall we can see that investment products and financial services remain on the top position and markets and platforms correlate positively as they seem to play an important role in this field. Secondly we assume that industry data is getting more and more important and seems to be an important foundation for the fields of "Research and Valuate" and "Manage and Operate".



Distribution of survey products according to industry focus areas (n=24)

When it comes to the technology itself we can clearly see that Ethereum is being used by 55,6 % followed by 40,7 % who have not precisely stated a technology provider. Hyperledger is being used by 14,8 %. Any other blockchain infrastructure seems to be rather exemplary.



Used blockchain platforms according to survey responses (n=24)

Looking at the financial side of the start-ups, 40,7 % have less funds than 200.000,- USD available. 22,2 % said they have gained funding less than 1 Mio. USD and 18,5 % gained more than 1 Mio. USD. 18, % have not raised additional funds at all. This picture is quite similar to the result of last year's survey.



Available funds according to to survey responses (n=24)

80,8 % say they funded their start-up from their own sources as well as from friends and family (38,5 %). Only 23,1 % where funded via private equity. 7,7 % made an STO/ICO. The rest (3,8 %) gained money via prize money and grants, subsidies by European Union or Business Angels.



Funding sources according to to survey responses (n=24)

When comparing the global database with the results of the survey, the picture is pretty much the same. The leading products and services lie with in the field of invest and finance. Tokenization of real assets is the big topic and withit comes the right infrastructure such as creating smart contracts or white label solutions by technology providers. But the field for for new products and services is much broader. Thus the need for a more secure, transparent and automated access to all levels of the real estate markets is huge.

This would explain why the most important value drivers that come with the technology are based on transparency, efficiency, security, liquidity, decentralization and disintermediation. All in all it is a matter of trust and involvement of all stakeholders in the industry-chain, starting from clients in the rental market up to commercial property owners further speaking of banks, lawyers, valuers and last but not least the government.

Although the advantages are quite obvious the biggest challenges still lie within the markets regulatory boundaries and secondly that stakeholders of the real estate industry still need time to really understand the impact of blockchain technology. These insecurities unfortunately lead to poor funding for start-ups, as seen in the answers above, where most of the respondents mentioned to being funded from their own sources.

But the outlook isn't that sinistre. All of the start-ups taking part in the survey at least have an MVP ready to market or proof of concept, so to speak onboarded clients and finding themselves already in a growth stage. It seems that local financial authorities already are about to accept their solutions and business models. And furthermore partnerships with smaller or larger entities and a lively global network of enthusiasts are positive supporters.

Conclusion

It seems that we can see a clear consolidation when it comes to the use of blockchain technology within the real estate industry. As in any other industry too not all of the start-ups make it, which is a matter of fact. Although the startup scene has shrunk in blockchain real estate, we see significant more that have entered a growth stage. Also we see a growing spread of possible solutions to the real estate processes, where blockchainapplication obviously makes sense. Nevertheless we still believe that the technology has the power to change the game in the real estate industry and we want to encourage everyone and especially those who are still in place to follow their vision. As blockchain technology is an enabling technology, we need to believe in long term perspectives. Meanwhile the real estate industry is slowly adapting to the need of digitalization, but on the other hand still remains peoples business.

Featured Companies

FIBREE provides access to the global market to all startups who can use our platform to feature their business; in return, their features support FIBREE to have a global presence. This mutual support is what defines FIBREE and we are very glad to present these companies in the FIBREE Industry Report 2020.

be traded, using blockchain to establish the asset's financial history,

increase its liquidity and ensure optimal growth of the base asset via

our data-driven platform.



NY, New York 10002, United States

info@solidblock.co

liquidity easily while keeping the ownership of their properties. By offering smart Club- and Co-Investing solutions, everyone can directly invest into real estate - even with very small shares and a broad diversification.

CEO Martin Kassing

Tokn GmbH

Kleine Präsidentenstraße 1 10178 Berlin, Germany

contact@upvest.co

CEO Jakob Drzazga

Brickblock DS GmbH An der Kolonnade 11 10117 Berlin

contact@brickblock.io

CEO Nathan D. Wosnack

Ubitquity, LLC

300 Delaware Avenue, Suite 210-A /Wilmington, Delaware, USA, 19801

info@ubitquity.io

CEO Dr. Christian Simanek

Sharing Real Estate Value - We are supporting landlords to receive

SICOS S.à r.l.

29 Boulevard Grande-Duchesse Charlotte, L-1331 Luxembourg City, Luxembourg

hello@housetoken.io

Featured Companies 43

Global Network

As of July 2020 FIBREE is represented in 30 countries at 73 locations with 97 active regional chairs. The data for the following country reports have been aggregated by the regional chairs of the specific country based on their knowledge of the industry. This data has no claim to be representative, but should give an indication of where the current state of the industry is.







Country Facts

Source: Wikipedia



\$1.375 trillion

Gross Domestic Product

Regional Chairs

Get in touch

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O Perth

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• Sydney

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FIBREE Facts

 \varnothing

December 2018 First chapter established

Fun Fact

The Australian Alps receive more snow than Switzerland.

Size of Community

Participants who share your and our passion about blockchain and real estate

<50	<100	<500	<1000	>1000

Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org





Innovation Trigger

Peak of inflated Disillusionment

Trough of Disillusionment

Slope of Enlightment







Regional Chairs

Get in touch

Vienna

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O Graz

Marco Neumayer marco.neumayer@fibree.org

Country Facts

Source: Wikipedia Vienna 俞 Capital $\overset{\circ}{\leftarrow}$ 8.858.775

5	German Language
හි	Euro Currency
	\$477.672 billion

Population

FIBREE Facts

R

July 2018

First chapter established

Fun Fact

At over a kilometre in length and spanning four tram stops, Karl-Marx-Hof is one of the longest single residential buildings in the world.

Gross Domestic Product

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 48





Find your local chapter



Country Facts





Regional Chairs

Get in touch

O Brussels

Alexander Appelmans alexander.appelmans@fibree.org

FIBREE Facts

March 2019 First chapter established

Fun Fact

Robert Cailliau, co-inventor of the World Wide Web, is a Belgian.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

Disillusionment



Disillusionment





Find your local chapter



Country Facts

Source: Wikipedia

	Brasília Capital
စို႐	210,147,125 Population
F	Portuguese Language
හි	Real Currency
\otimes	\$1.893 trillion Gross Domestic Product

Regional Chairs

Get in touch

São Paulo

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FIBREE Facts

November 2018 First chapter established

Fun Fact

Brasilia, the capital took just 41 months to build, from 1956 to 1960.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

Disillusionment



Disillusionment

FIBREE Global Net 52

Slope of Enlightment



Canada

Country Map

Find your local chapter



Regional Chairs

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O Toronto

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Country Facts

Source: Wikipedia



\$1.812 trillion

Gross Domestic Product



 \varnothing

FIBREE Facts

March 2019 First chapter established

Fun Fact

There's an area in the Hudson Bay region that has less gravity than the rest of the planet.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

Disillusionment



Disillusionment

FIBREE Global Net 54





China

Country Map

Find your local chapter



Country Facts

Source: Wikipedia



Regional Chairs

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Shanghai

Albert Ao Xuan albert.xuan@fibree.org

China

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FIBREE Facts

March 2020 First chapter established

Fun Fact

There's a bridge between mainland China and Macau, where cars switch from left to right-hand drive and vice versa.

Size of Community

Participants who share your and our passion about blockchain and real estate



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How far the country is moving from paper-based business to a digital economy in the real estate industry

Partly digital, Still mostly Mostly 100% but mostly digital paperbased digital paperbased

Gartner Hype Cycle

Use of blockchain technology in real estate



Innovation Trigger

Trough of Disillusionment

Disillusionment

For blockchain and real estate

1. EBaaS

- 2. Ant Blockchain
- 3. Hunan Smart Gov Blockchain (Loudi)

Slope of Enlightment



Croatia

Country Map

Find your local chapter



Country Facts

Source: Wikipedia $\widehat{\blacksquare}$ Zagreb Capital

 $\overset{\circ}{\leftarrow}$

Population Croatian ģ Language Kuna 6) Currency \$63.172 billion \varnothing Gross Domestic Product

4,076,246

Regional Chairs

Get in touch

Zagreb

Tomica Cesar tomica.cesar@fibree.org

FIBREE Facts

July 2018 First chapter established

Fun Fact

The necktie that business people from all over the world wears daily originated from Croats who were fighting as mercenaries for the Kingdom of France.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Trigger

Disillusionment



Disillusionment

FIBREE Global Net 58

Slope of Enlightment





Regional Chairs

Get in touch

Tbilisi

Mariam Turashvili mariam.turashvili@fibree.org

Country Facts





\$17.83 billion Gross Domestic Product

FIBREE Facts

 \varnothing

July 2018 First chapter established

Fun Fact

Georgia is one of the oldest wine regions in the world, for at least 8000 years.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 60

Sector Activity

in blockchain and real estate



For blockchain applications » Bitcoin Most Promising Start-Ups For blockchain and real estate





Find your local chapter



Country Facts

Source: Wiki	pedia
	Berlin Capital



\$3.863 trillion Gross Domestic Product

FIBREE Facts

July 2018

 \mathcal{B}

First chapter established

Fun Fact

You can't be punished for escaping prison. This does however not include crimes committed in the great escape.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Analog to Dig	gital			ľ
How far the con digital economy	untry is moving fr y in the real estate	om paper-base e industry	ed business to a	F 1
Still mostly paperbased	Partly digital, but mostly paperbased	Mostly digital	100% digital	2

Disillusionment

Gartner Hype Cycle

Trigger

Use of blockchain technology in real estate



Disillusionment

Regional Chairs

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O Munich

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• Regensburg

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• Stuttgart

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Most Promising Start-Ups

For blockchain and real estate

1. Brickblock, Finexity, Immoschein, OLI Systems, **RAAY Real Estate**

2. Blockstate, Bloxxter, 21st Real Estate 3. EverReal

Slope of Enlightment



Find your local chapter



Country Facts

Source: Wikipedia Athens 俞 Capital



Regional Chairs

Get in touch

O Athens

Stefanie Behrendt stefanie.behrendt@fibree.org



FIBREE Facts

October 2019 First chapter established

Fun Fact

There are more tourists in Greece than Greeks during summer.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

Sector Activity

Slope of Enlightment



Hungary

Country Map

Find your local chapter



Country Facts

Source: Wikipedia



Regional Chairs

Get in touch

O Budapest

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FIBREE Facts

May 2019 First chapter established

Fun Fact

Judit Polgár is a Hungarian chess grandmaster. She is generally considered the strongest female chess player of all time.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle

Trigger

paperbased

Use of blockchain technology in real estate

paperbased

digital

Disillusionment

digital



Disillusionment

FIBREE Global Net 66

Sector Activity

Slope of Enlightment



India

Country Map

Find your local chapter



Regional Chairs

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Country Facts

Source: Wikipedia



FIBREE Facts

October 2018 First chapter established

Fun Fact

Yoga originated in India and is still practiced 5000 years later.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Trigger

Disillusionment



Disillusionment

FIBREE Global Net 68

Slope of Enlightment



Israel

Country Map

Find your local chapter



Regional Chairs

Get in touch

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O Tel Aviv

Or Perelman or.perelman@fibree.org

Country Facts

Source: Wikipedia



FIBREE Facts

August 2018 First chapter established

Fun Fact

The Dead Sea's surface and shores are 430.5 metres below sea level, Earth's lowest elevation on land.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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Use of blockchain technology in real estate

Trigger

Disillusionment



Disillusionment

Slope of Enlightment



Find your local chapter



Regional Chairs

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O Rome

Patrizia Giannini patrizia.giannini@fibree.org

Country Facts





FIBREE Facts

July 2018

First chapter established

Fun Fact

Italian scientist Alessandro Volta created the first battery in 1800. The volt – the unit of electrical power – is named after him.

Size of Community

Participants who share your and our passion about blockchain and real estate



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Gartner Hype Cycle



Innovation Trigger

Peak of inflated Disillusionment

Trough of Disillusionment



Slope of Enlightment

Find your local chapter



Regional Chairs

Get in touch

O Nairobi

Samuel Ouko samuel.ouko@fibree.org

Country Facts

Source: Wikipedia



FIBREE Facts

January 2019 First chapter established

Fun Fact

Adam Cheyer, Co-Founder of Apple's Siri, liked the idea of the Kenian word "Siri", which means "secret" in Swahili.

Size of Community

Participants who share your and our passion about blockchain and real estate

<50	<100	<500	<1000	>1000

Join the Community

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Use of blockchain technology in real estate

Trigger

Disillusionment



Disillusionment

Sector Activity

Slope of Enlightment



Find your local chapter



Country Facts

Source: Wikipedia



Currency

\$15.134 billion

Gross Domestic Product

Regional Chairs

Get in touch

Valletta

Andrea Romaoli andrea.romaoli@fibree.org

FIBREE Facts

 \varnothing

September 2019 First chapter established

Fun Fact

One of the most iconic moments in Maltese history was the great siege of Malta in 1565. 6000 knights defended Malta from 40,000 soldiers.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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Trigger

Disillusionment



Disillusionment

FIBREE Global Net 76

Slope of Enlightment





Country Facts



\$1.322 trillion

Gross Domestic Product

Regional Chairs

Get in touch

• Mexico City

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FIBREE Facts

 \varnothing

February 2020 First chapter established

Fun Fact

Cuexcomate is the world's smallest volcano. It stands 13 meters tall, and it's accessible via stairs that allow you to walk up to the crater.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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community@fibree.org fibree.org



Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 78





Slope of Enlightment



Find your local chapter

Regional Chairs

Get in touch

• Amsterdam

• Enschede

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Jan Veuger jan.veuger@fibree.org



Country Facts

Source: Wikipedia



FIBREE Facts

July 2018 First chapter established

Fun Fact

With at least 18 million bicycles there are more bikes than people in the country.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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Gartner Hype Cycle

Trigger

Disillusionment



Disillusionment

Netherlands

Slope of Enlightment



Nigeria

Country Map

Find your local chapter



Country Facts

Source: Wikipedia 俞 Abuja Capital

0%	206,630,269 Population
5	English Language
8	Naira Currency

\$504.57 billion

Gross Domestic Product

Regional Chairs

Get in touch

O Abuja

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Lagos

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FIBREE Facts

 \varnothing

April 2020 First chapter established

Fun Fact

Nollywood is the nickname for the Nigerian Movie Industry, and it's even bigger than Hollywood. It is estimated to be second in the world, only to Bollywood in India.

Size of Community

Participants who share your and our passion about blockchain and real estate

<50	<100	<500	<1000	>1000

Join the Community

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Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 82







Find your local chapter



Country Facts



 $\overline{}$

6

 \varnothing

Polish

Language

Polish Złoty

\$607 billion

Gross Domestic Product

Currency



Get in touch

• Warsaw

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FIBREE Facts

January 2019

First chapter established

Fun Fact

All the TV programs in Poland are dubbed by one male voice, no matter if it's a woman, man, or kid speaking, everything is read by the same, male voice.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

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Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 84

Poland

Slope of Enlightment

Find your local chapter



Regional Chairs

Get in touch

Lisbon

Cristina Campian cristina.campian@fibree.org

Country Facts



FIBREE Facts

October 2019

First chapter established

Fun Fact

Portugal has the biggest wave worldwide, called Nazaré. 2017 Brazilian surfer Rodrigo Koxa surfed the 24,4 meter wave in Nazaré, Portugal.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Trigger

Disillusionment



Disillusionment

Slope of Enlightment



Find your local chapter



Regional Chairs

Get in touch

O Moscow

Stephen Inscoe stephen.inscoe@fibree.org

Country Facts

Source: Wikipedia





FIBREE Facts

May 2019

First chapter established

Fun Fact

Russia has almost the same area than dwarf planet Pluto. Pluto has an area of 17,600,000 km², and Russia has an area of 17,098,246 km².

Size of Community

Participants who share your and our passion about blockchain and real estate



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community@fibree.org fibree.org



Gartner Hype Cycle

Trigger

Disillusionment

Real Estate Sector



Disillusionment

FIBREE Global Net 88

Sector Activity

Slope of Enlightment



Saudi Arabia

Country Map

Find your local chapter



Country Facts

Source: Wikipedia Riyadh 俞



Regional Chairs

Get in touch

O Riyadh

Faraj Alhouty faraj.alhouty@fibree.org

FIBREE Facts

February 2020 First chapter established

Fun Fact

350 million years ago, there was actually a six-meter tall mushroom in Saudi Arabia. Scientists claim that it was likely the largest living thing on dry land at that time.

Size of Community

Participants who share your and our passion about blockchain and real estate

<50	<100	<500	<1000	>1000

Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Trigger

Disillusionment



Disillusionment

FIBREE Global Net 6



Slope of Enlightment

Plateau of Productivity Saudi Arabia

Find your local chapter



Regional Chairs

Get in touch

• Singapore

Oliver Siah oliver.siah@fibree.org

Country Facts

Source: Wikipedia



\$391.875 billion Gross Domestic Product

FIBREE Facts

 \varnothing

September 2019 First chapter established

Fun Fact

Chewing gum (except dental and nicotine gums) is officially forbidden in Singapore.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Gartner Hype Cycle

Trigger

Disillusionment



Disillusionment

Sector Activity

Slope of Enlightment



Slovenia

Country Map

Find your local chapter



Country Facts



Regional Chairs

Get in touch

Ljubljana

Andrej Lampe andrej.lampe@fibree.org Denis Petrovcic denis.petrovcic@fibree.org

\$56 billion \varnothing Gross Domestic Product

FIBREE Facts

July 2018

First chapter established

Fun Fact

A single vine of Žametovka growing in the Slovenian town of Maribor is estimated by the Guinness Book of Records to be the oldest living vine still producing fruit in the world at over 400 years of age.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Partly digital,

Still mostly Mostly but mostly paperbased digital paperbased

100% digital

Disillusionment

Gartner Hype Cycle

Trigger

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 94

Sector Activity



Most used Technology For blockchain applications **>>** Ethereum Most Promising Start-Ups For blockchain and real estate 1. Blocksquare 2. Elements Estate 3. -Climbing Entering the Slope the Plateau

Slope of

Enlightment

Slovenia

Time

Plateau of

Productivity

Spain

Country Map

Find your local chapter Barcelona Madria 0 Levante (Region) Sevilla Malaga Fuengirola

Regional Chairs

Get in touch

O Barcelona

Daniel Codina Guerra daniel.codina@fibree.org

• Fuengirola

Ali Parandeh Zandpour ali.parandeh.zandpour@fibree.org

• Levante (Region)

Andrew Mark Campbell-Boross andrew.campbell.boross@fibree.org José García Caballero jose.garcia.caballero@fibree.org

Madrid

Alfredo Diaz-Araque Moro alfredo.diaz-araque.moro@fibree.org Miguel Linera Alperi miguel.linera@fibree.org

Malaga

Vicente Ortiz Alonso vicente.ortiz.alonso@fibree.org

Seville

Eric Sanchez Galvez eric.sanchez@fibree.org

Country Facts

Source: Wikipedia





FIBREE Facts

January 2019 First chapter established

Fun Fact

Spain is the only country in Europe producing bananas.

Size of Community

Participants who share your and our passion about blockchain and real estate

<50	<100	<500	<1000	>1000

Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org





Disillusionment

Trigger

Disillusionment

Slope of Enlightment



Find your local chapter



Country Facts



\$704 billion Gross Domestic Product



Get in touch

Lugano

Paolo Siligoni paolo.siligoni@fibree.org

🔾 Zug

Lutz Thelen lutz.thelen@fibree.org Michael Trübestein michael.truebestein@fibree.org Walter Strametz walter.strametz@fibree.org

FIBREE Facts

 \varnothing

July 2018 First chapter established

Fun Fact

Being an animal-loving country, it's against the law to keep only one guinea pig. You need to have a pair.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Gartner Hype Cycle

Trigger

Disillusionment

Real Estate Sector



Disillusionment

Sector Activity

Enlightment

Productivity

Switzerland

Uganda

Country Map

Find your local chapter



Country Facts

Source: Wikipedia



Regional Chairs

Get in touch

Kampala

Ronald Kaweesi ronald.kaweesi@fibree.org

FIBREE Facts

August 2019 First chapter established

Fun Fact

In Uganda, a "Rolex" is an omelette wrapped in a chapatti.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Gartner Hype Cycle

Trigger

Disillusionment

Use of blockchain technology in real estate



Disillusionment

FIBREE Global Net 8

Sector Activity

Slope of Enlightment



Find your local chapter

Regional Chairs

Get in touch

London

Ben Jeater ben.jeater@fibree.org

Jeremy Barnett jeremy.barnett@fibree.org Kevin O'Grady kevin.ogrady@fibree.org



Country Facts Source: Wikipedia



FIBREE Facts

May 2019

First chapter established

Fun Fact

Wales has a railway station named "Llanfairpwllgwyngyllgogerychwyrndrobwllllantysiliogogogoch".

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

community@fibree.org fibree.org



Trigger

Use of blockchain technology in real estate



Disillusionment

Disillusionment

Climbing Entering the Slope the Plateau Time

Slope of Enlightment

Plateau of Productivity United Kingdom

US

Country Map

Find your local chapter



Regional Chairs

Get in touch

O Boston

Paul Ferreira paul.ferreira@fibree.org

Chicago

Geoffrey Kasselman geoffrey.kasselman@fibree.org

O Denver

Garratt Hasenstab garratt.hasenstab@fibree.org

Los Angeles

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New York

Alexandra Levin alexandra.levin@fibree.org Anthony Elia anthony.elia@fibree.org John Dean Markunas johndeanmarkunas@fibree.org

• Philadelphia

Gary Brandeis gary.brandeis@fibree.org

• San Francisco (San José)

Ranga Krishnan ranganathan.krishnan@fibree.org

Seattle

Brock Freeman brock.freeman@fibree.org

Country Facts

Source: Wikipedia





October 2018

First chapter established

Fun Fact

You can get a unicorn hunting license from Michigan's Lake Superior State University.

Size of Community

Participants who share your and our passion about blockchain and real estate



Join the Community

Gladly let us know if you want to support the FIBREE network, open a regional chair in your area or if you want to launch an event centered around the topic of blockchain and real estate. We're happy to hear from you!

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Gartner Hype Cycle



Innovation Trigger

Peak of inflated Disillusionment

Trough of Disillusionment



Enlightment

Productivity

USA

Product Database

This product database was created by a FIBREE working group mainly based on desktop research (see page 36 for details). Products that were public available by 30 June 2020 have been recognized to the best of our effort. As the industry is constantly changing this can only be a snapshot and has no claim to be complete. So please be aware that some of the products listed, might in the period in between have ceased their activities. Via the FIBREE website you can add products / startups to this database or let us know in case projects that are listed here ceased meanwhile. Highlighted products are supporting FIBREE as a featured company.

Want to be found in the haystack? Have a look on how to become a FIBREE supporter as featuredcompany on our website: fibree.org/advertise

Brand	Focus	City	Country	Website
Crowdium	Invest and Finance	Buenos Aires	Argentinia	crowdium.com.ar
Avestix	Invest and Finance	Brisbane	Australia	avestix.com
Bricklet	Invest and Finance	Manly	Australia	bricklet.com.au
BuildSort	Plan and Build	Perth	Australia	buildsort.com
Contracoin	Markets and Platforms	Southport	Australia	contracoin.network
Deedcoin	Invest and Finance	Melbourne	Australia	deedcoinlaunch.com
Fractonium	Invest and Finance	Sydney	Australia	fractonium.com
Frethan	Building Technologies	Brisbane	Australia	frethan.com
Hutly	Markets and Platforms	Brisbane	Australia	hutly.com
iContract Technologies	Plan and Build	Sydney	Australia	icontract.ai
Konkrete	Invest and Finance	Melbourne	Australia	konkrete.io
Labrys	Markets and Platforms	Brisbane	Australia	labrys.io
Liquid Token	Invest and Finance	Melbourne	Australia	liquidtoken.net
Powerledger	Building Technologies	Perth	Australia	powerledger.io
Serenity Source	Building Technologies	Narrabeen	Australia	serenitysource.com.au
Tokenized	Invest and Finance	Canberra	Australia	tokenized.com
Black Manta Capital Partners	Invest and Finance	Vienna	Austria	blackmanta.capital
Brickwise	Invest and Finance	Graz	Austria	brickwise.at
Hot City (Picapipe GmbH)	Smart City Solutions	Vienna	Austria	picapipe.com
realest8	Invest and Finance	Vienna	Austria	realest8.at
Rise Markets	Invest and Finance	-	Bahamas	risemarkets.io
Asset Voucher	Invest and Finance	Knokke	Belgium	assetvoucher.info
Estate Share	Invest and Finance	Leuven	Belgium	estateshare.eu
Propchain	Manage and Operate	Brussels	Belgium	propchain.be
Settlemint	Manage and Operate	Leuven	Belgium	settlemint.com
Trase	Building Technologies	Antwerpen	Belgium	trase.be
Growth Tech	Manage and Operate	Rio de Janeiro	Brazil	growthtech.com.br
MB Digital Assets	Invest and Finance	Sao Paulo	Brazil	mercadobitcoin.com.br
One Percent	Manage and Operate	Sao Paulo	Brazil	onepercent.io
Atl.Estate	Invest and Finance	-	Britsh Virgin Islands	alt.estate
BIG Token	Invest and Finance	-	Britsh Virgin Islands	bigtk.io
Limechain	Building Technologies	Sofia	Bulgaria	limechain.tech
Acreage	Invest and Finance	Pickering	Canada	acreageway.com
BRED Token	Invest and Finance	Ontario	Canada	bredtoken.com
Chelle Coin	Invest and Finance	Mississauga	Canada	chellecoin.com
Coinvestion Technologies Inc.	Invest and Finance	Burnaby	Canada	coinvestion.com
Fidelity Holding Inc.	Building Technologies	Quebec	Canada	fidelityholdingsinc.ca
Honestdoor	Markets and Platforms	-	Canada	honestdoor.com
Infiblocks Technologies Inc	Manage and Operate	Toronto	Canada	infiblocks.com
Nobul	Markets and Platforms	Toronto	Canada	nobul.com
ProximaX	Markets and Platforms	Vancouver	Canada	proximax.io
RealShare	Invest and Finance	Calgary	Canada	yourealshare.com
Reitium	Markets and Platforms	Vancouver	Canada	reitium.com
Supa X	Invest and Finance	Ontario	Canada	supax.com

Tokenfunder	Invest and Finance	-	Canada	tokenfunder.com
XR Web	Markets and Platforms	-	Canada	xrweb.network
Cash Telex	Invest and Finance	-	Cayman Islands	ico.cashtelex.com
Evareium	Invest and Finance	-	Cayman Islands	evareium.io
GRIP Investments	Invest and Finance	-	Cayman Islands	grip.investments
Aassio	Markets and Platforms	Hong Kong	China	aass.io
Brix International Limited	Invest and Finance	Hong Kong	China	brix.international
Chaintech	Building Technologies	Beijing	China	cchaintech.com
Cybereits	Invest and Finance	Beijing	China	cybereits.com
EBaaS	Building Technologies	Shanghai	China	ebaas.com
IHT	Markets and Platforms	Shanghai	China	ihtcoin.com
Uprets	Invest and Finance	Bejing	China	uprets.io
VastChain	Building Technologies	Hang Zhou	China	vastchain.cn
Wealthe Coin	Invest and Finance	-	China	wealthe.io
White Crypto City	Invest and Finance	Limassol	Cyprus	mightycause.com/story/whitecryp- tocity
Blocknify	Building Technologies	Prague	Czech Republic	blocknify.com
Blocks	Invest and Finance	Prague	Czech Republic	blocks.eu.com
Brikkapp	Markets and Platforms	Prague	Czech Republic	brikkapp.com
Akaiito	Markets and Platforms	Tallinn	Estonia	akaiito.io
Bondkick	Markets and Platforms	Tallinn	Estonia	bondkick.com
Emphy	Manage and Operate	Tallinn	Estonia	emphy.io
Chainum	Invest and Finance	Besançon	France	chaineum.com
Cocoricos	Invest and Finance	-	France	cocoricos.io
Olarchy	Markets and Platforms	Paris	France	olarchy.com
Token Invest	Invest and Finance	Paris	France	tokeninvest.fr
21st Real Estate	Research and Valuate	Berlin	Germany	21re.de
51Nodes	Building Technologies	Stuttgart	Germany	51nodes.io
Apato	Invest and Finance	Berlin	Germany	apato.company
BIM Real Estate Design	Manage and Operate	Munich	Germany	infinite.de
Bloxxter	Invest and Finance	Hamburg	Germany	bloxxter.com
Cryptowerk	Research and Valuate	Munich	Germany	cryptowerk.com
Datarella	Building Technologies	Munich	Germany	datarella.com
Domi	Research and Valuate	Berlin	Germany	domilabs.io

Evan.Network	Building Technologies	Dresden	Germany	evan.network	
EverReal	Markets and Platforms	Munich	Germany	everreal.co	
Finexity AG	Invest and Finance	Hamburg	Germany	finexity.com	
Fundament	Invest and Finance	Hamburg	Germany	fnd.group	
iFunded	Markets and Platforms	Berlin	Germany	ifunded.de	
KlickOwn AG	Invest and Finance	Hamburg	Germany	klickown.com	
Micobo	Building Technologies	Frankfurt am Main	Germany	micobo.com	
OLI Systems	Manage and Operate	Stuttgart	Germany	my-oli.com	
RAAY Real Estate	Building Technologies	Munich	Germany	raay.digital	

Spherity	Building Technologies	Dortmund	Germany	spherity.com
Upvest	Invest and Finance	Berlin	Germany	upvest.co
W2B.IO / Wollenberg Capital	Invest and Finance	Frankfurt am Main	Germany	w2b.io
Bitland	Smart City Solutions	Kumasi	Ghana	bitland.world
Innovasis Hotels	Invest and Finance	Gibraltar	Gibraltar	innovasishotels.com
LVE	Building Technologies	-	Greece	lveblockchain.org
Realchain	Invest and Finance	Athens	Greece	f6s.com/realchainp.c
Rech	Markets and Platforms	-	Greece	rechus.com
SmartDeposit	Invest and Finance	Budapest	Hungary	smartdeposit.io
Minddeft	Building Technologies	Ahmedabad	India	minddeft.com
Origochain	Smart City Solutions	Thiruvananthapuram	India	origochain.com
Property Share	Invest and Finance	Bangalore	India	propertyshare.in
Zeroblocks	Building Technologies	Hyderabad	India	f6s.com/zeroblocks
I-Pro Token	Invest and Finance	-	Indonesia	i-protoken.com
Triumland	Invest and Finance	Bitung	Indonesia	triumland.com
Banx	Invest and Finance	Tel Aviv	Israel	banx.one
Everflow	Invest and Finance	Tel Aviv	Israel	everflow.global
Inveniam	Building Technologies	-	Israel	inveniam-group.com
Solidblock	Invest and Finance	Jerusalem	Israel	solidblock.co
CASAVO	Markets and Platforms	Milano	Italy	casavo.com
HomePanda	Markets and Platforms	Milano	Italy	homepanda.it
Real House	Invest and Finance	Milano	Italy	realhouse.io
REDD	Research and Valuate	Roma	Italy	realestatedocumentsdata.com
Trusters	Invest and Finance	Milano	Italy	trusters.it
WIZKEY	Markets and Platforms	Milano	Italy	wizkey.io
Yookye	Markets and Platforms	Alba	Italy	yookye.io
Land Layby	Invest and Finance	Nairobi	Kenya	hrbe.io
Squarex	Markets and Platforms	-	Latvia	squarex.io
CROWDLITOKEN AG	Invest and Finance	Triesen	Liechtenstein	crowdlitoken.com
Housetoken	Invest and Finance	Luxembourg	Luxembourg	housetoken.io
STOKR	Markets and Platforms	Luxembourg	Luxembourg	stokr.io
Tokeny	Building Technologies	Luxembourg	Luxembourg	tokeny.com
Whizzl	Smart City Solutions	Kuala Lumpur	Malaysia	whizzl.io
Tokenomica	Markets and Platforms	San Gwann	Malta	tokenomica.com
Kauri	Markets and Platforms	-	Marshall Islands	kauricrypto.com
100Ladrillos	Invest and Finance	Zapopan	Mexico	100ladrillos.com
Mexenova	Invest and Finance	-	Mexico	mexenova.com
Ofertare	Markets and Platforms	-	Mexico	ofertare.com
Bitprop BV	Invest and Finance	Amsterdam	Netherlands	bitprop.com

FIBREE INDUSTRY REPORT 2020

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Blandlord	Markets and Platforms	Rotterdam	Netherlands	blandlord.com
Blockmaterials	Plan and Build	Heerlen	Netherlands	blockmaterials.com

Brickblock	Buidling Technologies	Amsterdam	Netherlands	brickblock.io
DecenterX	Building Technologies	Amsterdam	Netherlands	decenterx.com
FIDA	Invest and Finance	LC Helmond	Netherlands	fida.io
house.coop	Invest and Finance	Rotterdam	Netherlands	the-equitable-project.org
LegalThings	Research and Valuate	Amsterdam	Netherlands	legalthings.io
Loek!	Markets and Platforms	The Hague	Netherlands	loekonline.nl
LTO Network	Markets and Platforms	Amsterdam	Netherlands	ltonetwork.com
Max Property Group B.V. en Max Crowdfund B.V.	Invest and Finance	Rotterdam	Netherlands	maxpropertygroup.com
MUXE	Markets and Platforms	Enschede	Netherlands	muxe.io
SBR Nexus	Research and Valuate	Amsterdam	Netherlands	sbrnexus.nl
Your Fund	Invest and Finance	Amsterdam	Netherlands	yourfund.nl
JUSTIN OKPU & CO. LTD.	Research and Valuate	Abuja	Nigeria	justinokpuandco.wordpress.com
Cestates	Markets and Platforms	Manila	Philippines	cestates.io
Quickwire Inc.	Markets and Platforms	Manila	Philippines	qwikwire.com
CCUniverse	Building Technologies	Warsaw	Poland	ccuniverse.org
Fortem	Invest and Finance	Warsaw	Poland	fortemcoin.io
SonarHome	Markets and Platforms	Warsaw	Poland	sonarhome.pl
Viejo San Juan Comunidad RE Fund	Markets and Platforms	San Juan	Puerto Rico	inportalusa.com
Universal Blockchain	Smart City Solutions	-	Russia	universablockchain.com
Waves Enterprise	Building Technologies	-	Russia	wavesenterprise.com
Atlant	Invest and Finance	Singapore	Singapore	atlant.io
BlockCrowd	Markets and Platforms	Singapore	Singapore	blockcrowd.io
Fraxtor	Invest and Finance	Singapore	Singapore	fraxtor.com
Fundplaces	Building Technologies	Singapore	Singapore	fundplaces.com
Investax	Markets and Platforms	Singapore	Singapore	investax.io
Moonwhale	Building Technologies	Singapore	Singapore	moonwhale.io
Mossland	Invest and Finance	Singapore	Singapore	moss.land
Real	Markets and Platforms	Singapore	Singapore	real.markets
SIMMST	Building Technologies	Piestany	Slovakia	simmst.de

Blocksquare	Building Technologies	Ljubljana	Slovenia	blocksquare.io
Elements Estates	Invest and Finance	Ljubljana	Slovenia	elementsestates.io
Investis	Invest and Finance	Ljubljana	Slovenia	investis.capital
Arex Real Estate Technologies	Building Technologies	Madrid	Spain	arex.technology
Bionm	Plan and Build	Madrid	Spain	bionm.es
BrickFunding	Markets and Platforms	Madrid	Spain	brickfunding.com
Deed	Markets and Platforms	Malaga	Spain	deedspain.com
Dyvare	Markets and Platforms	Almeria	Spain	dyvare.com
Housers	Invest and Finance	Madrid	Spain	housers.com
Landstead	Smart City Solutions	Barcelona	Spain	landstead.atraurablockchain.com
RealFund	Invest and Finance	Madrid	Spain	realfund.tech

The Tokenbuilder	Invest and Finance	-	Spain	thetokenbuilder.com
Tokeniza	Invest and Finance	Madrid	Spain	tokeniza.es
Transfertrade	Building Technologies	Madrid	Spain	transfertrade.com
Vicente Ortiz&Co	Markets and Platforms	Marbella	Spain	vicenteortizabogados.com
Chromaway	Building Technologies	Stockholm	Sweden	chromaway.com
AdNovum	Building Technologies	Zurich	Switzerland	adnovum.ch
Algotecture	Research and Valuate	Zurich	Switzerland	algotecture.github.io
Blockimmo	Markets and Platforms	Zug	Switzerland	blockimmo.ch
BlockState	Markets and Platforms	Zug	Switzerland	blockstate.com
Bluenote	Smart City Solutions	Zug	Switzerland	bluenote.world
Brickbit	Manage and Operate	Chiasso	Switzerland	brikbit.io
Brickmark AG	Invest and Finance	Zug	Switzerland	brickmark.net
Casa Real Estate AG	Invest and Finance	Trogen	Switzerland	casarealestate.ch
Consensys	Building Technologies	Zug	Switzerland	consensys.net
Crowdlitoken	Invest and Finance	Zurich	Switzerland	crowdlitoken.com
Crypto Real Estate	Building Technologies	Zug	Switzerland	cryptorealestate.tech
Elea Labs AG	Building Technologies	Baar	Switzerland	elea.io
element36	Building Technologies	Zug	Switzerland	element36.io
eLocations	Markets and Platforms	Zug	Switzerland	elocations.com
PrepayWay	Markets and Platforms	Baar	Switzerland	prepayway.com
Swinca	Invest and Finance	Zug	Switzerland	swinca.io
Swiss Realty	Invest and Finance	Zurich	Switzerland	swissrealty.io
Swiss-Crowd	Building Technologies	Lugano	Switzerland	swiss-crowd.com
Token Factory	Building Technologies	Zug	Switzerland	tokenfactory.global
Tokenestate.io	Invest and Finance	Geneva	Switzerland	tokenestate.io
Sharkaroo	Building Technologies	Bangkok	Thailand	sharkaroo.io
Etherty	Invest and Finance	-	UAE	etherty.com
Global REIT	Invest and Finance	Dubai	UAE	globalreit.io
SmartCrowd	Markets and Platforms	Dubai	UAE	smartcrowd.ae
Clean Path Emerging Markets Uganda (CPEM)	Markets and Platforms	-	Uganda	americancryptoassociation.com
Crypto Savannah	Building Technologies	Kampala	Uganda	cryptosavannah.com
Bips	Invest and Finance	Cheshire	UK	bips.moneybrain.com
Block Estates	Markets and Platforms	London	UK	blockestates.io
Blockdeed	Invest and Finance	London	UK	blockdeed.com
Brikcoin	Invest and Finance	London	UK	brikcoin.net
BuildingIM	Building Technologies	Guildford	UK	buildingim.com
Click to Purchase	Markets and Platforms	London	UK	clicktopurchase.com
CurveBlock	Invest and Finance	Leeds	UK	curveblock.io
CustomCoin	Invest and Finance	London	UK	ccnowpro.com
Dacx	Markets and Platforms	London	UK	dacx.io
ehab	Plan and Build	Norwich	UK	ehab.co
Elad Network	Invest and Finance	London	UK	elad.network
Fetch	Smart City Solutions	Cambridge	UK	fetch.ai
Fieldcoin	Markets and Platforms	London	UK	fieldcoin.io
Global Property Register	Markets and Platforms	London	UK	globalpropertyregister.io

Helex	Markets and Platforms	London	UK	helex.world
Inferium	Invest and Finance	London	UK	inferium.co
Leaseum Partners	Invest and Finance	London	UK	leaseumpartners.com
Resilience Parnters Ltd	Research and Valuate	London	UK	resilience-partners.co.uk
Smartlands	Invest and Finance	London	UK	smartlands.io
Tag World Exchange	Invest and Finance	London	UK	twex.info
TPX TrustMe Property Exchange (UK) Limited	Invest and Finance	London	UK	tpx-london.io
XRed	Invest and Finance	London	UK	xred.co
YieldCoin	Invest and Finance	London	UK	yieldcoin.io
Zortrex	Manage and Operate	Prestonpans	UK	zortrex.com
Illuminates	Invest and Finance	-	Ukraine	illuminates.org
Opengeekslab	Building Technologies	Zaporizhzhia	Ukraine	opengeekslab.com
Stobox	Building Technologies	Kyiv	Ukraine	stobox.io
A Real Blockchain Solution	Invest and Finance	Dallas	USA	arealblockchainsolution.com
Abstract Tokenization	Invest and Finance	Seattle	USA	abstracttokenization.com
Alfa-Enzo	Invest and Finance	Bellevue	USA	alfaenzo.com
ALTS Capital	Invest and Finance	Connecticut	USA	altscapital.com
Bei.re	Research and Valuate	San Jose	USA	bei.re
BIT Real Estate Exchange	Invest and Finance	Lewis Center	USA	cointinuum.io
BIXReal	Invest and Finance	Lewes	USA	bixreal.io
Blockchain Hotels	Invest and Finance	Lewes	USA	innovasishotels.com/chain-2
Blockchain in CRE	Invest and Finance	Palo Alto	USA	blockchaincre.io
Blockchainrealestatesystem	Building Technologies	Makawao	USA	blockchainrealestatesystem.com
Blockcities	Markets and Platforms	Pleasant Grove	USA	blockcities.com
Blockspaces	Building Technologies	Татар	USA	blockspaces.io
Buildingbits	Invest and Finance	Portland	USA	buildingbits.com
Casacrowd	Manage and Operate	Delaware	USA	casacrowd.com
CertifiedTrue	Manage and Operate	New York	USA	certifiedtrue.co
Cherre	Research and Valuate	New York	USA	cherre.com
Coinrealty	Manage and Operate	New York	USA	coinrealty.com
Compound	Invest and Finance	New York	USA	getcompound.com
CompStak	Research and Valuate	New York	USA	compstak.com
Concordiarealty	Research and Valuate	Oak Brook	USA	concordiarealty.com
Concreit	Invest and Finance	Seattle	USA	concreit.com
Сргор	Manage and Operate	Covington	USA	cprop.io
DomiDocs Ins	Markets and Platforms	Florida	USA	domidocs.com
Earn	Markets and Platforms	New York	USA	earn.re
Figure	Invest and Finance	San Francisco	USA	figure.com
Finicity	Research and Valuate	Saltlake City	USA	finicity.com
FlareAgent	Markets and Platforms	New York	USA	flareagent.com
FundingTree	Markets and Platforms	Westlake Village	USA	fundingtree.com
Harbor	Invest and Finance	San Francisco	USA	harbor.com
HomeBloc	Invest and Finance	New York	USA	homebloc.io
HouseAfrica	Research and Valuate	San Francisco	USA	houseafrica.io
Houzlink Technologies	Markets and Platforms	New York	USA	houzlinktechnologies.com

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Ubitquity LLC	Research and Valuate	Wilmington	USA	ubitquity.io
Tokensoft	Building Technologies	San Francisco	USA	tokensoft.io
Token Listings	Markets and Platforms	New York	USA	tokenproperty.netlify.com
thirdACT	Invest and Finance	Menlo Park	USA	thirdact.io
The Praetorian Group	Invest and Finance	New York	USA	praetoriangroup.io
The LendingCoin	Invest and Finance	Boise	USA	thelendingcoin.com
TerraChain CRE	Manage and Operate	Seattle	USA	terra-chain.io
Tellus Title Company	Manage and Operate	San Francisco	USA	tellustitle.com
Superworld	Markets and Platforms	Los Angeles	USA	superworldapp.com
StreetWire	Research and Valuate	New York	USA	streetwire.net
Staybit	Invest and Finance	Miama	USA	staybit.io
Social Spaces	Markets and Platforms	Los Angeles	USA	socialspaces.life
Slice	Invest and Finance	Los Angeles	USA	slice.market
ShelterZoom Corp.	Markets and Platforms	New York	USA	shelterzoom.com
Securitize	Invest and Finance	New York	USA	securitize.io
Rise Housing	Invest and Finance	New York	USA	risehousing.io
Resourceblockchain	Invest and Finance	Denver	USA	resourceblockchain.io
Relex	Invest and Finance	New Jersey	USA	relex.io
RELedger	Markets and Platforms	New York	USA	reledger.org
Rebloc	Research and Valuate	New York	USA	rebloc.io
Realto	Invest and Finance	Frisco	USA	realto.estate
Realio	Invest and Finance	New York	USA	realio.fund
Realblocks	Invest and Finance	New York	USA	realblocks.com
Real Estate Consortia	Markets and Platforms	San Francisco	USA	reconsortia.com
Real Asset Exchange	Invest and Finance	San Jose	USA	rax.exchange
QuantmRE	Invest and Finance	Newport Beach	USA	quantmre.com
Propy	Markets and Platforms	Delaware	USA	propy.com
Propertylist	Markets and Platforms	Irvine	USA	f6s.com/propertylist.io
Propellr / Fluidity	Manage and Operate	New York	USA	propellr.com
Privy	Invest and Finance	Denver	USA	getprivynow.com
NYCREC	Invest and Finance	New York	USA	nycrec.io
Meridio	Invest and Finance	New York	USA	meridio.co
Leasera	Manage and Operate	Seattle	USA	leasera.com
Jointer	Invest and Finance	Los Altos	USA	jointer.io
Imbrex	Markets and Platforms	New York	USA	imbrex.io

Velocity Ledger	Invest and Finance	New York	USA	velocityledger.com	
Vertalo	Markets and Platforms	New York	USA	vertalo.com	
Vestfar	Invest and Finance	Los Angeles	USA	vestfar.io	
VTS	Manage and Operate	New York	USA	vts.com	
Zeehaus Inc.	Invest and Finance	San Francisco	USA	zeehaus.com	

Our Global Sponsor

Support in bringing together the expertise of pioneers and exchanging knowledge and insights that have already been gained.



CBRE

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"The partnership with FIBREE offers us excellent opportunities for global networking within the real estate blockchain scene," says Dr. Thomas Herr, EMEA Head of Digital Innovation at CBRE. "It is impressive how quickly and sustainably FIBREE has grown since its foundation in 2018. FIBREE already connects more than 6,000 blockchain and real estate experts at 73 locations in 30 countries on all continents.

CBRE's more than 90,000 professionals provide exceptional outcomes for clients in 100+ countries by combining local market insight, broad services, specialized expertise and premier tools and resources.

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FIBREE Executive Board

Based on the steady growth of the network we clearly stated that evenmore we want to connect people and organisations globally who share a common interest of blockchain and real estate. By bringing together the expertise of pioneers in this field and sharing knowledge and insights already gained, FIBREE wants to make an important contribution to the adoption and implementation of this technology in the real estate market in the coming years.

Our mission

We want to develop local networks across the globe, especially in those countries where we are not represented yet, collect and analyse data to promote the adoption of blockchain in real estate.

We are proud to have the best experts within FIBREE and to have regional chairs that can lead and inspire their network, thus being able providing the the best data about blockchain and real estate in each local network.



Jo Bronckers Vice President PR / Corporate Relations

Amsterdam, Netherlands



Alexandra Levin Regional Development North America

New York City, USA



Florian Huber Community Engagement

Vienna, Austria



Walter Strametz Treasurer

Zug, Switzerland

FIBREE Academic Board (FAB)

The main objective is to share knowledge in this specific research area and to increase the number of participants with a scientific or professional research background. This specific professional group (academic partners) is intended for professionals who are active in real estate or blockchain/IT within the FIBREE community. The academic board offers student participation and PhD participation.

Purpose

The objective of the AB is to increase the number of participants in FIBREE and thus also the number of participants with a scientific or professional research background. This is a specific, but very valuable, professional group (Academic partner) intended for professionals who are professionally active in real estate or Blockchain/IT. within the FIBREE community, which is expected to experience great added value if it can be easily connected to scientific and research professionals elsewhere in the world. FIBREE has many advantages for this community because they, as researchers and scientists, share their research results within FIBREE. That is why FIBREE wants to set up the ,AB' specifically intended to unite and, where possible, facilitate this community. The AB advises the board of FIBREE on both solicited and unsolicited matters relating to FIBREE's strategy and the connection - both internally and externally - with professional research institutes and professional researchers and scientists.

Education

We are working on a way of incorporating developments about Blockchain and real estate into a Massive Open Online Course (MOOC) with opportunities for certification, mirco credentials, etc. in collaboration with other universities and the professional field.

PhD-participation

Scientistswith a PhD title or PhD candidates and/or a professional association with a university of applied sciences can participate in this group. The main objective is to share knowledge in this specific research area and to jointly develop a scientific agenda. In addition to the two Meetups per year in which participation is possible, at least four new research-output titles in the field of Blockchain & real estate can be delivered.

Activities 2020-2021

- » July 2020 Start database thesis en PhD researches
- » September 17-18, 2020 Participation on CIRRE 2020 The Netherlands http://www. cirre.eu/ with presentations and publications of research.
- » End of 2020 Blockchain PhD Day
- » **February 1-5, 2021** Blockchain Week Saxion University The Netherlands with PhD-day, FIBREE Blockchain & real estate day and Blockchain Challenge.
- » May 2020 Scientific articles in FIBREE Industry Report 2021



Prof. Dr. Ing. Jan Veuger, MRE, FRICS

President, Saxion University of Applied Sciences (Blockchain Institute)

Netherlands



Dr. Balkiz Yapicioglu

Arkin University of Creative Arts and Design

Cyprus



Alexander Appelmans, MSc

KU Leuven

Belgium



Dr. Eleni Papadonikolaki

The Bartlett School of Construction and Project Management (Faculty of the Built Environment)

United Kingdom



Dr. Rebecca Yang Senior Lecturer RMIT University Melbourne Australia

Australia



Dr. Rebecca Leshinsky RMIT University

Australia



Andrew Baum Saïd Business School University of Oxford

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Alan McNamara PhD Candidate at the University of New South Wales

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North America

Cody Weiss / Calgary

Kazim Kargi / Vancouver

Nathan Wosnack / Toronto

O Canada

O Mexico Carlos Vazquez / M

South America

O Brazil Rafael Stocco / Sao Paulo

Rubens Neistein / Sao Paulo

Colombia

Andrés Assmus / Bogotá

O Uganda

Nigeria

Ronald Kaweesi / Kampala

Jide Oluwadeyi / Lagos

Olusola Enitan / Lagos

Justin Okpu / Abuja

Nura Jibo / Abuja

Ifemayowa Omotunde-Bank / Lagos

• Saudi Arabia

Faraj Alhouty / Rivadh

- United Arabic Emirates Mustafa Shinnar / Dubai

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		Paul Ferreira / Denver
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Notes

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