

Editorial

Achim Jedelsky
Berlin, June 30, 2022



Dear reader

The 2022 FIBREE Industry Report is the fourth annual issue of our network that gives insights into the global activities around the use of blockchain in the real estate industry. Thanks to our fantastic community we are able to present to you the knowledge of our network in three parts:

1. *Articles from our international experts*
2. *Country information and database of products*
3. *Information about recent developments within FIBREE*

I am sure that everyone - no matter how much you already know about decentralized technology or real estate - will find an interesting topic in our report and maybe even an entry point for joining our community actively.

What I love most about this report is the diversity of topics that we were able to present to you, ranging from circular economy solutions, through asset tokenization, to web3 explorations. Therefore, it is very difficult to pick a 'number one' subject - at least if you are actively involved in our community and witness constantly how many different ideas are being discussed. I guess when looking at our industry from the outside, it is fairly obvious that the discussion around the metaverse drew the most attention. Suddenly we are in the middle of solving real estate problems for the metaverse. How exciting is that! The challenge is only that - in many cases - these problems haven't really been solved in the real world, yet. Therefore, we are at risk of bringing our mistakes with us to the metaverse - instead of creating something that offers better mechanisms than we know today. This ambition should be our focus for this journey. Luckily, we are still at the very beginning of this evolution and actually we don't really know yet what the metaverse is - or will be. Let's figure it out!

With FIBREE we are some steps further than that, but we are also constantly evolving. In 2022 we introduced not only our new **community platform**, but we also started asking for membership fees. This was a dramatic shift that went exceptionally well and we are extremely happy that we continue to constantly grow our membership base. Thank you for this support!

For the near future FIBREE will continue on the path we have already started which includes our topic related working groups, the academic cooperation with Universities, student writing competitions and educational programs like our podcasts and webinars and meetups. If we learned one thing over the last four years, it is that there can't be enough education when it comes to innovation. Only by exploring what is going on today, will we be able to shape the future.

Enjoy reading our report!

Achim Jedelsky
President of FIBREE

*PS: To celebrate this year's issue we offer to all readers a 20% reduction on all FIBREE memberships! Go to: **Memberships | FIBREE** and use this code: **FIBREE2022***

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 2022 edition a working group has been formed within FIBREE, consisting of the following people:

- » Jo Bronckers (the Netherlands)
- » Florian Huber (Austria)
- » Achim Jedelsky (Germany)
- » Cristina Kampion (Lisbon)
- » John Dean Markunas (Miami)
- » Rubens Neistein (Saõ Paolo)
- » Alexandra Popa (the Netherlands)
- » Walter Strametz (Switzerland)
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FIBREE aims to continue the research and knowledge exchange about blockchain and real estate developments. FIBREE invites product-suppliers, real estate organizations, 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 our community platform community.fibree.org and subscribe to the engagement of your preference.

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Put Your Money Where Your Impact Is

- and Have No Doubt About It with a Distributed Ledger Technology

Author: Roland H. FARHAT, MBA, Chair FIBREE Frankfurt am Main

Forward

2022 has so far produced various negative headlines relating to companies failing at ESG (Environmental, Social and Governance issues). Sustainability-oriented investors looking to make a positive impact on climate are getting increasingly unnerved. Whom should they trust their money when they hear stories like these:

- » *Morningstar, a data provider, has removed more than 1,200 funds with a combined \$ 1.4 tn in assets from its European sustainable investment list after an "extensive review" of their legal documents. The data provider dropped the funds after closely examining disclosures provided to investors such as prospectuses and annual reports¹.*
- » *The Securities and Exchange Commission has fined BNY Mellon's investment adviser division \$1.5 mn for allegedly misstating and omitting information about environmental, social and governance investment considerations for mutual funds that it managed². The regulator alleged BNY Mellon Investment Adviser "failed...to prevent the inclusion of untrue statements of fact", adding that the firm "did not always perform the ESG quality review that it disclosed using".*

1 Akila Quinio (2022). "Morningstar removes 1,200 funds from sustainable investing list". *Financial Times*, February 11, 2022, page 6.

2 Patrick Temple-West & Stefania. Palma (2022). "BNY Mellon unit fined in crackdown on green-washing". *Financial Times*, May 24, 2022, page 8.

Introduction

ESG is steadily coming of age in the real estate industry. Investors looking to positively impact the climate through property investments are simultaneously overwhelmed with data about the negative effects of real estate on energy and unconfident about the trustworthiness of so-called green products. It is needless to point out the huge role of real estate in meeting the Paris agreement³. The real estate industry - including the construction industry - is responsible for more than a third of the world's energy consumption and for almost 40% of global CO₂ emissions. The trend is increasing. Advancing net-zero emissions by 2050 will require all new buildings to operate at net zero carbon by 2030 and by 2050 consequently 100% of all buildings⁴.

Today, investors have the means to embrace ESG and stay informed about the impact of their investments through the use of modern technology.

This article is mainly about regulated real estate investors aiming at achieving financial return and generating positive impact⁵ on the environment, in their communities and for their stakeholders. It shows how they can comply with all regulations by wisely using new technologies and more specifically a distributed ledger technology.

3 United Nations (2016). *To tackle climate change and its negative impacts, world leaders at the UN Climate Change Conference (COP21) in Paris reached a breakthrough on 12 December 2015: the historic Paris Agreement. It aims to hold the increase in the global average temperature to "well below" 2°C above pre-industrial levels. It marks the beginning of a shift towards a net-zero emissions world. The operational details for the practical implementation of the Paris Agreement were agreed on at the UN Climate Change Conference (COP24) in Katowice, Poland, and finalized at COP26 in Glasgow, Scotland, in November 2021.* [Online] UN. Available at: <https://www.un.org/en/climatechange/paris-agreement>. [Accessed May 14, 2022].

4 World Green Building Council (2020). "Advancing Net Zero". [Online] WorldGBC. Available at: <https://www.worldgbc.org/advancing-net-zero>. [Accessed May 22, 2022].

5 Global Impact Investing Network, GIIN (2022). "Impact investments are investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return". [Online] GIIN. "What Is Impact Investing". Available at: <https://thegiin.org/impact-investing/>. [Accessed May 18, 2022].

The regulatory view

The flow of new regulations of sustainable investments doesn't tear off. Regulators have been busy lately with precising their requirements on ESG disclosures. Within the framework of the European Green Deal and the Sustainable Finance Strategy of the EU, there are a number of innovations that are intended to increase transparency with regard to the inclusion of sustainability criteria in decision-making processes for investments. The three most important new EU regulations on corporate transparency are the EU Taxonomy, the Corporate Sustainability Reporting Directive (CSRD) and the Sustainable Finance Disclosure Regulation (SFDR), which is tailored primarily to financial companies.

It is the Sustainable Finance Disclosure Regulation (SFDR) that could revolutionize sustainability reporting and consequently influence the kind of data that companies track to measure their ESG performance. SFDR aims at improving transparency of ESG disclosures by financial product and service providers. It is bad news that not every metric and its measurement standards are available at scale and agreed upon yet. Therefore, the right data must be made available and efforts must be made to overcome low reliability of data reported and incomplete data coverage of metrics and industry sectors.

In addition to meeting Principal Adverse Impacts (PAI), SFDR requires evidence of inclusion of good governance practices. Companies seeking to comply with these practices must account for the Do-Not-Significant-Harm test – each of which comes with its own data coverage challenges. The implementation of the European Commission's Corporate Sustainability Reporting Directive (CSRD) will help bridge the gap, eventually compelling close to 50,000 companies to report sustainability performance on a comprehensive set of metrics⁶. SFDR reporting requires evidence of performance on ESG risk, alignment with climate targets including those of the Task Force on Climate-related Financial Disclosures, and alignment with the UN's Sustainable Development Goals.

The SFDR was already adopted in 2019 and its disclosure requirements will be phased in from 2021 to 2023. Most of the disclosures of the SFDR have to be reported - already since March 30, 2021. The ESA published two Regulatory Technical Standards (RTS) on the SFDR in February and October 2021. These contain, among other things, concrete forms with strict content requirements and structuring specifications. They are

6 Clarity AI (2021): "How Data Science Can Enable SFDR Reporting". [Online] ClarityAI. Available at: <https://www2.clarity.ai/how-data-science-can-enable-sfdr-reporting>. [Accessed April 27, 2022].

to be adopted in a Delegated Act which, according to the current status, will become mandatory as of January 1, 2023.

On another hand, there is a growing need to assess how risks stemming from the current or prospective impacts of ESG factors on counterparties or invested assets shall be mitigated by financial institutions. The European Banking Authority EBA recognizes a need to enhance the incorporation of ESG risks into institutions' business strategies, internal governance arrangements and risk management frameworks⁷.

There is growing concern in the real estate market about collecting unnecessary or even false data about ESG, and therefore disclosing wrong information about real estate portfolios and risks related to ESG. The good news is, Blockchain has enormous potential⁸ in addressing many of the risks and root causes of digital misinformation. An approach based on a distributed ledger technology (DLT) makes it potentially effective, through a clear chain of custody to build trust in the digital real estate ecosystem. Generally speaking, there are mainly three key ways DLT can help establish trusted data: Verifying provenance, maintaining online identity and reputation, and incentivizing high-quality content⁹. This can apply to the case of ESG.

A glimpse behind the data scenes

Since 2020 the FIBREE community has been - in research work and different projects - very active in discussing how blockchain can help fostering sustainability in the real estate industry. FIBREE showed at different stages theoretically and practically the benefits of putting DLT – and broadly speaking new technologies - at the use of ESG, ultimately benefiting all players in the real estate industry¹⁰. In a remarkable article published in November 2021¹¹ Robert S. Kaplan from Harvard Business School and Karthik Ramanna from Oxford University's School of Management state that few ESG reports engage meaningfully with the moral trade-offs within the three domains [E, S, G]

7 European Banking Authority EBA (2021). "EBA report on management and supervision of ESG risks for credit institutions and investment firms". [Online] ESG. Available at: <https://www.eba.europa.eu/eba-publishes-its-report-management-and-supervision-esg-risks-credit-institutions-and-investment>. [Accessed February 14, 2022]

8 Harrison Kathryn and Leopold Amelia (2021). "How Blockchain Can Help Combat Disinformation". [Online] Harvard Business Review. Available at: <https://hbr.org/2021/07/how-blockchain-can-help-combat-disinformation>. [Accessed May 12, 2022].
NB: This article doesn't suggest real estate is disinforming market participants. Rather it refers to the above-mentioned article in the adapted context of misinformation potential.

9 See aforementioned footnote.

10 Roland H. Farhat, (2021). "Winning the Transparency Game in Real Estate -- and How a Distributed Ledger Technology Can Help". [Online] FIBREE. Available at: www.fibree.org. [Accessed May 8, 2022].

11 Robert S. Kaplan and Karthik Ramanna (2021). "Accounting for Climate Change". [Online] Harvard Business School. Available at <https://hbr.org>. See also Harvard Business Review, November-December 2021 issue.

and the company's profits. Companies also selectively present metrics that portray themselves in a favorable light, resulting in the widespread perception that ESG Reporting is "awash in greenwash" – and hard for auditors to grab. The authors propose a more targeted and auditable way of ESG reporting. Companies should first develop specific and objective metrics for the most important and immediate ESG "problems", rather than produce "catch-all" reports that are often made up of inaccurate, unverifiable, and contradictory data. Greenhouse Gas (GHG) emissions are the ideal starting point for such an approach. To Kaplan and Ramanna the underlying GHG Protocol has "serious conceptual errors", which can be fixed. The solution they present integrates the introduction of blockchain technologies to accounting and auditing, as well as measuring emissions and financial accounting practices. Blockchain technology can be used to accumulate and transfer GHG-units from stage to stage, from production up to delivery and use.

The look forward

As stated in the FIBREE Report 2021, real estate companies can on the organizational level adopt a data-driven approach to strategy, and build their data streams alongside their investment process¹². Depending on the scope of the business, data can start with the analysis of macroeconomics for investment decisions. Data then evolves through the whole cycle of managing real estate, and investing in the existing portfolio. It is lastly needed to decide on divestments and their execution. Technology solutions automate the data collection by accessing application programming interfaces (APIs) and connecting various databases before preparing the data for measurements, analysis and reporting.

In a further step, and taking all new regulatory requirements into consideration, companies can execute their disclosures on a risk-based methodology and start with few, most relevant dimensions for their business. These dimensions should be carefully selected in a way that the industry can agree about what are "good" or "bad" outcomes, and which can be already measured well. To disclose these metrics, companies can use a distributed ledger technology and build a blockchain which stores all ESG relevant data. The blockchain can simply be structured around a public permissioned blockchain for its open character and a closed blockchain with its private permissioned characteristics. Which data shall be stored on what blockchain will definitely depend on the transparency requirements in

the disclosed segment. In a first step, metrics related to the specific risks of each component of ESG can be put on-chain. The company disclosing that kind of data can then show how it intends to mitigate the risks it has identified and to comply with ESG regulations. The sustainability-oriented investor can subsequently decide about his/her investment, relying on a secured, trusted information offered to him/her on the blockchain and to very low costs.

But what are the main risks related to ESG and how should a company respond to each category? What type of blockchain would be most suited to each information?

- » *Of ESG's three components, the Environmental is the most complex task to solve, because Environmental involves different measurements that don't necessarily lie in one hand and can't be executed upon one uniform or scientifically recognized concept. The climate transition will affect both individual buildings and entire real estate markets¹³. The biggest environmental risks derive from physical risks, transition risks, and other climate risks.*
- » *Measuring a company's Social impact can be challenging as well, for it involves different factors which can be moderately impacted by the company's action itself. Starting with some community related projects in the immediate neighborhood of a property can be a first step. Prominent social risks comprise unsafe living and working conditions, bribery and corruption.*
- » *The most problematic of the three components is Governance, for it is not an outcome in itself but rather an ongoing procedure. Companies would be reluctant to disclose sensitive data of their own organization, particularly if the metrics were to show a "bad" governance. Main Governance risks include racial and social inequality, and lack of leadership within the company.*

¹² FIBREE Industry Report Blockchain Real Estate 2021. Page 6 – 9.

¹³ Brodie Boland, Cindy Levy, Rob Palter, Daniel Stephens, (2022). "Climate Risk and the opportunity for real estate". [Online] McKinsey & Company. Available at: www.mckinsey.com. [Accessed May 24, 2022].

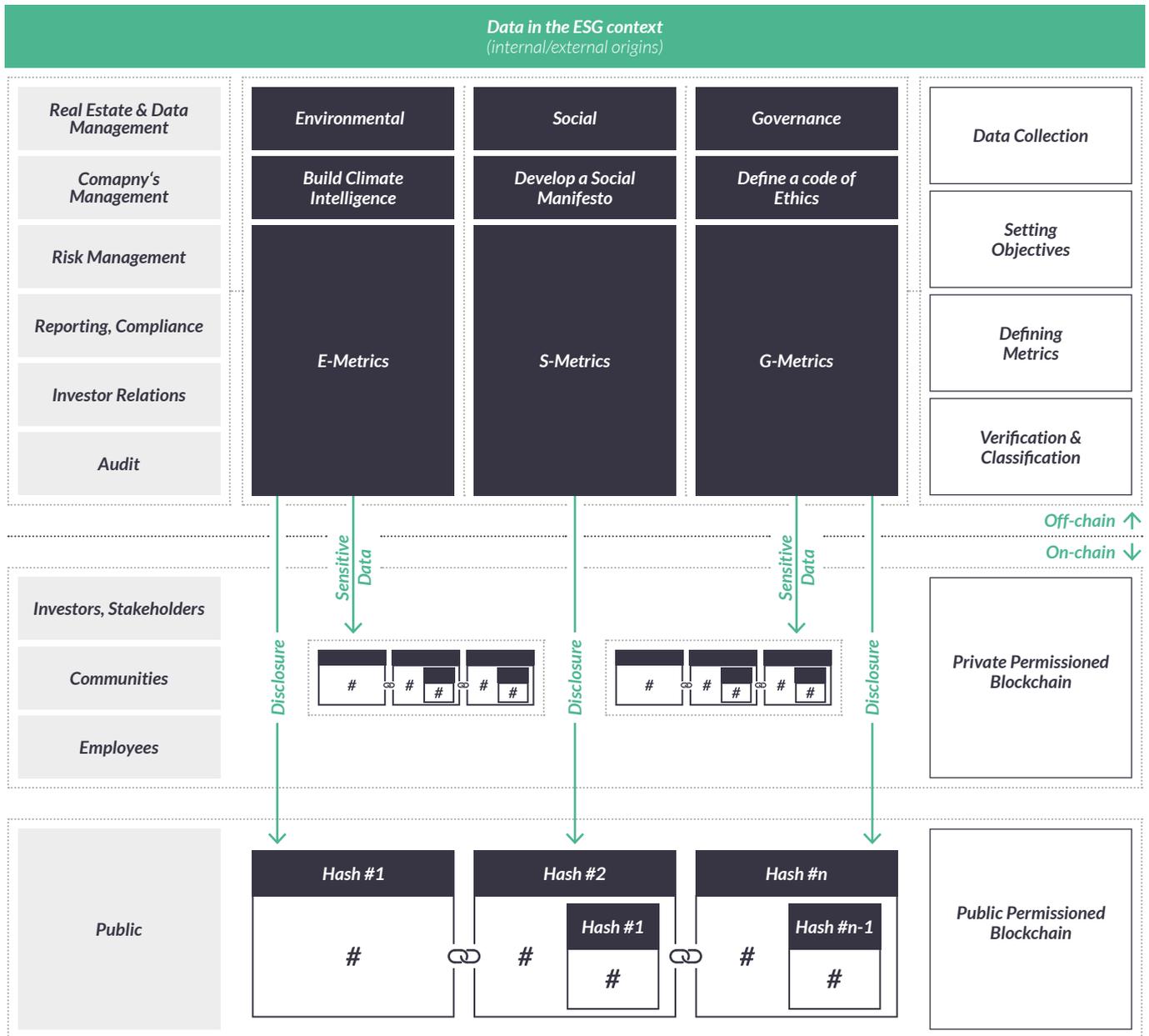


Figure 1: How DLT can be put in the context of ESG

The response to each risk category will sharpen the profile of companies. The way these companies disclose their information will influence their appeal to ESG-oriented investors. The bigger the public interest and concern, the more public should be the info sharing. The more sensitive the data and its provenance are, the more considered should their accessibility be. In all cases, putting a Distributed Ledger Technology at work can enhance the trust in ESG reporting and sustainability-relevant facts and figures¹⁴. Real Estate companies become better ratings, and

investors can rely on data that is crucial for their investments. So what should a response look like?

¹⁴ Roland H. Farhat, (2020). "Getting Truly Sustainable in Real Estate -- and How Blockchain Can Help. An Approach". [Online] FIBREE. Available at: www.fibree.org. [Accessed June 1, 2022].

- » *Considering firstly the Environment, the main purpose of a company disclosure has to reliably indicate its contribution to (better) protect our planet Earth. A good start would be to measure the CO2 footprint of the company and its assets. Once that kind of inventory was done, a look forward to how to decarbonize the real estate portfolio should follow. A public permissioned blockchain can offer an informative portal for potential investors. Tailored partly as a private permissioned blockchain, it can give different stakeholders (e.g. owners, tenants, service providers) a platform to exchange and disclose all relevant data.*
- » *On the Social level, companies committed to ESG would inform on how to strengthen the communities they are invested in. Defining and executing urban projects can surely attest their social engagement and commitment to enhance public conditions. Much of the data can be put on a public permissioned blockchain that would show what outcomes projects (e.g. a new built, company financed bus station) have on their neighborhoods.*
- » *On the Governance level, one main investors' interest would be to know what kind of values a company focuses on and how it lives up to them. Delivering on diversity and supporting socially responsible activities can be two indicators of good governance. A public permissioned blockchain can show investors what kind of managers they would entrust their money to. A private permissioned blockchain can be home to sensitive data.*

Conclusion

Achieving net zero carbon needs not only reducing energy consumption but most notably measuring and disclosing carbon and improving verification and rigor. Performing better on ESG is going to be a marathon. And the least runners need is unreliable information about the way to go. New technologies today offer trustworthy compasses, and a Distributed Ledger Technology can enhance authenticity in companies' disclosures. More regulations are inevitably to come¹⁵ – as are news about more companies failing at ESG¹⁶. Today, sustainability-oriented real estate investors need to look through the data noise for relevant ESG risks and metrics. Companies in search for equity should close the reporting gap and offer trusted facts and figures about their “green products”. Using new technologies like DLT as shown in this article can enhance investment performance by enabling reliable and solid decision metrics, and building trust with external stakeholders. ●

15 At the time of finishing this article, the European Securities and Markets Authority, ESMA, issued a guidance on the integration of sustainability risks and disclosures in the area of asset management. [Online] ESMA. Available at: <https://www.esma.europa.eu/press-news/esma-news/esma-provides-supervisors-guidance-integration-sustainability-risks-and>. [Accessed June 2, 2022].

16 At the time of finishing this article, news was published about German police raiding DWS and Deutsche Bank offices in Frankfurt as part of greenwashing inquiries. DWS had sold “green financial products” whose ESG factors were not considered at all in a large number of investments. June 1, 2022. [Online] Reuters. Available at: www.reuters.com. [Accessed June 1, 2022].

Data, trust, and transparency in Real estate - bringing it all together

Authors: Kevin O'Grady & Jo Bronckers, both are FIBREE Regional Chairs in respectively London (UK) and Amsterdam (NL)

If you've ever experienced buying or selling a home, you will know that it can take a long time and you will be only too aware of the parties involved – lawyers, buyer, seller, EPC (Energy Performance Certificate) assessors, lender, together with estate agents (realtors in the USA), surveyors, insurance, etc - the list seems to go on. Resultant from this are high fees and the inevitable delays and time to gather and verify the requisite information. With so many people involved in the chain, it is often difficult for the buyer and seller to know what's happening at each stage of the transaction.

With offline real estate transactions frequently requiring face-to-face interactions between several parties in the chain, the use of Blockchain technology has made it possible to improve this. This allows for social distancing to be during pandemic restrictions, especially seeing as so many people looked to relocate during the pandemic resulting in an escape from the cities for space in the country. Homes may now be tokenised and sold as a digital asset thanks to the development of smart contracts on blockchain platforms. By tokenising property, assets can then be traded, much like stocks on an exchange, and transactions can be done online in any time zone. Real estate brokers and estate agents have been acting as liaisons / negotiators far as long as we can remember.

Having the estate agent assist with the sale helps both parties of a property create a degree of confidence. The agent is well-versed in the rules and regulations around real estate transactions. So, they can verify that the seller owns the property, and that the buyer has the necessary finances to purchase it. The industry still employs the same strategies and procedures today. The use of blockchain-powered platforms, is gradually but certainly changing the process by introducing new ways to buy and sell real estate, enabling trading platforms and online marketplaces to support transactions more comprehensively with improve transparency.

Digital Transformation

The UK HM Land Registry set out its vision for an “ambitious digital transformation towards becoming the world's leading land registry for speed, simplicity and an open approach to data”. The objective is for “property to be changed instantaneously” and for the public database to hold more granular data through underlying blockchain protocols as a part of the “Digital Street” initiative.

The online “Sign Your Mortgage Deed” system, accessible to re-mortgaging homeowners via GOV.UK, is another recent development in the Land Registry / blockchain collaboration. Using the pre-existing GOV.UK Verify service for identity security and assurance, mortgage deeds can now be produced and signed as part of a largely disintermediated digital conveyance process legitimately recorded at the Land Registry. Thousands of mortgage deeds have now been signed in this manner, with major lenders including Nationwide, RBS, NatWest and Atom Bank utilising the service along with conveyancers such as Enact, LMS and Optima.

In the planning system whilst not removing the political minefield and ambiguity, blockchain offers much-needed efficiencies. For example, sequential principles can form standardised meta processes – subsequently applicable to a range of key local planning authority decisions (without the need for administrative intermediaries)

Inevitably, legal structures will also need to adapt particularly around questions of data protection and security. In the UK, beyond compliance with anti-money laundering regulations, today there are very few government regulations and laws surrounding the use of blockchain. Bodies such as the Law Society and the Financial Conduct Authority will have to ascertain how blockchain transactions are monitored. The FCA is adopting a “wait and see” approach, although has reportedly been communicating with regulators in other jurisdictions.

Additionally, the development of property “tokens” in connection with blockchain technology provides a more affordable alternative when it comes to property investment, reducing the risk and expense involved at a time when businesses and incomes are already in a fragile position.

Home Logbooks

The immutable nature of using blockchains means that the accuracy and trustworthiness of the data eliminates the time needed for extensive due diligence and enables real estate to be immediately transferable. Storage of documents on a blockchain ledger - under the current system, parties are required to request title documents, relying on the fact that the necessary documents are recorded correctly and that there has been no mismanagement between transfers. By holding all the relevant real estate information in one place in a KognitiveHome digital Logbook and recording this data in a structured manner, it would be possible to track and trace ownership interests of the data and be made available on a permissioned basis for the relevant parties to have access. This would generate a clearer record of title for a property, thus saving costs and time to obtain title

reports between contract and completion. Sharing data from the Home Logbook with certified 3rd parties like valuers, municipalities, chartered surveyors, assessors, and more can have additional benefits, because these 3rd parties can certify the available data with their specific expertise. Additional trust layer to data is created and the data will only become more appealing to the next custodian of the Home.

Network solutions needed

One of the challenges in the current real estate industry is the fragmentation of available data, often stored in proprietary databases that are difficult accessible for automated interoperability. This is a putting a big limitation on the ability to benefit at full scale from the added value blockchain can bring to real estate processes. Within FIBREE we recognized this challenge already some years ago and we have developed a open applicable methodology to turn closed databases into network solutions. Our solution is called the Unique Object Identifier methodology, or in short UOI. It can be seen as a universal open applicable connector ID, based on so called UUID's or GUID's familiar in the software industry, that can be applied by any database in conjunction with any existing identifier and at any level of detail about a building, even if it is still in the design phase. Enhanced interoperability will be created in a network, and this leverages the impact that can be created with advanced technologies like blockchain.

Smart Contracts

one of the most useful inventions that use Blockchain technology are smart contracts as these enable the automatic execution of transactions based on computer code, thus removing the need for human intervention. Since the real estate market deals with many transactions, it is an ideal use case for this technology. Smart real estate contracts enabled by blockchain-powered platforms can help to make the due diligence process more efficient as well as speed up the process and at a lower cost of buying and selling a property. Blockchain technology can be used to authenticate identities, confirm ownership of the property, highlight any planning, or restrict any covenants that are relevant etc. Enforcing mortgage and loan provisions through smart contracts - mortgage contracts are filled with complex contingencies, covenants and conditions that trigger different default events when they occur throughout the life of the loan. Upon the occurrence of a default event, the typical penalty is an increased interest rate until the breach is cured. Smart contracts can automate this process with greater accuracy than paper-based analogue systems.

Titles

land titles continue to rely on paper documentation and are vulnerable to loss, fraud, and mismanagement. Blockchain technology offers the opportunity to replace old paper deeds with actual digital assets, tracking changes on a blockchain and so offering a secure shared source of truth for documents across numerous individuals and organisations. Blockchain technology can store and verify these critical legal real estate documents, and by utilising it will help by eliminating the risk of fraud and alteration of records in land entitlement. The same goes for digital data about the property. Why not put all relevant data in a repository connected to a NFT and transfer the ownership of this NFT together with the legal property transfer at the notary so all relevant data remain with the property along its entire life cycle? Blockchain makes this in fact already today possible without a need for changing legislation first and this enhanced data-structuring may enable different significant process-innovations throughout the entire real estate value chain.

Home green retrofits

with the Energy Performance Certificated EPC data we can understand the steps required to improve the efficiencies of our home, reduce utility bills, and reduce the carbon footprint. The EPC provides an estimated cost to install intervention such as efficient air source heat pumps, solar panels, loft insulation etc. Again, in steps blockchain, as homeowners are suffering from ever increase utility bill, and monthly mortgage payments, applying for a green mortgage holiday can facilitate some breathing space. When a lender agrees the retrofit value and transfers cash – there's no guarantee that the funds will be used for the home green improvement. By tokenising the green retrofit funds, the homeowner will only be able to spend with approved suppliers and not travel agents or car dealers – not saying that anyone would, but lenders like the assurance just in case.

Financing

due to extensive documentation and the participation of multiple intermediaries, property financing and payments have been slow and expensive. With all your key documents being stored in a open but controlled accessible database and referred to with hashes on a blockchain there will not be the need to send a multiple of different documents to your bank or estate agent. It will be possible to access and verify credit checks, income and identification verification, debt-to-income ratios and much more by using Blockchain technology. Blockchains provide a system which increases and reinforces trust and reduces real

estate broker dependency, meanwhile improving cost efficiency, accelerating transfers, and opening avenues for networking by creating a digital platform other entities can tap into. The big question is who should control access to such databases, should this be a public authority, can we leave it under the auspices of banks or notaries, or should it be left as a fully decentralised responsibility of all property owners?

Conclusion

It would be hasty to conclusively define blockchain's role in the property ecosystem. However, as the explorations continue, the budding technology clearly has an important role to play. Administrative time and cost savings, a more transparent due diligence process, and security around green retrofits funds will all appeal to investors, lenders, and developers alike. The application of the technology across the fast-growing peer-to-peer business models is also particularly interesting. The technology is there to make the largest purchase of one's life as painless as it can be - so it will be fascinating to see how the property industry adapts around it over the next 5 years. ●

Brief introduction into Financial Regulation in Blockchain-Based Real Estate Finance

Author: Axel von Goldbeck, Partner DWF Germany Rechtsanwaltsgesellschaft mbH

Introduction

Financial regulation has a considerable impact on entrepreneurial decisions of companies with blockchain-based business models. In an international environment with hugely different regulatory frameworks, if any, getting a clear picture is not easy, and expertise is costly. This may contribute to the growth of „regulatory myths“ and misconceptions about regulations that are widespread and hard to counter.

For example, the belief that lightly regulated jurisdictions are those of choice for choosing a business location is widely accepted. Especially, because quite often the „regulation havens“ are quite often „tax havens“ as well and seem to offer at least two material benefits for founders. But – together with the general suspicions about crypto business - money laundering issues and the shady character of many offshore vehicles will make it difficult to market blockchain-based services in Europe and many other countries; not to talk about the persistent problems with receiving bank and other financial services.

In real estate, tokens are mostly used as a means of financing a property. Crypto currencies and utility tokens are rarely generated so far although there is considerable room for such ideas. Such „finance tokens“ are mostly covered by some sort of regulation. The purpose of this article is to give a short overview on major regulatory topics associated with tokens.

Trends in global regulation

With a growing market and a growing understanding of regulators of the risks carried by blockchain based business models, regulatory activities have grown exponentially worldwide. However, different approaches have been taken starting at complete bans and extending to “laissez-faire” attitudes of countries that consider this the best way of attracting business. National regulations prevail so far although everybody is aware that this is insufficient to curb the risks on global markets. On a global level, joint action was driven by the need to curb money laundering, still a predominant driver of regulations. In Europe, implementing freedom of capital policies is EU competence leading to harmonization efforts at least on a EU level, e.g. in the form of the upcoming Market for Crypto Asset Regulation.

Even within blocks like the EU, regulation approaches differ widely. While some member states adopt prohibitive approaches banning certain activities completely, others develop coherent legislations, which sometimes run parallel to existing legislations. Predominantly, governments try to fit crypto regulations into the existing systems which sometimes provide appropriate solutions, however, sometimes new solutions need to be found. The European Banking Association correctly pointed out that: „proliferation in national approaches across the EU could, again, pose risks to the level playing field.“ Still, decision making is complex and takes time on national as well as international level. Regulators need to move cautiously in a fast developing technological environment. In the meantime, blockchain businesses are struggling with an often unclear legal environment.

Major regulatory issues

In general, governments have become active to include blockchain/token transactions in (1) anti-money-laundering legislation, to impose (2) license and/or registrations requirements on certain activities carrying major risks and (3) extend disclosure requirements to public offering of tokens, in particular (but not only) those regarded as securities.

» **Token Taxonomy**

Token Taxonomy, or the classification of tokens, has been a major issue in many jurisdictions. Very early, supervisors tried to distinguish between security and non-security tokens. As there is security regulation in place in almost every jurisdiction, this appears to be the easiest way to cover at least part of the token economy quickly. But when is a token a security? Different answers have been found in different jurisdictions. Most prominently figures the position of the SEC that very early caught basically all tokens with the arguments that all or most of them were created to grow in value. Other countries have taken a more focussed approach, especially EU countries that had to comply with the MIFID definition for securities. That left and still leaves room for many tokens that are not classified as securities and require special legislation.

Some countries differentiate between securities and other financial instruments. Germany's banking laws, for example, developed a large variety of non-security financial instruments and Germany simply added crypto assets to the list. This helped to put crypto asset service providers under the supervisory radar screen. Other than security issuers, however, issuers of financial instruments are not subject to special disclosure requirements. Meanwhile, almost all tokens with the exemptions of simple non-tradeable vouchers with no expectation of a value growth are classified as either financial instruments or securities.

» **AML**

Fighting money-laundering has been the foremost target on global, regional and national level. Although early enthusiasts figured out how to largely decouple the token economy from the FIAT economy, it became apparent very early on that these ideas would not last.

Once the token economy started to be developed by corporations, banks started to take a closer look at transactions and funding, in particular ICO's. Supplied with warnings from central banks and supervisory authorities around the world, they naturally took – and take – a cautious approach. Opening a corporate bank account – the simplest form of a banking services - is still a challenge in many countries, not to mention more complex and riskier financial

services, slowing down the development of the sector considerably.

Equally, fund-raisers involving crypto currencies, in particular the early ICO raised concerns with many banks and financial institutions. They generally regarded crypto fundraising as increased risk and requested investor identification from token issuers before releasing crypto-exchanged FIAT. This request took some token issuers by surprise and left large amounts of money locked in bank accounts, sometimes for years. On the other hand, such incidents opened the eyes of the blockchain community that it was not exempt from laws and regulation. Finally, and because AML laws were ubiquitous the community introduced safeguards and developed services that helped blockchain companies become compliant.

Fighting money laundering surely is a legitimate purpose. However, supervisors sometimes take it as a pretext to introduce measures that might be regarded as excessive. A current example is the EU legislative proposal for a crypto asset transfer regulation as part of the latest AML package. The regulation not only aims at collecting information about the sources and the beneficiaries from crypto transactions, but also includes unhosted wallets from private persons without minimum thresholds. This is widely regarded as discrimination against the crypto sector by the FIAT sector.

» **License requirements**

Besides fighting money laundering, regulations worldwide mostly aim at creating a level playing field for centralized and decentralized financial services. This basically means putting the same license, registrations and/or reporting obligations on businesses with the same risk propensity. As a matter of principle, this is fair. However, license requirements – and the ensuing ongoing supervision – are an entry barrier that often proves to be too high for young companies. Regulators have to balance the target conflict between admitting innovative companies and/or products on the one hand and preventing companies with insufficient corporate compliance from rendering banking and financial services. In too many countries, however, the target conflict is decided against blockchain based business models, in particular where the established financial services sector is lobbying against the decentralized competitors.

License requirements are company level regulation – not to be mixed up with product level regulation that relates to financial products. License requirements are subject to the respective national laws at the place of business only while product regulation applies at any place where a product is offered. This difference is key, and sometimes overlooked when international token offerings are considered.

As a general rule, it is true to assume that token offerings

do not require a license in the technical sense of the term. In Europe at least, token issuers are exempted from license requirements. Only the token offering, i.e. the disclosure document, however, may be subject to approval by the authorities if the token is a security and the offering is public. This brings us to the product level regulation, i.e. disclosure requirement, as the last major regulatory topic.

» **Disclosure requirements**

Disclosure requirements aim at balancing the information imbalance between the issuer of a token and the recipient of a token. At least in liberal countries, regulators largely abstain from product prohibitions, but resort to disclosure information in order to force token issuers to make the token features and the risks carried by the offering transparent.

Yet, there is no general disclosure obligation for all tokens. As a general rule, only security tokens are subject to prospectus requirements, at least if and when the tokens are publicly offered. In many jurisdictions, the disclosure documents need to comply with certain standards and require approval from the supervisory authority. Offerings without such approval may be stopped by the authorities. Exemptions are provided for offerings to certain groups of investors who have sufficient experience to deal with security risks on their own.

The offering of other tokens (crypto currencies, utility tokens) may be free from any disclosure obligation. Still, if and when information is provided, for example in marketing documents, white papers, etc. it needs to be accurate. In any case, token issuers need to be very careful in their communication with investors. Such care is not always applied.

Summary

Financial regulation may look like the famous Bermuda triangle at times. However, keeping the regulation levels and general principles explained above in mind, should enable the average non-lawyer to develop a rough idea where to look in order to control regulatory risks. Looking for proper advice may come at a price. But the price may be lower than following the various myths in the market on this or that alleged benefit in a specific jurisdiction. Strictly regulated markets may be more difficult to enter, but inspire trust with investors. There are no easy truths in the realms of financial regulation. ●

How digitalization and social evolution may impact the future of conventional real estate.

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A personal vision based on own extensive research in recent history, meant to inspire people in finding guidance into a more digitized real estate industry. Written for The Foundation of International Blockchain and Real Estate Expertise – FIBREE

Let's examine real-estate ownership and transactions. This includes rights of ownership, recorded in a register, and when transacted go through a process to record the change of ownership. The property gets purchased through cash or utilizing a mortgage, mainly to be utilized as a first home, a second home, a place to park some money for long term in land, or a cash flowing asset.

Here are few elements that I dissected and examined, each independently:

The evolution of records

Records of everything starting by births, marriages, car or property ownership, shares and economic rights in companies used to be inked on big books with witnesses confirming authenticity. These have become our ledgers of trust, a major fundamental cornerstone for our economic activities that have led to creating prosperity in many societies, however still aspired in other parts of the world.

With time this evolved. We started long ago having a general register for all such records on a city level. Time passed again and we started recording multiple copies of the register, on a country level to guarantee accuracy and prevent manipulation of records. We secured records from loss or the impact of natural elements on ink and paper. As time passed by and our nations

became computerized, we moved records to computers, that made them easier to search through and less vulnerable for physical degrading caused by humidity or pests. Yet this method was also hit by evolution and hit hard, as we discovered that computers aren't secure enough and data loss or manipulation is possible, we started duplicating the records and mirroring the storage containers.

Every one of those steps, came with an initial rejection, so we ended up moving to the new method however retaining the old method, until it became obsolete. With time the cloud dominated, and everything ended up on the cloud.

Did anything come afterwards? Well, there are some claiming that blockchain and decentralized distributed ledgers are a better way to store records. Is it? Is it being adopted by governments and major companies now? Are we still retaining the old methods? Maybe, but we are getting to the realization that blockchain has major benefits to store records.

Even land registrars like the Dubai Land department started recording title deeds using a distributed ledger; recording titles on the blockchain. This is more secure and currently with no way to manipulate it.

For now, blockchain is the best and most recent of the innovations and the best way to store records. Blockchain to cloud is what computers are to the big books stored in the back room of the town hall. So blockchain it is - at least for now and for some time to come.

The evolution of owning and transacting economic rights (all what derives from an asset or a company).

You used to own your own property, your own car, your own boat. All of this changed when we started thinking of the power of the collective effort as well as the benefit of risk mitigation through risk distribution. What landed in history is the start of the first cooperation (cooperative). Merchants in England found that some of them were going out of business just because a ship owned by one of the merchants was either raided or faced by a storm. They wanted a solution that allowed them to lessen the risk. They thought of distributing the risk and came up with the concept of a cooperative. This system had multiple ships owned by a cooperative. While each owns a share in each ship rather than all of them, a failure of a voyage was no longer a catastrophe. This concept evolved with time and started getting used for companies, as well as ownership and transaction of many assets and structures that had economic rights attached to them. Harvesting the bigger power of the collective, while reducing the risk of the individual is a no-brainer. This became a way that evolved to support innovation through crowdfunding and other methods. It is a system based on the value such economic vehicles generate and transacting a share in it based on your view of the change in value with time.

I am sure you can't imagine a world now where the only way for you to own a part of a cellphone manufacturer is to purchase the whole company or having to start a company that designs futuristic chips you will need to mortgage your inherited house to unlock your generational wealth. And for a city after a fire, earthquake, flood, or hurricane, it would take many years to be able to rebuild while people in the interim might go back decades in their lifestyle and will have to live in tents or sheds rather than houses.

The above-described evolution made it possible for us to eliminate such high impacting risks with cooperative systems and to get to where we are. And there will be further evolution that is brewing as we speak, that will take us to even better places as humanity.

The evolution of our behavioral DNA.

How many of us a 100 years ago were trying to change the world? Is your answer very few? Well done.

We have been driven by trying to increase the stability of things. We targeted and worked towards stability. We were measured as communities by the level of stability we sustained. Evolving from our old us, those ancestors who moved a home for protection for the outside wild to a village offering a higher and

more stable level of protection, also securing other basic needs like providing a stable source of water to another.

Alongside this continuous evolution of several elements around us, one day we arrived, in full accordance with Maslow's hierarchy of needs, to the adoption of an ever-evolving mindset. Our understanding to what's right, and our perception of stability, prosperity and growth started changing. Our habits were increasingly adapting to the way we live and the stabilities it offers us. Changing times, changing risks, changing the meaning of community, and changing the impact or major beliefs. It is simple. The loyalty to rooted rules was changing, and with it our behavioral DNA. Patterns of emotion evident through reactions to the world around us were changing forever, new patterns were developing. The impact of having information 24/7 around us and the ability to learn from others and educate ourselves on any topic we want can no longer be ignored. And today's experiences and knowledge can circulate in seconds to every spot of the world.

How many of us want to change the world today? Yes, many of us do. At least most of the generation Z. How many of us can change the world today? Yes, you are right again, the answer is most of us. I believe that knowledge is compounding, not diminishing. Knowledge can circulate quicker, the faster we can get the ability to build on the accumulated results of one another.

The next evolution I foresee comes from sharing knowledge and experiences. Children and adults are acquiring new skills, developing new emotions, and reaching new realizations by conducting experiments in a virtual world.

When you used to train on flying a plane you used to use a flight simulator, it allows you to live experience of flying and prepares you for what may come on flight. Off duty, many formula 1 drivers like to spend many hours in sim racing, obviously because this helps them to get familiar with race tracks or to improve their real racing skills, but not in the least because it is a good simulation for their real world experiences. Following these examples, imagine having a life simulator, yes, a life simulator, and this is what the metaverse is. Could this have the potential to become a major part of our lives by blending physical and virtual eco-systems? Will you soon live part of your life physically and another part virtually? Will you increasingly interact virtually with the world around you, will you develop new sets of emotions... Is this evolution coming? Actually it is already here, and I personally believe it will impact all our lives ever more. Remember with a new medium comes a new way of transacting, owning, interacting and much more.

Do you agree with the thought that this is the evolutionary route we are on? I thought you would. I am sure you are not like some

ignorant people, who continue denying it even if they can easily see it happening in their own close circles. The big uncertainty however is the pace and real-life impact of this evolution.

I am sure you don't expect to use the usual currency bills in the metaverse. Unless we can use pictures of it. Pictures?? Yes, digital pictures. And is there a way to make pictures of currency stand the value that currency stands as a unit of exchange. Can we make it non duplicable, difficult to counterfeit and possible to account for and to pass on and hold it?

Is it possible to do so by encrypting it and giving each unit of it unique characteristics and create a medium and rules of exchanging it? So making it exactly like the currency note but as a picture or in a digital format. Cryptography allows us to do so. Great so we can have a digital form of this currency. Isn't that crypto currency? Yes and no. There are many forms of crypto currency and not all hold value and some of it are backed by sort of perceived stable assets. The tech allowing us to issue them effectively and transact it efficiently is also maturing, resulting in an ever-further growing user base. I expect it will only be a matter of time until also this evolution will hit the tipping point.

But what does this have to do with this section, isn't it about behavioral DNA? So, we have a growing virtual part of our life and we created new tools to blend normal life increasingly virtually. With this, our values, our feelings and how we express them (LOL) and our relationship and interaction with the world around us is also evolving. This is what I call the evolution of our behavioral DNA. One thing is for sure, that no technology or solution will be a final solution, everything is transitory, and we will continuously remain living and adapt our lives to this. The pace of this evolution is dictated by the societal adaptivity level of our behavioral DNA.

The evolution of finances.

A long time ago when seasons were bad, neighboring villages lent their neighbors seeds to start new seasons. The world was run by an economy of what is physically available, produced, traded and consumed. The only way the economy or GDP could grow is by growing what is physically produced, traded and consumed. This formula didn't suite us and we wanted the ability to grow our economy bigger, faster, with little relevance to what is physically available. The introduction of money was the big gamechanger. The form of lending and value creating at that moment changed and later we started creating institutions to systemize this development. Central banks were created, and as for every trade you need brokers, so banks were created. Banks, guided by the rules and processes set by the central banks, brokered and mediated to facilitate all such financial transactions. This

can be considered the evolution of finances. A few years ago this evolution entered a next level by the development of some neo financing which motivated different practices like peer-to-peer transacting.

And like expected this evolution brings new ways of finances forth: a technology saw light where central bank rules and processes are maintained and monitored through a decentralized protocol, and this guides and guards all peer-to-peer transactions without the need for a human, bank, or intermediary. The protocol facilitates it all. It is called Decentralized Finance, or DeFi in short. It seems obvious that this evolutionary step will change conventional ways of financing forever. Everyone active in finance - and we all are - will have to deal with it at some point. It is better to keep an eye on how exactly and how quickly it will become commonplace so that you can prepare for it in time.

Tracing the future of property purchasing and selling

I will start with how we think about owning property. Do we still perceive property the same way? Is it still necessary to spend 100 million USD to get benefit of owning that shopping mall? This has long evolved. We have entities that arrange private equity transactions and allow us to buy into a 100 million USD deal for half a million dollar. We also have REITS and funds that allow us spreading your exposure to assets worth billions of dollars spending 10,000 USD only.

From a risk spreading point of view, it is more logical to be able to own interest in 50 properties in 6 countries using 100,000 USD rather than only owning partial interest in only one property. This is what is called diversifying the exposure while still getting the benefit. Can this also be configured in a similar way for your own home? That I buy as much as I can afford of my house, so I start collecting rent or reducing the rental burden from the parts that I own, without a mortgage and without long term commitments? If the answer is yes, is there then a way to make this systematic so partial homeowners can have the additional benefits of diversifying: reducing the probable costs of a single homeowner by systematically sharing the risks with plenty of other parties similarly involved?

With the latest technology it is also possible to create a record of that purchase in a non-manipulatable and seamless way? That's the evolution we are currently going through. And what will it bring us in the nearest future?

Can I expand the experiences with my home to partially owning other properties in my personal life, like the shopping mall, the dance studio, the workplace, and will this impact how I look at my home? Can I pledge a part of all these properties I own in a

second any time I wish, against some urgent cash so that I can sort an urgent errand? Can I build the house I would love to build and live in while funding it fully from having the community own part of it and I own the other part. I consistently buy into it with time while I pay rent for the other part or rent it out to someone else on the moment I am at leave.

Can we record a continuously shifting partial property ownership on the blockchain as the most secure and efficient way to record ownership, split it to thousands of small shares to alloy the cooperative concept reducing risk and maintaining benefit? Fund it using DeFi as the most advance way to fund a project. Can we combine this ownership with other life experiences, create new values by sharing them with others in a partial virtual metaverse and distribute all rewards based on the shareholding in a systematic manner?

We don't have a crystal ball that will tell us exactly what our future will look like. But evolution with the goal of bringing more stability to our lives will continue to be the driving factor for further system innovation, perhaps more than ever before. Therefore, as far as I am concerned, the question is not if, but how quickly the evolution towards advanced systems powered by advanced technology will make their way into the real estate industry on a broad scale. Perhaps this time the lead will be taken by those parts of the world that have long aspired to the prosperity that others have but are not hampered by existing legacy. ●

For Sale: Is the Future of Real Estate in the Metaverse?

Todd Miller, VP of Business and Partnerships at ChromaWay

When I was at Fannie Mae, there was an initiative that was called the Dedicated Channel¹. It was a purposely innocuous term for a program that provided automated mortgage underwriting and best mortgage-backed security execution for emerging internet-based loan originators – think Walmart - who could be more efficient than traditional banks in issuing loans. It was surely ahead of its time given that today 8 of the top 10 mortgage originators in the US are non-banks (e.g., Quicken Loans, Loan Depot, etc.). In a similar way, are we seeing a shift from brick-and-mortar investing to one that focuses increasingly on bits and bytes?

It's hard to believe that real estate investing – and how we think about and use real estate - will be spared the disruptive consequences that nearly every other industry has experienced since the dawn of the internet. What's being referred to as Web 3.0 - technologies associated with a decentralized internet, trustless and permissionless transactions, instant settlement through blockchains and native tokens - would seem to only accelerate these hyper-digitization processes.

Instead of some sort of penultimate battle of bricks vs. bytes, are we really seeing some of the same underlying Web 3.0 technologies and innovations being applied in very interesting ways in both segments? Before we examine those ways, let's explore some first principal concepts to help us assess where we are.

What Exactly is the Metaverse?

As Wired Magazine's Eric Ravenshaft writes "...the metaverse is the future of the internet. Or it's a video game. Or maybe it's a deeply uncomfortable, worse version of Zoom? It's hard to say. Meta is building a VR social platform, Roblox is facilitating user-generated video games, and some companies are offering up little more than broken game worlds that happen to have NFTs attached."² So while the definition of the metaverse is up for debate and may be more aspirational than real property (referring to it as "property," in this context, itself, is even up for debate) markets in virtual lands, games, and exchanges have emerged. Even factoring in the current crypto downturn, virtual property (*Figure 1*) appears to be a permanent and growing part of the economy.

Tony Parisi, a pioneer in virtual reality and the creator of „Virtual Reality Modeling Language," or VRML considers "the metaverse is the internet, enhanced and upgraded to consistently deliver 3D content, spatially organized information and experiences, and real-time synchronous communication."³ Augustin Ferreira from Decentraland believes terms like the „spatial web" or „immersive web" are much more technically descriptive. For our purposes, we will stick with the use of the more popular term "metaverse" recognizing its many limitations.

1 <https://books.google.com/books?id=iD8-bWporl8C&pg=PA141&lpg=PA141&dq=Dedicated+Channel+for+originating+loans+at+fannie+mae&source=bl&ots=telFD-VOj&sig=AC-fU3U1SHisySr9uUjlsF9Er5AyRa-s7A&hl=en&sa=X&ved=2ahUKEwj-8pvS7f3AhURm-AKH7m9B40Q6AF6BAgV-EAM#v=onepage&q=Dedicated%20Channel%20for%20originating%20loans%20at%20fannie%20mae&f=false>

2 <https://www.wired.com/story/what-is-the-metaverse/>

3 <https://www.readthegeneralist.com/briefing/decentraland>

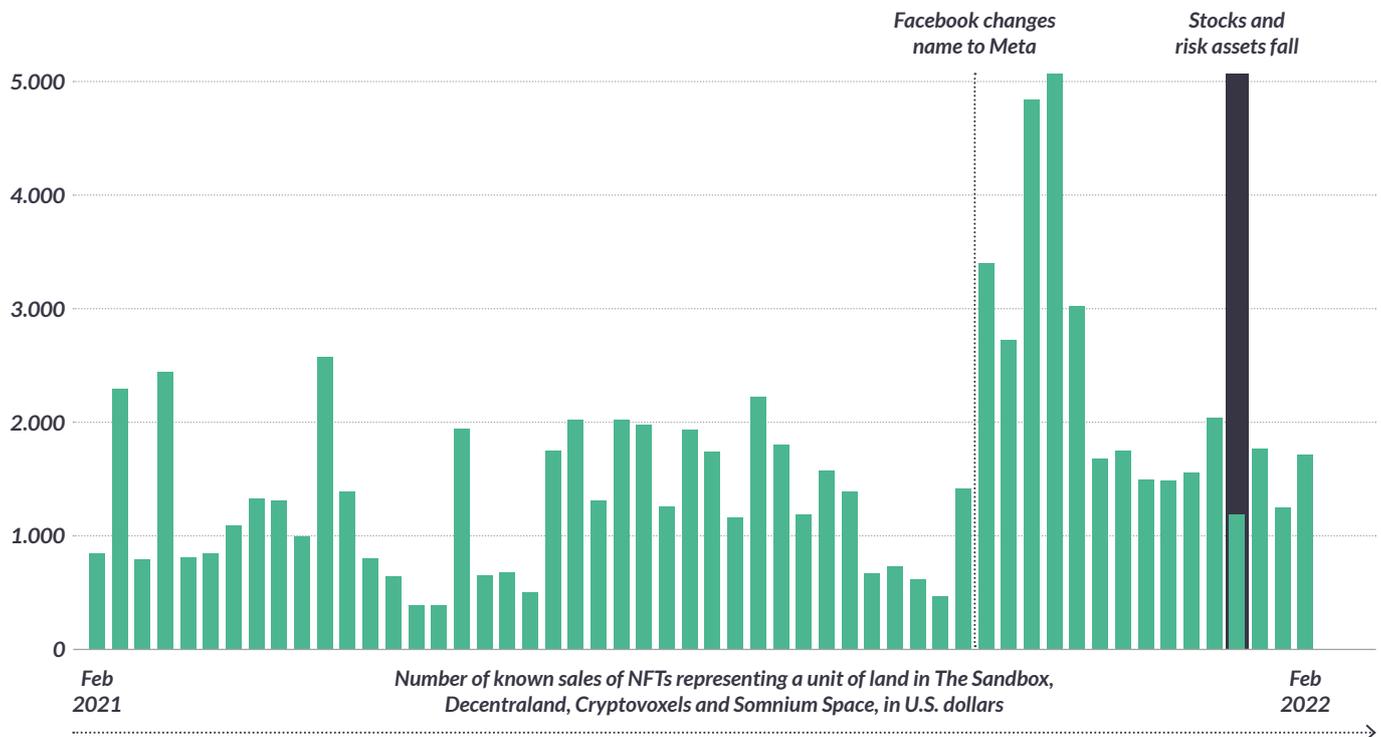


Figure 1: Virtual Real Estate Sales Volumes

What does Property Mean in the Metaverse?

Real property is immovable. It includes the land, everything that is permanently attached to it, and the rights connected with the land. In other words, the right to own, lease, sell and use the property in any way the owner deems fit. Real property is generally identified by a legal description (the geographical description of a parcel of land that identifies its precise location) and boundaries which can be defined through a land survey. Ownership rights to real estate are generally vested through a physical deed recorded in the land records of the jurisdiction where the real estate is located.⁴

In the metaverse, “property” comprises code stored in a database along with a graphically rendered component to look like land. The size of a digital land parcel varies by platform. For example, a parcel measures the equivalent of 52 feet by 52 feet in Decentraland and approximately 315 feet by 315 feet in The Sandbox. Unlike real property, metaverse land is movable (to different URL’s or servers or the platform hosting the land could go out of business), but the parcel of land can be owned, leased, or sold via a non-fungible token or NFT. The NFT is akin to a real-world property deed or a receipt (note it could also represent ownership of a real-world asset). Instead of an ownership

record stored in a national or local property registry, the NFT is recorded on a blockchain (e.g., Ethereum). So, by way of the real world comparison, the virtual property is the code, the NFT is the deed, and the blockchain is the ownership registry.

The NFT itself, is simply executed code stored in a smart contract that conforms to different standards, such as Ethereum’s ERC-721. The actual image (e.g., a GIF) of the land or, for that matter, the virtual buildings or amusement parks that sit on the land (they could also be NFTs) are typically stored off-chain in a centralized database (again, similar to separation of the ownership receipt (a deed) from the actual property.

Because of gas fees (blockchain validator transaction costs) and storage limitations on chains like Ethereum, the token, meta data, and image cannot be stored on the blockchain⁵. Unlike the physical property registry where ownership of a parcel is proved with a recognized government identification document and perhaps the help of a notary, the virtual property NFT can only be claimed through the owner’s unique private cryptographic key.

4 <https://www.jdsupra.com/legalnews/virtually-real-real-estate-an-intro-2111098/>

5 The Chromia blockchain, designed using relational databases, has solved this problem through its Originals Protocol

Legal and Tax Dimensions of Virtual Property: It's Complicated

Currently, NFTs – whether property, Bored Apes, or NBA Moments - have a somewhat murky legal status. Owners of NFTs are generally depending on a combination of the immutable characteristics of a blockchain, the terms and conditions of the platform, and the durability and good will of the platform application provider to protect their interests. In general, the rights that accompany an NFT are determined by the seller of the NFT. Per the Decentraland Terms of Service:

„All Title and ownership rights over each piece of LAND lies with its owner. Each LAND owner decides the Content to be included in the LAND and may impose its own terms and conditions and policies. In the case of Districts, the relationship between the District and District participants - in any capacity - is exclusively governed by the applicable plan approved by each community⁶“

In other words, make sure you read the small print.

According to Sam Gabor at Dentons, “Like other types of intangible intellectual property, such as trademarks, copyrights and patents and the legal rights therein, digital assets and NFTs might arguably fall under the meaning of an “intangible” under personal property security legislation since digital assets are not tangible (i.e., physical) personal property⁷.” In the future, property owners may be interested in adding additional covenants and restrictions to the smart contract to automatically take away certain control settings in an effort to avoid any tenant operating a business that is either illegal or would otherwise diminish the value of the parcel or community area⁸.

The Taxman is Coming

There's not the space here to fully explore the tax consequences of virtual land. By way of reference, India is developing legislation around virtual digital assets (VDAs) which incorporate both cryptocurrencies and NFTs. In cases where the NFT is designated as a VDA, the income from a virtual property sale could be taxable at rates similar to a normal capital asset. A virtual land held for more than 36 months would be treated as long-term capital assets, and the income arising from such transfer shall be taxable at 20% after indexation of the cost of acquisition⁹.

⁶ <https://decentraland.org/terms/>

⁷ <https://www.jdsupra.com/legalnews/the-metaverse-personal-property-9592900/>

⁸ <https://www.sports.legal/2022/03/real-estate-law-may-soon-play-a-role-in-the-metaverse/>

⁹ https://economictimes.indiatimes.com/wealth/tax/how-will-income-from-land-in-metaverse-be-taxed/articleshow/91332851.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Investment in Virtual Property: Is Value Sustainable?

Perhaps the biggest question connected to virtual property (and it certainly extends to NFTs as a whole), is whether long term value can be sustained for developers and investors. One can certainly see the powerful attraction of virtual property. After all, virtual property owners and investors don't have to deal with pesky title searches (the chain of ownership is recorded on the blockchain) and costly title insurance, and there are no complicated building permits and city development processes to contend with. For that matter, there aren't NIMBY-oriented citizen groups to block projects (not yet!).

From an investment perspective, there is no Howey Test (again, not yet) needed along with scores of expensive securities lawyers to determine whether the transaction involves investment contracts. Because tokens are native to a platform, smart contracts can more easily execute buy and sell transactions. Web3 composability introduces greater liquidity and the introduction of lending products attributable to interoperability with a wide range of exchanges and protocols. Transactions are frictionless, but can virtual property retain its value?

A Range of Property Value Models

Builders of virtual properties are banking on the assumption that the future will be a logical extension of the present where we will spend an increasing amount of our lives in digital worlds. Zoom boasted more than 300 million users in April 2020 and there were 2.67 billion video game users in 2021¹⁰. No doubt that COVID-19 was an accelerant to our digital lives, but few experts believe the trends will reverse. Real property values are driven by the physical locations of places that humans live, work, shop, and socialize. Perhaps with the exception of living, the virtual world offers many of the same benefits and we might be witnessing the big brand advertisers, game studios, and others creating an economic foundations for sustainable property values.

¹⁰ <https://financesonline.com/number-of-gamers-worldwide/>

	Q4 2021		Q1 2022	
	Volume of NFTs circulating	% of the supply	Volume of NFTs circulating	% of the supply
Art	389.856	22,6%	284.733	15,4%
Collectibles	2.304.853	33,6%	1.907.241	24,2%
Gaming	7.559.025	35,3%	5.221.908	23,2%
Metaverses	79.799	15,7%	131.900	24,3%
Utilities	350.393	25,3%	321.086	19,7%

Table 1: Volume of NFT's Circulating

According to a report from NonFungible Q2 2022 Report:

Despite the hype surrounding the Metaverse, this segment remains relatively small in comparison to the scale of the rest of the NFT industry, with a total of 53,000 sales for \$365 million traded. The price of a plot of Metaverse remains relatively high. The low volume of dollars traded can be explained by a limited supply of plots in each metaverse, the challenge of these virtual worlds now being to build experiences for their users more than to sell new plots and enlarge their maps¹¹.

As the author's point out (also see Table 1), though the metaverse (property) is the smallest NFT segment, it appears to be the strongest as volumes have increased since 2021.

Some Specific Use Cases

Virtual real estate is perhaps the easiest to understand with platforms like Decentraland and The Sandbox. Decentraland (Figure 2) was launched in 2017 and provides a finite, traversable, 3D virtual space called LAND, a non-fungible digital asset maintained in an Ethereum smart contract. Land is divided into parcels that are identified by cartesian coordinates (x,y). These parcels are permanently owned by members of the community and are purchased using MANA, Decentraland's cryptocurrency token.

The total number of parcels in Decentraland is capped at 90,000. To give the reader a sense of activity, for the year ending May 25, 2022 (Table 2) there were 18,000 property sales totaling \$159m with an average sale price of \$8.6K. The secondary market accounted for nearly 80% of the sales. The MANA token is currently trading at just over \$1.00 with a market cap of over \$1.8 billion.

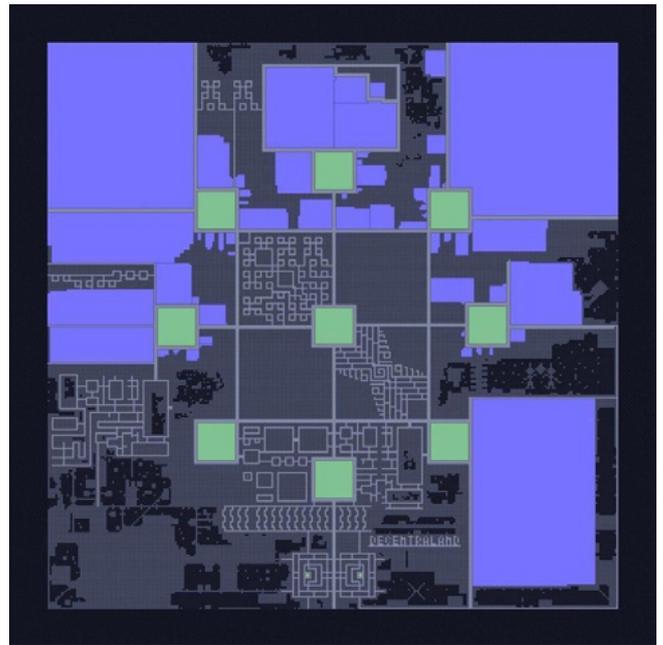


Figure 2: Decentraland

Number of Sales		Sales USD	
18K	-2,47%	\$159M	541,63%
Average USD		Active market wallets	
\$8.6K	557,90%	8.8K	39,11%
Primary Sales		Secondary Sales	
8.6K	-32,32%	9.9K	57,86%
Primary sales USD		Secondary sales USD	
\$32M	337,51%	\$127M	625,96%
Unique buyers		Unique sellers	
7.1K	38,19%	2.9K	51,45%

Table 2: Annual Property Sales on Decentraland: May 25, 2021
Source: <https://nonfungible.com/market-tracker/decentraland>

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By way of a comparison, let's look at The Sandbox (see Table 3) for a comparison during the same time period. For the year ending May 25th, 2022 there were 64K sales totaling \$454m with an average of \$7.1K per sale. Sales came from 26,000 active wallets compared to just 8,000 for Decentraland. The Sandbox's native token is the SAND, and currently trades at \$1.36 with a market cap of \$1.67 billion.

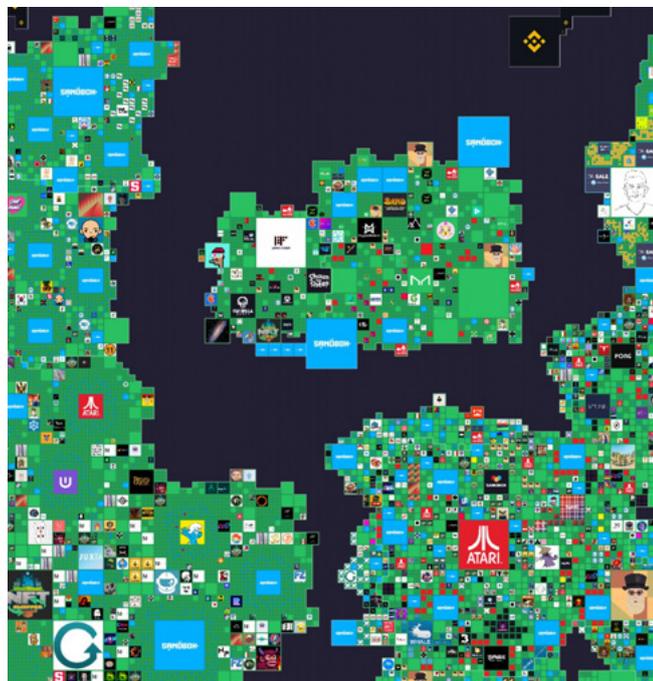


Figure 3: The Sandbox

Number of Sales		Sales USD	
64K	-1,43%	\$454M	1844,40%
Average USD		Active market wallets	
\$7.1K	1872,59%	26K	295,95%
Primary Sales		Secondary Sales	
15K	-63,09%	49K	99,07%
Primary sales USD		Secondary sales USD	
\$46M	321,47%	\$409M	3152,94%
Unique buyers		Unique sellers	
22K	260,38%	9.6K	456,47%

Table 3: Annual Property Sales on The Sandbox: May 25, 2021
Source: <https://nonfungible.com/market-tracker/thesandbox>

Sandbox migrated to a Layer 2 Polygon blockchain. One important differentiator is that The Sandbox offers users the ability to purchase virtual land by leveraging the OpenSea as well as the Sandbox marketplace. On the contrary, Decentraland allows users to purchase NFTs only from the MANA marketplace.

Game Worlds: The Best Platform for Maintaining Sustainable Virtual Property Values?

Given the size of the global gaming industry, it's not a big leap to envision property in these worlds growing in exponential value. They already have. The combination of large user demand (i.e., 3.24 billion gamers in 2021¹²) and in-game designed economic systems seem to create fertile ground for escalating property values.

It's one thing to purchase land on a spatial web platform, it's another thing to be able to rent out the land to virtual farmers in a play-to-earn game. P2E games (where players own assets and can earn crypto rewards by completing game activities) are a relatively new phenomenon and (like everything on the blockchain) are still evolving. Still these digital economy games like Axie Infinity, which reported 1.8 million daily users in 2021 and sales volume of close to \$2.3 billion,¹³ appear to provide a glimpse into the future.

Mines of Dalarnia¹⁴, the digital economy mining game developed by Workinman Interactive, Binance Smart Chain (BSC), and Chromia presents a further model on how virtual property might be positioned in the future. Every planet in the Mines of Dalarnia (Figure 4) game world is sectioned into a grid. Each section represents a mining plot, which is represented by an NFT. Players must purchase mining plots in order to acquire resources and progress in the game. When they wish to mine a plot they do not own, they must pay mining fees to the owner of the land. Owners of a mining plot earn revenue when other players pay to mine your land. In addition, they can sell the ownership of your land (and by extension, the NFT representing it) on the open market.



Figure 4: Mines of Dalarnia

¹² <https://www.statista.com/statistics/293304/number-video-gamers/>

¹³ <https://www.coindesk.com/business/2021/10/05/axie-infinity-nears-2m-daily-active-users-as-creator-raises-152m-series-b/>

¹⁴ <https://www.minesofdalarnia.com/>

The Path Ahead: A Blending of Metaverse and Real Property Protocols?

It seems like the only predictable thing about the blockchain is how unpredictable its innovations seem to be. Most of the world hadn't heard of NFT's even 2 years ago (the ERC-721 standard dates to just 2018) and now a piece of NFT art has sold for \$79 million. As has been described in this report, despite the spectacular growth of virtual property there are a number of legal, tax, and regulatory questions which still need to be sorted out.

Interestingly, we are now seeing blockchain-type protocols port over to the real world of property investing. For example, several projects are introducing NFTs to residential sales. These initial sales involve NFTs which provide ownership in an SPV that owns the home, not the property itself. Still, the experiments give the industry an opportunity to test the market and legal aspects of blockchain protocols in the real world. Much more successful has been tokenization of real estate initiatives (See Immotokens example, Figure 5). In these projects, issuers typically fractionalize a part of a residential or commercial property and offer it for sale in the form of a token that can be stored in an investor's wallet.

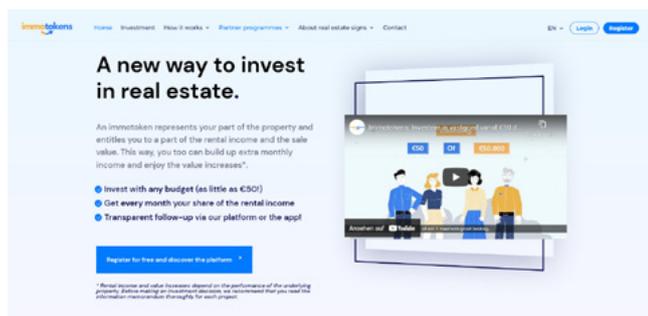


Figure 5: Immotokens Tokenization of Real Estate

The token can be transferred to other investors through a P2P or Alternative Trading System (referred to as a Multiple Trading Facility in Europe). Since most countries across the world have securities law exemptions for crowdfunding or property syndication, there is already a regulatory path for these offerings. Many of these projects further protect themselves from regulatory risks by issuing tokens with economic rights to dividends and not ownership rights. Smart contracts are used to buy, trade, and program in compliance much like we see in metaverse property transactions.

A Future for Property?

The industry is still exploring how to improve the chances that property in the metaverse will retain its long-term value. Will it be like trophy properties in the real world (e.g., the Empire State Building or properties in central London?) Will certain parts of the metaverse be preferred above others? Will the value of virtual property ultimately, similar to the real world, be a function of economic activity that can only be replicated in a game-like environment? Will protocols like NFTs and asset-backed tokens continue to make waves in the real property world? These questions and many more will only be answered through the wide breadth of exciting innovations and experiments that we are seeing today –which will likely only accelerate in the years ahead.

For current real estate professionals, they might consider what metaverse protocols and processes are most likely to be adopted in the conventional real estate sector. As noted above, we are already seeing the use of digital wallets, smart contracts and tokenization to support fractional investment of property recorded on the blockchain. As these technologies continue to grow, the industry should consider their application to their business in the context of regulatory approval, user and investor protection, and technical maturity and safety. With this in mind, the property industry can continue to innovate with the goal of broader access to real estate investing, reduced transaction costs, and creative solutions for expanding housing and eco-friendly commercial development. ●

Real Estate in the Metaverse

Author: Gordon Christian, Digital Playhouse Agnes Water, FIBREE Regional Chair, Queensland, Australia

While blockchain has enabled tokenization of real estate assets in the real world it is also transforming the ownership of land in the Metaverse. This article is an exploratory journey into the transformation metaverse can bring to the existing world as most of us know it today. Fasten your seatbelts!

So how big is the current market for Real Estate in the Metaverse?

According to MetaMetric Solutions In metaverse land sales topped \$501 million in 2021. By the end of 2022 this is expected to hit \$1 billion.

BrandEssence Market Research says expected growth compounded annually from 2022 - 2028 sits at 38%. Forbes states both Goldman and Sachs and Morgan Stanley have separately called the metaverse an \$8 trillion opportunity.

What are the highest land sales to date?

Single virtual property acquisitions are now in the millions with Bitcoinist reporting that Curzio Research, a financial publishing company, purchased a sizable virtual land in TCG World for a record price of \$5 million USD in May 2022. This topped the previous high of Everyrealms acquisition of a large estate in Sandbox for \$4.28 Million USD in late 2021.



So where did the Metaverse begin?

CNET says the idea of the metaverse started in fiction decades ago by Orson Scott Card and Neal Stephenson with the first wave realised in games like Second Life, Minecraft, and Roblox.

But with the rise of blockchain we have seen the emergence of a new metaverse. One that is open, decentralised where the user has replaced the shareholder. One where digital assets can be created, owned and traded by creators and users.

In Michael Yardleys Property update on May 30 writer Steffi Sendekki states that Metaverse real estate platforms Sandbox, Decentraland, Crypto Voxels and Somnium currently dominate the landscape with a total of 268,645 land parcels between them.

What does a Metaverse Real Estate Company look like?

Leading Metaverse Real Estate company Everyrealm has 27 metaverse platform investment portfolios. Everyrealm has over 100 real estate virtual real estate developments underway. Fantasy Islands is one that consists of 100 islands, complete with villas and jet skis recorded sales at \$15,000 on the first day of release.



The Metaverse Group is a leading virtual real estate company offering exposure to this burgeoning industry via the Metaverses. They facilitate the acquisition of virtual property along with a suite of virtual real estate centric services that are provided by pioneers of the crypto, blockchain and non-fungible token (NFT) industries.

Their company Metaverse Properties offer or plan to offer services including buying and selling of virtual real estate across the Metaverse, development of virtual land, expert level consulting for all major metaverses, finding a rental within the metaverses to fit any need, property management of existing real estate, marketing and advertising your business in the metaverse.

So what is at stake in the metaverse?

Epic Games CEO Tim Sweeny of the gaming engine Fortnite said

"The Metaverse is going to be far more pervasive and powerful than anything else. If one central company gains control of this, they will become more powerful than any government, and be a god on Earth."

Outlier Ventures Jamie Burke in his Open Metaverse OS Paper put it simply, there are at least two versions of the Metaverse we observe emerging: one dominated by closed platforms and Big Tech like Facebook / Oculus and the other built on open protocols leveraging blockchains, such as the decentralised virtual land Decentraland and Sandbox.

So what is the opportunity?

Robby Yung - CEO, Animoca Brands and creators of Sandbox explains that open metaverses allow user generated content (UGC) environments where users can create their own 3D online experiences. Virtual worlds offer opportunities for real estate development, gaming experiences and entertainment where corporations and individuals can buy some virtual real estate "to create cool stuff"

So how will we value Metaverse Real Estate?

Metaverse Land Parcels are recorded by transfers of NFTs. NFT's as an asset class provide an intersection of the metaverse and the real world.

Nitin Gaur - Director, IBM Financial Sciences & Digital Assets says a lot of work is being done by banks and regulators to work out what the framework will look like for non bankable assets estimated to be \$2.5 quadrillion assets and how that value can be unlocked using NFTs. This is a new world that preserves value, transfers value and appreciates value that will come from transparent movement of value that is accessible to anyone.

Robby Yung sums it up nicely that the value of real estate will be more valuable by enhancing the experience in the metaverse, no different to that in the real world.

So what does the future look like?

Janine Yorio - Managing Director of Everyrealm says institutional capital will be critical in building the open metaverse. Those who have the crystal ball can see into the future. Janine has that crystal ball.

Those who stay close to the action, participate, create and educate will reap the rewards. ●

NFTs, Tokenization and the Future of Real Estate in Web 3.0

Author: Sanjeev Birari , Co-Founder Realto Group & Corporate FIBREE Member - City of San Francisco California (USA)

Blockchain technology, tokenization and NFTs are transforming the real estate space into the Web 3.0 era. Tokens and NFTs were the buzzwords of the first quarter of 2021 through the first quarter of 2022, however, the recent turmoil in global equity and the volatility of the crypto market shook the psyche of sponsors and investors.

To understand the various reasons for this, let's get a fresh perspective on what, how and why we require tokenization in real estate, and how NFTs will work in the real estate space.

What is Tokenization of Real Estate?

- » Tokenization means digitalization of an asset through blockchain technology.
- » Any asset with real-world value such as real estate, land, arts and trademarks can be converted into a digital representation by issuing a token.
- » A common token used to represent an asset is the Ethereum-based ERC-20 token modified to comply with security laws.
- » Therefore, these assets are viewed as securities.

Tokenization example:

- » You're a property owner.
- » The property is your asset.
- » Tokenizing that asset entails issuing a limited number of tokens to represent the value of that asset.
- » You can slice your asset into a million pieces (tokens) and trade them on the market (secondary exchanges, also known as Alternative Trading Systems or ATS) for greater liquidity and to take advantage of asset appreciation.

How Tokenization works in the real estate space:

- » Tokenization breaks the large investment of a real estate asset into smaller shares.
- » Fractional ownership of real estate opens up a new potential capital pool of investors.
- » Tokens are stored on a distributed ledger which uses smart contracts to validate token ownership.
- » This not only provides the investor with a high level of security, but reduces the administrative costs of trading asset ownerships.
- » On the secondary market (ATS exchanges), investors can sell their tokens at any time for a low cost.
- » Tokenization maintains all regulations a traditional real estate project has to follow, as it is subject to the U.S. Securities and Exchange Commission (SEC).

Advantages of Asset Tokenization:

- » Liquidity.
- » Round the clock trading capabilities through Alternative Trading Systems.
- » Breaks geographical barriers - a person in any corner of the world can trade.
- » Enhances price discovery.
- » Reduces price volatility.
- » Eliminates intermediaries required to validate the transaction and authenticate people involved. These intermediaries also receive a portion of the investment for taking on counterparty risk. Since tokenization takes place on a blockchain, there is no need to establish trust - thanks to the smart contracts that efficiently validate each transaction.

Capital Raise through Tokenization for Real Estate Fund Managers & Asset Owners

Tokenization of real estate assets, essentially digital shares of properties launched and tracked on blockchain networks, have been around for a few years, but tokenization as a method of raising capital is recently gaining momentum. Tokenization can extend access to new sources of capital on a retail and institutional level during the capital raise for real estate fund managers and asset owners.

Leveraging blockchain's smart contracts and seamless peer-to-peer transferability allows for fractionalization, the process of democratizing ownership by dividing property ownership represented by a token or even division of a token, across multiple parties. Fractional ownership broadens the audience for scaling investments in a way that far exceeds the limitations of traditional exchanges.

Use Case Examples of Asset-backed Tokens:

Though asset-backed tokens look similar to traditional stocks, security tokens can do a lot more than traditional stocks. Stocks are designed to operate on company shares. However, security tokens can create cryptographic analogues of almost all traditional assets. The foremost important factor to differentiate these is liquidity.

Tokens are backed by real world assets, compatible with the gold standard formerly determining the value of paper currencies. However, we need to understand the difference between digital shares and unregulated cryptocurrencies like Bitcoin and Ethereum. These use blockchain technology to facilitate payments and transactions, and they are not considered securities by the Securities and Exchange Commission (SEC). Digital tokens offered by sponsors/issuers are regulated securities and therefore entail investor protection. Digital securities are only permitted to be held and transferred to parties who have undergone rigorous KYC/AML (Know Your Customer/Anti-Money Laundering) to ensure their eligibility. Tokenized digital shares and the ATs that trade them are subject to U.S. securities laws; including regulation, oversight, and approval of the SEC, the Financial Industry Regulatory Authority (FINRA), and other state and federal agencies, anti-money laundering rules, and other laws, just as they do with shares that have not been tokenized.

Since one of the strongest driving factors for tokenization is enhanced liquidity, the first class of asset-backed tokens belongs to assets that are known for limitations in liquidity – derivatives, real estate, collectables, private equity, and the like. These

assets are worth trillions of dollars, but they are stored without transactions as hedges against inflation.

Tokenization of big value real estate assets is broken down into smaller pieces which represent an ownership that is tangible and fungible. Since the value of these tokens is more likely to be in the affordable range for more investors, it makes the entire market more democratic. This solves the problem of liquidity for high value assets that were classically considered not at all liquid!

Examples include:

- » *Real estate investment trusts*
- » *Equity from commercial property and rental income*
- » *Corporate debt or equity*

Now that we understand the importance of tokenization in real estate, let's dive into how NFTs will change the real estate industry for the better.

Non-Fungible Tokens (NFTs) are changing asset ownership in the real world as well as the digital world. NFTs will significantly impact the way real estate business is transacted. NFTs are unique digital tokens stored on a blockchain ledger that represent ownership of an asset; real or virtual. These are gaining popularity within the physical and virtual real estate space.

Before we understand how NFTs can redefine the real estate industry, let's look at NFTs in general and how they work in the real estate industry.

What is an NFT?

Non-fungible Token (NFT) is a digital asset for real-world tangible objects. These are usually built on ERC-721 tokens on the Ethereum blockchain, but other networks offer possibilities as well. Unlike a cryptocurrency such as Bitcoin, each NFT token is unique and identifiable as such.

For instance, you create art, and you can sell it as an NFT. While people can still access the art for free, the NFT will ensure that the rights to the piece are with the owner.

Each NFT has a unique code that identifies it. The most critical difference between cryptocurrency and NFTs is that you cannot exchange one NFT for another.

What is NFT in Real Estate?

Real estate NFTs signify a digital certificate of ownership, similar to a deed, that is published (“minted”) on a blockchain for the world to see, verifying ownership. Each real estate property is unique. It can also be treated as a unique digital asset when it is minted on the blockchain as an NFT.

An NFT becomes a representation of the actual or virtual property. Consequently, when you buy a real estate NFT, you become the owner of both the NFT and its underlying physical real estate property.

Advantages & Use Cases of Real Estate NFTs

Advantages of adoption and use cases of NFTs in real estate have increased, including:

1. Security & Transparency

Blockchain-powered NFT platforms enable general resistance to hacks and data exploitation. In addition, traders can access transactional data of their properties, ensuring transparency.

2. Mortgage

In the real estate space, clients often use property as a security to secure a mortgage. Now however, collaterals are no longer limited to only physical assets as evidenced by DeFi (Decentralized Finance) protocols, which offer loans with NFTs as collateral. A client can lend or borrow NFTs from decentralized marketplaces, thus NFTs encourage the concept of mortgage.

3. Fractional Ownership

Asset owners can divide property into smaller fractions or NFTs that represent the ownership of assets. Buyers can purchase fractional NFTs of assets in fractional value.

4. Absence of Middleman

The decentralized NFT based real estate network eliminates the middleman while buying and selling of real estate properties.

The Bottom Line on Tokenization and NFTs in the Real Estate Space

These concepts are interesting from a sponsor/issuer and individual investor standpoint. Real estate tokenization and NFTs will play a major role in the transformation of the real estate industry. Real estate tokenization is about dividing indivisible assets into virtual shares, called security tokens. These are secured via blockchain and are tradable.

NFT based assets provide a real sense of “physical” ownership, particularly when NFTs act as virtual “twins” of real assets. We believe security comes from the comfort of owning something we can relate to, a stable investment in a world where change happens at an unpredictable pace. With the advent of web 3.0, fully digital exchanges will only become more commonplace.

Looking forward, we expect more real estate firms will adopt Web 3.0 technology of ering tokenization and NFTs giving investors the option to tokenize their real estate deals. More sponsors/issuers will create tokenization and NFT real estate marketplaces which will drive a more streamlined process of adoption of Web 3.0. ●

Building the Future of Real Estate with NFTs: It's the Business Model, Stupid!

Author: Irina Karagyaur, FIBREE Regional Co-Chair Valencia, Spain

„Utility‘ will, without a doubt, become the gold standard for NFTs while creativity will be its enabler.“

As the first wave of interest in NFTs wanes – an attentiveness based on fun, curiosity, and collectibles – there is now a general movement to link additional substance to these non-fungible tokens that are often thought of as mere jpgs.

The good news is that for the last two years, while the mainstream narrative has been flooded with the successors of the crypto kitties, a mountain of tech innovation has been developed and will enable mind-blowing utility to NFTs and to their users. What's more, the digital transformation of key industries has accelerated in the same period. As a result, by the end of this decade we will see the adoption of blockchain tech within the energy industry, supply chain, luxury, and/or real estate due to their readiness to work on innovative integrations.

The digital transformation of your own industry has developed apace, so I will focus on what the NFTs are bringing to the *bundle of property rights management*, specifically for real estate.

The new functionalities that 3rd generation NFTs have created can be grouped into two categories: A) Re-fungibility and B) Nesting NFTs. In short, a re-fungible token (RFT) is a non-fungible token that becomes fungible again while Nesting is the capacity to host in one main NFT other fungible and non-fungible tokens, creating bundles that can be programmed and transferred.

When we talk about a building, RFTs are the prime movers because we're referring to fractional ownership. Every building is unique and the blockchain approach to real estate normally begins by creating an SPV (special purpose vehicle) which owns the real estate, then splitting its shares between the partners. For the sales, generally speaking, the tokens give buyers an exclusive right to acquire the property and all its uses, rights & related deed covenants. However, the traditional real estate procedure for the final transfer of rights prevails. And it will prevail, until the digital transformation of this sector is completed and the securities laws and other fundamental regulations of the sector are adapted to the new technology.

However, the functionality that allows a non-fungible token to become fungible means that there is the possibility of creating new business models which will be leveraged by real estate. That additional step, from not fungible to fungible, makes the difference because it means that an NFT can be converted into a cryptocurrency, or any other type of fungible crypto asset. For instance, on the side of the customer, receiving an NFT that can be transformed into a certain amount of Kusama or Polkadot opens the ability to stake, lend, rent, or sell those tokens. Obviously, the necessary liquidity pools and protocols need to be set up to allow this kind of business model to be developed.

On the other hand, with Nesting NFTs, we can create bundles of fungible, non-fungible, and RFTs. This will allow the creation of business models where different assets in kind will be put together to offer attractive products and services to users.

For example, any company will be able to offer a flight, cruise, city sightseeing, restaurant meal, or other service, by asking users to perform an activity and paying a certain amount of money, or exchanging a certain type of token. Users could perform the asked activity, exchange the asked tokens, or just buy the package with the capacity to modify the bundle by adding more or less services, or even changing details such as the travel dates. The execution will be automatic and powered by blockchain technology.

Bundles can be implemented by retail users, insurance companies, pension plans, governments, or the real estate industry to sell, rent, lease, or engage in any other legal framework in our society. The flexibility of this tech allows us to put together different kinds of assets, prepare programmable packages with them, and allow tokens to be claimed all at once or in parts. Due to the fungible and non-fungible nature of what is contained in these smart packages, this can also add a new dimension to traditional systems – almost extinct nowadays – such as checks, IOUs, and bills of exchange. A given corporation or professional can design an offering of services which will be executed in parts while the customer will unlock the corresponding activities agreed upon as exchange or payments.

The new golden standard for NFTs is utility, but since the genie is already out of the bottle, we will need a little more wished-for creativity to exploit the new opportunities ahead. ●

Will RE Asset Tokenization kill Property (as we know it)?

Author: Federico Garaventa, RE Project Manager

The virtual and real worlds are converging and getting ready to merge into each other. In virtual worlds, some major retail brands have already purchased NFTs of land plots in high-quality central locations, to “build” their future virtual malls. In the real world, attempts to move the circulation of real estate property deeds to blockchain are increasing. A gravitational force is pulling the two worlds, slowly but relentlessly, towards each other and the link is the blockchain. Actually, blockchains, written with a lowercase “b”, since smart contracts and NFTs are the reign altcoins, with Ethereum still at the top of the food chain. But what exactly is it that we want to be traded by means of tokens? Which rights? Ownership? The “full property”? Maybe it won't be the case, though.

What exactly is property?

The concept of property is a dynamic one, having evolved over time. The position taken on historical considerations is what used to be called „full ownership“.

In 1765 it was defined „that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe“¹.

In 1846 the approach was even more radical. “Property is the right to use and abuse. It is the absolute, irresponsible domain of man over his person and his goods. If it ceases to be the right to abuse it, it would cease to be property”²

¹ *Encyclopedia of Real Estate Terms, Damien Abbott, Second Edition, 1999*

² *Encyclopedia of Real Estate Terms, Damien Abbott, Second Edition, 1999*

Compared to these quite radical definitions, history and contingency have enforced significant limitations and mitigations. Today's world is a much busier place, much more crowded, less roomy and everything is getting overly complicated. Moreover, in virtual worlds, definitions like the previous ones wouldn't even make sense. These definitions seem poorly fitting, since holding some tokens is nothing more than having the private keys of some bits of a blockchain. In fact, no one can dispose of, destroy or tamper in any way with a (really) decentralized blockchain. To begin with, not even the private keys of a bit of a blockchain can be destroyed or canceled. Anyone can get rid of their keys, but the blockchain will remain unaffected. All an "owner" can do with his private keys is to pass them over to someone else, rather than disposing of them. For a reward, eventually. We can state that a decentralized blockchain has no owners, just users. No owners equals to: no property.

Back to the real world, over time most regulatory bodies already broke down full ownership into (at least) its two fundamental parts: bare property and its rewards (usufruct). However, markets have shown that they favor the high road when it comes to sensitive and important issues such as real estate. Solutions of partial or limited ownership have been, in the long run, marginal at best.

The main frame of existing systems relies on property, full ownership. Let's not mistake activities such as leasing or renting, with a limitation of full ownership, for they represent a service provided by the full owner against payment, free to do so by being a full owner. But are we so sure that the top goal, in real estate, will always be full ownership? Property comes with its burdens and risks, of course.

Perhaps utilizing smart contracts can help create interesting derivatives from the full property. After all, a main feature of smart contracts is being able to be customized to the process rules of the business idea and the perspective market.

For example: a properly designed smart contract, to fund a real estate development, can provide alternative ways out in case of a default scenario, with well timed and automatically triggered algorithms that restructure the legal ownership situation accordingly. And those ways out can be more structured and better alternatives to auctioning the asset "as is" and hoping for the best.

Actually, perhaps ownership is increasingly going this other way, relying on newly created digital tools to represent only a partial right of a real estate asset, to be exercised within a perimeter of functions, availability or limited capacity where the limits are those imposed and, at the same time, guaranteed by the smart contract and its innovative features. Let's imagine what this will bring us.

We all remember many attempts, in the past, to sell shared properties. Most of them did not succeed. Perhaps they had the right idea, but not the right tools. But new tools, such powerful ones, are better suited to unlock new business ideas, rather than helping old ones to work. Looking forward, a likely scenario is, for RE and property, to follow the trend that, thanks to the internet, other markets have already achieved. It is called Industry 4.0.

We all know how music has evolved, in practical terms, from the ownership of an object (a vinyl disc) to a service. Letting aside the flashy covers of the old LPs, (sometimes, real art masterpieces for the ages), the ownership of a record came with its own drawbacks. Storage, protection of the asset over time, maintenance, wear (vinyl can stand a given number of sessions, high as it can be, before declining in quality).

It's not just about raising academic issues. Getting personal, I lost all my vinyl collection years ago, having left it in my unguarded parents house, after a water pipe broke down and flooded some of the rooms. Today, the same songs are on a server, somewhere in the cloud, in digital format and I don't have to worry about asset protection anymore. Music market was just an easy model to refer to, we could mention many.

Will tokenization in real estate become the equivalent of streaming content? Will the blockchain be what the internet happened to be to other businesses?

Let's study a real project. A couple of years ago I got involved in a tokenization project. The business was about developing a smart-hostel, a zero carbon footprint cutting edge project, in a central area of a large city in Northern Italy. Unfortunately, COVID restrictions halted the development of the project and it has yet to restart but the business idea was developed enough to be helpful here. Steps were nothing new: funding, building, renting.

First step was to achieve the segregation of the asset (brown field, at the time) from the SPV and earmark it to be tokenized. A given number of tokens was to be mined, each one representing the right to use a certain bed (and associated services) of the to-be-built hostel, for a certain night, for the next 30 years. So a total equal to about 3.000.000 tokens. The developer would allocate on the market an amount of tokens, equal to the total number of beds/nights for the first years, tendering among hotel firms to select the partner. Nine years of tokens sounded, at the time, a reasonable figure. With the revenues from the sale of the first batch of tokens, the developer could fund the construction of the hostel and deliver the asset to the tenant. Once the hostel was up and running, at some point in the future, the developer would put more batches of tokens on the market, up for sale, depending

on their business strategy and the relationship or agreements with the current tenant. In fact, batches of tokens also represent the right to the management of those beds, for a given span of time. The underlying rationale was that the right for a single night could be valuable only to a final user, assuming that the hostel was fully operational. While, for a potential manager, the single token has no value, unless it was part of a complete batch of significant periods. Partial or scarce batches of tokens would have fewer buyers interested to acquire and manage the hostel. At the time, the idea was to limit the perimeter of the smart contract, leaving the matching from developer to tenant, to the market and off-chain. Of course, the price/value of the token had to rise, along its way. From representing a share of a brown field, through construction and readying of the hostel, its value was to increase. At the end, the very same token had to be sold to the final customer of the bed, at its final value. The difference between the cost of the batches of tokens and the amount of revenues from selling them retail, to customers, would generate the operating budget for the tenant. So the token would end its life in the wallet of the customer representing, in fact, a voucher.

The smart hostel would have services and access managed through smart locks/token readers. Once the token for the day is in his wallet, the customer would have access to hostel spaces and services. An app could easily link it to a face recognition or other UI system.

As a matter of fact, the same token mined at the launching of the business, even before the construction of the hostel, would have followed the entire lifespan of the business, passing hands between different subjects, from the developer, to the investor, to the tenants and, may be, even their contractors and, finally, to the customer. In the hands of the customer, it performs its final tasks, starting by unlocking the room door.

The same digital object would have represented different kinds of rights, all along the business lifespan, at different values in different hands (wallets). Likely, there would be a time when part of the tokens were still in the developer's wallet, parts in the tenant's wallet, and may be parts of them in the many user wallets. All in the meanwhile, a SPV vehicle still has the naked property, useless for the next 30 years. So probably priced close to zero, as an asset, in its balance.

Now, back to the title question: who's the owner?

Is the owner of the SPV holding the bare ownership? A next-to-zero value asset? The Net Actual Value, 30 years discounted, would be close to zero and holds no current rights or benefits. At the end of the 30 years the building will be deteriorated and obsolete, representative of cost, rather than a value.

Are the owners, the tokens holders? Who's holding them? The developers still? The tenant? The customers who already purchased a bed?

When tokenization will be widespread, real estate assets will no longer be owned, but simply used. Used by those who retain the right to do so, within the limits of the smart contract they hold in their wallet. ●

Why Real Estate Tokenomics Makes Economic Sense

Author: Lori Elizabeth Souza, MBA, BSIT, International Blockchain Advisor and Real Estate Broker, FIBREE Regional Chair Tampa/St. Petersburg, Florida, USA

Today's Global Real Estate market has been greatly affected by inflation, with property prices having climbed historically fast in many areas of the world since the onset of the COVID pandemic. This inflation is not only happening in real estate markets but also with all consumer goods and services. The economy has not only seen real estate pricing increase significantly, but also in other markets such as automobiles, gasoline, meat, and construction materials to name a few, all which directly impact consumer spending. Not only are we seeing inflation, but we are also seeing a decreased supply of these goods and services available which brings a plot twist to the reason why consumer spending is trending in two very different directions.

One mindset is to stock up on everything you can, just in case there is a shortage, or another pandemic outbreak. Supply chains are unable to keep up with this mentality of spending, especially when retail shortages are already apparent.

The second mindset for consumer behavior is to not spend while prices are high. With such over inflated pricing, most of the population is unable to make these purchases and therefore decisions to spend or not, have already been made for them due to a lack of purchasing power. Keep these two consumer behaviors in mind as we further explore the concept of tokenomics and why it makes sense in an inflated economy for both buyers and sellers.

In regard to the real estate sector, with inflationary pricing so high, many potential buyers have been priced out of the market and more property owners have decided to hold on to their properties causing historically low inventory levels of listed properties for sale. When inventory is low, prices will continue to climb.

As consumer spending is slowed and/or stifled due to inflation AND supply continues to decrease, markets will eventually slow down, causing another factor to come in, and that is higher unemployment. In the real estate industry, workers slow their volume of production, real estate agents, mortgage brokers, title companies. As unemployment increases, economic growth decreases. This is a formula for the next step to the equation, which is stagflation. Stagflation halts much of the production, due to shortages, high prices and unemployment. The mainstream population will be scratching their heads, asking, how do we fix this Economy?

The answer will be, we can't. The U.S. has printed an additional 9 trillion dollars in the last 2.5 years alone. This makes a total of a million dollars of debt per minute in U.S. dollars making a recovery in the current economy impossible. Technologists have known this since the great real estate recession during the years of 2007-2012, something went wrong. Economic laws were not considered in the solution. The solution, for recovery, was to print more money and bailout existing corporations. Suddenly,

millions of dollars became billions of dollars which adds even another factor to the equation. This is new and contrary to the very definition of stagflation and inflation. What we see now is a decrease in the value of the dollar, which has over the last decade, caused the income of the workforce to also stagnate rather than increase proportionately, which is what a healthy economy would see.

The band-aid has been put on the old economy, the economy that operated out of the principles of economics, the law of supply and demand, and economic growth with wage increases. This is not happening in our current system.

The good news is here! Technologists have been working diligently over the past decade to develop solutions, and new industries are building around these existing advanced technological infrastructures. I like to call this forward-thinking parallel economy today, the *New Digital Economy*, and in this new economy we introduce tokenomics.

Tokenomics is a subset of economics, allowing for fractionalized and/or personalized digital financial ecosystems wrapped around real, tangible assets. These ecosystems are being developed and created while introducing brand new industries, job opportunities and investors. Tokenomics brings not only the possibilities' but also the opportunities for new markets to emerge, new industries to spring open, allowing for job creation. And for the real estate sector, tokenomics opens up ownership interest opportunities to those already stifled populations worldwide through the purchase of tokens offered by the property owner.

Here is one scenario: a property owner in the current economy, wants to sell his property to gain liquidity to purchase another property. However, the owner sees low supply and limitations. He decides to hold his property. With tokenomics, the property owner continues to hold his property, while offering an ownership interest through a digital asset, a token. This is much like the concept of Mortgage-backed Securities.. Now, we have real estate backed securities, however, in token form.

The new digital ledger technology of blockchain holds data, and keeps data as if it were a (U.S.) County Recorder's office; first in time, first in line. This new financial technology logs each transaction, proving the transaction is true, for the life of the digital asset. Now, property owners issue tokens for their properties and offer these tokens to not only accredited investors, but also individuals, who a) wish to get into the real estate market, b) who would normally not have purchasing power to purchase an entire property at inflationary prices and c) now can hold a digital asset, which has value and is backed by the real estate itself.

Tokenomics makes sense to keep markets moving and economic growth occurring. Implementing tokenomics provides job creation and an influx of investments. Industries currently being built around the creation of tokens use the new financial technology of blockchain and cryptocurrencies. And consumers are becoming vastly aware that this alternative investment is becoming more readily available as an option. Global money is being moved into the new digital economy while the old economy is experiencing extreme hardships and new economic problems never seen before.

As we begin to fractionalize real assets through tokenization, we are digitizing the possibilities for both the future real estate investor and the property owner. Investors and property owners must know the value both bring to the table as holders of assets from the old economy. Anyone can create a token, but the token must meet criteria to hold value and longevity. Token creators and token holders alike would be wise to look at these four factors as part of their due diligence when considering tokenization:

1. *Utility: does the token have a use? Is it backed by a tangible asset?*
2. *Supply: what is the supply being offered to investors and for how much, including minimum and maximum investment?*
3. *Distribution: to what marketplace is the token being offered and is it being purchased?*
4. *Governance: a token provides the governance necessary in a transaction. It is minted or created through digital means using the technology of blockchain, which provides proof of transaction, a transaction of truth. The record cannot be changed and is transparent allowing for cross-border transactions of real assets.*

Today, as regulations continue to realize and change, 2022 will be a monumental year. We will begin to see the unveiling of this new digital financial technology gain recognition as a solution for old systems and glimpse slightly into the future of how STOs (Security Token Offerings) will be affected. However, the point of this article has been to provide insight into the field of tokenomics and how it plays and will continue to play a very important role as a viable solution as we continue to see old economic systems unraveling. ●

Blockchain and Cryptocurrency in Real Estate State of the Industry Report – State of Florida, United States

Author: Jason L. Bennick, President of Digital Innovation Group Holdings, a GA Telesis™ company

Introduction

Since the advent of peer-to-peer electronic cash system technology with Bitcoin¹ over 18,000 digital currencies have been created and introduced to the consumer market² over the last 14 years.

The total market cap of all cryptocurrencies is \$2.023 trillion, with the trading volume of all cryptocurrencies per 24 hours presently at \$75 billion². Bitcoin has the highest current market cap at over \$700 billion, more than double its closest rival, Ethereum. Several of the top twenty cryptocurrencies are directly pegged to USD value – Tether (USDT), USD Coin, and Binance USD.

Approximately 10% of the US population (34 million adults) own cryptocurrency³, with 3.6 million already paying with crypto and forecast to surge by double digits through 2023³.

While traction and adoption of cryptocurrencies and the use of blockchain accelerate, it is also not without harsh financial industry criticism, securities regulatory crackdowns on scams, and increased government oversight.

Yet, despite these industry challenges, the emerging technologies of blockchain and cryptocurrencies continue to develop, as does a strong interest in arguably the most significant asset industry on earth, real estate.

1 <https://bitcoin.org/bitcoin.pdf>

2 <https://explodingtopics.com/blog/number-of-cryptocurrencies>

3 <https://www.insiderintelligence.com/insights/us-adults-cryptocurrency-ownership-stats/>

Blockchain and Cryptocurrencies in Real Estate

Blockchain is an open-source ledger technology providing transparency within an economic system that also supports the use of digital asset transactions⁴.

Real estate has been fraught with fraud for a long time, dating back thousands of years from the fraudulent creation of ownership deeds to present-day payment fraud scandals. Blockchain has emerged as an innovative foundation for helping address these concerns by providing verified transactions across parties, documentation, and accurate property ownership through land registry on blockchain⁵.

Further, efficiencies can be materially addressed by introducing smart contracts and the use of cryptocurrencies in payment transactions.

Here are some important and relevant aspects of how these technologies impact the real estate industry, and where this is occurring today in the State of Florida:

a. Elimination of Third Parties.

Escrow companies are intended to protect all parties in a transaction by acting as a third party without any shared transactional interest. This is done by managing all contractual documents and money through transaction closing. Blockchain technology can eliminate the requirement of such a system using smart contracts and encrypted digital wallets, allowing a transaction to execute upon satisfaction of predetermined conditions, triggering the release of funds with those requirements having been met.

Such a process has a measurable potential of making real estate transactions faster and cheaper.

As cryptocurrency transactions are run on a peer-to-peer network, blockchain technology allows the transaction to be recorded instantly on each designated user's computer, creating identical, tamper-proof records that can also become public for viewing, not alteration. Conventional transactions in real estate take time and require informing all parties involved regarding the transaction's status throughout the process as it moves forward. Blockchain technology allows users to view records as they become updated, keeping everyone up-to-date in real-time and allowing parties to keep track of transaction progress from anywhere, anytime.

With 23 locations in the U.S. and three of those central to the State of Florida, Millennial Title runs Millennial Blockchain, a solution designed to eliminate friction in the real estate

transaction process for buyers, sellers, banks, and lenders making use of digital assets. Millennial Blockchain facilitates insured, secure real estate transactions with cryptocurrency while actively adapting to regulatory standards⁶

b. Upscaling Opportunities.

Small capital retail investors have not had access or resources to real estate investing, despite a high demand to do so for decades. Due to an increase in the number of retail and blockchain investors in recent years, as can be seen with the introduction of platforms such as Gemini, FTX, Robinhood, and Coinbase, the purchase and trading of digital assets have become commonplace. With the tokenization of property, real estate assets can essentially be crowdfunded and purchased by small-cap retail investors by leveraging their purchasing power. Tokenization of real estate would now mean democratizing property ownership across broader market membership, allowing property owners to rebalance into the masses rather than be owned by an elite few.

Miami-based HouseBit Corp is a company specializing in the development and implementation of digital real estate and real estate technology⁷. On May 25, 2022, HouseBit completed the first fully tokenized Florida property at The Loft in downtown Miami, introducing a new paradigm for ownership and occupancy in the real estate market⁸. HouseBit's Land Trusts are cryptographically secured and associated with a specific immutable blockchain smart contract while property records are maintained in a jurisdiction's public records office, providing complete end-to-end transparency to the token's holders.

c. Faster Liquidity.

An owner or seller may also be provided with faster access to liquidity using tokenization. If a \$25 million luxury estate goes up for sale, it may take months, if not years, for the right buyer to come along or be found and secure a transaction and commit to that value of capital. However, tokenizing the property and introducing fractional ownership could likely be sold off in five million 5-dollar shares, yielding much faster access to liquidity by the seller.

d. Leveraging Fractional Ownership.

Fractional ownership of real estate on the blockchain can disintermediate the entire gamut of real estate ownership and investing. Fractional ownership is an equitable innovation using blockchain that creates an entirely new game for property ownership, especially for the most significant

⁴ <https://hbr.org/2017/01/the-truth-about-blockchain>

⁵ <https://www.allerin.com/blog/how-blockchain-can-prevent-land-fraud>

⁶ <https://encryptedestates.com/>

⁷ <https://housebit.com/>

⁸ <https://www.globenewswire.com/news-release/2022/05/24/2449621/0/en/HouseBit-Completes-First-Fully-Tokenized-Property-at-The-Loft-in-Downtown-Miami-and-Introduces-a-New-Paradigm-for-Ownership-and-Occupancy-in-the-Real-Estate-Market.html>

percentage of the population who cannot easily hand over \$10, \$25, \$50, or \$100,000 as a down payment on a commercial or residential property.

This is now possible, however, through properly licensed digital asset exchanges. As the demand rises for tokenized real estate assets, real property can be pre-aggregated into tokens as securities, so small-cap players can more effectively pool their resources. Real estate tokenization helps property owners raise capital more efficiently and gives investors unprecedented access to private real estate investments, transparency, and liquidity⁹.

Smart contracts can also further simplify long-term ownership by accepting rent payments and disbursing proportionate shares directly to the wallets of property owners. An excellent example of this is BlokHaus, a real estate broker-dealer turned fintech platform based in Miami¹⁰, poised to be a key player in tokenizing South Florida's highly sought-after real estate market. The company's vision is to "Democratize real estate by providing liquidity solutions through asset digitalization." This aligns with their mission to "Implement fintech into real estate services by offering investment opportunities and fractional ownership through security tokens." BlokHaus represents what is believed to be the future of Miami's real estate market and the future of the global real estate industry on the blockchain.

e. International Investing Becomes Fast, Simple, and Cost-Efficient.

The movement of cross-border funds can be complicated, costly, and untimely. It is also subject to restrictive banking hours, a large variety of country-specific holidays, and the availability of resources. The use of blockchain with cryptocurrency allows international transactions in minutes, not weeks, with no relevance to the time of day or geographical location. It can also cost a fraction of bank wire costs and bank fees¹¹.

Managing risks in international transactions can also be primarily mitigated using smart contracts. The strictest requirements on even complicated criteria can be programmed into templated smart contracts, enforcing standards to be met in validating parties, identities, business entities, and more before international parties can transact¹¹.

There is also the factor of delayed transactions, considering

the risks of currency exchange rates. This risk can be largely mitigated when all transaction parties are transacting wallet-to-wallet in cryptocurrency, simplifying the process for cross-country transactions, regardless of currency exchange rate risks¹¹. Wallet-to-wallet cryptocurrency real estate transactions are starting to emerge domestically in the United States, specifically in Miami, Florida, with the largest crypto real estate purchase ever on blockchain sold for \$22 million in June 2021¹². 2022 has already seen two luxury homes sold wallet to wallet in cryptocurrency on blockchain, with one of those sold on its first day of market listing¹³.

Florida continues to lead the country (and the world) in using blockchain and cryptocurrencies in real estate transactions, and this trend is expected to continue.

f. Transparent, Public, and Secure.

Essentially, cryptocurrency transactions are performed on a public ledger, meaning the public can instantly see post-transaction select transaction details available on the public ledger¹⁴. This is a significant change from the world of real estate, where transactions are shrouded in secrecy, and it generally takes a considerable effort to gather information through a public records search or the county recorder's office. Transparency will also democratize access to all players, small and large, across the industry to become more knowledgeable across trends and purchase signals, empowering all for more efficient decision making. Greater transparency also means increasing trust.

One of the more exciting characteristics of blockchain technology is its immutability. This supports a greater trust in both the transaction of documents and payment of funds at closing¹⁵. Not only are funds kept secure through blockchain technology, but sensitive information is also protected from hackers. Online data breaches have become commonplace. Thus, the security of cryptocurrency should provide greater peace of mind for all parties in a transaction using blockchain technology¹⁶.

9 It is important to note this is a very nascent industry, and as such, there is currently not an active secondary market for digital assets of this type. Any investor's ability to liquidate will be dependent on market conditions and there is no guarantee that a buyer will be available that can offer a price deemed acceptable by the seller. Investments involve risk, including principal loss, and, unless otherwise stated, are not guaranteed. Targeted returns are subject to change and are based on modeling performed by the sponsor. Be sure to first consult with a qualified financial adviser and/or tax professional before implementing any strategy discussed in this report.

10 <https://blokhausre.com/>

11 <https://publications.iadb.org/publications/english/document/Cross-Border-Payments-with-Blockchain.pdf>

12 <https://www.travelandleisure.com/travel-news/cryptocurrency-real-estate-miami#:~:text=The%20lower%20penthouse%20of%20Arte,they'd%20be%20accepting%20crypto.>

13 <https://oceandrive.com/first-crypto-real-estate-sale-2022>

14 <https://www.dummies.com/article/business-careers-money/personalfinance/cryptocurrency/the-transparency-of-bitcoin-223558/>

15 <https://www.upgrad.com/blog/what-makes-a-blockchain-network-immutable/>

16 <https://www.ibm.com/blogs/blockchain/2019/04/how-transparency-through-blockchain-helps-the-cybersecurity-community/>

Conclusion

As Goldman Sachs reports¹⁷, blockchain is the “new technology of trust,” a technology now redefining the way we transact with the potential to change the way we buy and sell, interact with the government, and verify the authenticity of everything from property titles to organic vegetables. It combines the internet’s openness with the security of cryptography to give everyone a faster, safer way to verify essential information and establish trust¹⁷. As the adoption and implementation of blockchain technology continue to forge across industries worldwide, a leading voice championing its use is the State of Florida, and that industry is real estate.

I, along with my colleagues, believe that the future of real estate will include incorporating blockchain technology with conventional methods across multiple facets of commercial and residential property transactions, making them more efficient, cost-effective, and user-friendly. We also see a future in technology determining the veracity of persons and property in transactions and the use of blockchain in performing low latency, highly secure, and friction-free payments at low costs.

If the innovative use of blockchain and cryptocurrency continues receiving the Florida legislative support, as it has been recently¹⁸, and as long as the efforts behind driving that support are further empowered¹⁹, then our road to a prosperous future traveled with the emerging technology of blockchain looks bright indeed.



17 <https://www.goldmansachs.com/insights/pages/blockchain/#:~:text=The%20transparency%20of%20blockchain%20has,technology%2C%20with%20no%20standardized%20implementation.>

18 <https://www.fbba.io/to-the-moon-legislature-passes-bill-to-deregulate-crypto-trading/>

19 <https://www.fbba.io/>

Can Blockchain Solve Problems for the Real Estate industry in Latin America?

Author: Andres Assmus, FIBREE Board Member, Regional Chair Toronto, Canada and Bogota, Columbia

Real estate remains an asset class that's very attractive for savings or investing for most of the people in the Latin American (LatAm) region. However, I look at this region, which is double the size of the United States in terms of population, as a very volatile financial market, having some weak currencies. Another key factor is the banking system, one of the most lucrative and centralized in the world, making it very difficult for many families to secure mortgages and other types of financing. The final factor, I would say, is that real estate transactions remain an antiquated paper-based process, making it difficult for all principal players and intermediaries to participate fairly in the real estate transaction process.

This picture of the region leaves us with some challenges as banks (CeFi – Centralized Finance) manage both sides of the market by providing mortgages for buyers and capital for real estate developers. This system hasn't changed for decades. In addition, real estate providers haven't changed that much in their way of selling assets or even how they improve the selling process or raise capital to build or join REITs or other investment vehicles as an alternative to investment access.

Real estate is one of the best investment options compared to stocks, commodities, and currencies. However, less than 5% invest in the stock market because of a lack of education (depending on the country). I will start explaining how real

estate has been evolving by giving a general context that shows weaknesses in LatAm's real estate industry in several aspects. If we compare it to Canada, the USA, or Europe, the LatAm region is still far behind in terms of real estate transaction volume, (i.e. very few REITs in LatAm, compared to the 223 in the USA) or time spent on the legality of transactions along with clear legal processes and property asset Identification such as the MLS system in the U.S. (Multiple Listing Service) which is absent in LatAm real estate. For some countries in LatAm, real estate holds 9.4% of the GDP¹ in real estate assets despite its illiquidity, costliness and distrusted real estate transaction processes. From Mexico to Argentina, real estate players have been approaching blockchain technology as a new way to compete, gain efficiency and offer a new user experience. Looking at the residential segment, the availability of multifamily housing is almost absent. The current needs are at least 15 million units to be built, which is a big increase compared to regions like Canada or Europe. Here blockchain can create a secondary market to address these issues by offering new types of ownership or offering tokenization, like Security Token Offering (STOs).

¹ <https://oxfordbusinessgroup.com/news/covid-19-and-latin-american-real-estate-what-are-silver-linings>

Growing acceptance from Bitcoin and Cryptocurrencies to DeFi

One driver for blockchain acceptance was Covid in 2020 and the use of Bitcoin as a digital currency payment, as speculation or its use for remittances. For five years now, cryptocurrencies have started to be adopted as an alternative to weak FIAT currencies (Fiduciary money). In 2021, the first cryptocurrency transactions occurred to buy real estate in Mexico, Argentina, Brazil, and Colombia. Today, we can finally talk about tokenization. Initially, construction companies were mostly very skeptical, uninformed and disconnected about the diversity of services offered by blockchain, as cryptocurrencies were the distraction point. More recently, since the Covid-period, acceptance of cryptocurrencies made a breakthrough in many LaTam-countries and governments seem to embrace digital solutions to develop their more efficient and futureproof infrastructures. This again enables development of new decentralised products and solutions by the market with entirely new digital finance and transaction vehicles.

Can Blockchain Improve the Real Estate Industry in Latam?

Blockchain technology is a powerful alternative for the LatAm region due to the lack of trust across the real estate value chain. One good example in this regard: the registration and transfer of land titles.

A country like Colombia, with 1,500 municipalities, has almost 80% of its problems associated with land identification (owners, cadastral, title, parcel identification, etc.)². Blockchain solutions can add great value because of the irrefutable transparency it can bring, to reduce or completely solve such trust issues. Especially in many rural areas in many LaTam-countries, another challenge is the complete lack of land titles, which affects legal land ownership, and produces a serious problem with trust. This is why construction companies are concentrated in urban areas where legal ownership is more transparent and legal. This leaves millions of people with unhealthy housing services by living outside of urban areas.

A second challenge is that regional or municipal jurisdictions do not use *Multiple Listing Services* which produces problems in price market evolution, transaction processing, increased legal costs and market structure.

In many countries across the region, I see a great opportunity for blockchain to optimize the identification of these property attributes. With FIBREE we are very well positioned to help governments and market players with the know-how from our expert-network. Like we did in Ecuador. In March 2022 FIBREE signed a Memorandum of Understanding (MOU) with the Ministry of Urban Development and Housing, Ecuador (MIDUVI) and the Kruger Corporation, Ecuador. The purpose of this MOU is to establish the general terms and conditions under which Kruger/MIDUVI and FIBREE collaborate in the execution and oversight of land registry blockchain pilot programs and land governance in Ecuador.

A third challenge is for residential and commercial properties. In terms of raising capital to build, sell and manage assets, the cost of raising capital is very high. This creates asymmetries for competitors. For example, some large construction companies are part of a holding where they have a bank or insurance company. For small or medium size real estate developers costs for loans are very high, and fiduciary and financial operations are costly. As such blockchain can provide a way to draft new services where capital is more of a commodity. However, it is very hard to navigate the regulatory framework.

The fourth challenge is how buyers such as individuals or families can approach real estate investing. The region not only faces an informal labor market, high inflation rates, and some inefficient stock markets which makes it challenging to offer alternatives other than the classic mortgage. In this stage, blockchain might be useful by offering tokenization; in ways such as listing properties (residential or commercial), creating new services to attract buyers that before weren't able to access the local market and were forced to go to dense urban regions where new affordable developments like apartments were constructed. In the ultimate LaTam-challenge, cooperative blockchain investing solutions may help mitigate the proliferation of slums or unhealthy housing, when making households less vulnerable to high financial impact events.

Last but not least, blockchain comes as an alternative to the financial system. In the last decade, we saw a flourishing offer of FinTechs, which specialize in offering different financial options and derivatives. Traditional banks were usually providing these 'complex products' only to the wealthiest 20% of the market, allowing them making 80% of the profits (wealth concentration). This addresses directly a Sustainable Development Goal of the United Nations, SDG 10: Reduced Inequalities³ as one of the

² <https://cpt.org/2021/07/06/colombia-land-ownership-mother-all-conflicts>

³ <https://www.un.org/sustainabledevelopment/inequality/>

seventeen sustainability challenges of our society. The LatAm region still has enormous structural problems in this regard. In Argentina for example, they say: LatAm specializes in the management of shortages, resourcefulness and inventiveness because of the inequality. I take this as a strength, the LaTam society will be capable of changing these problems for the good! Strong leadership, with a courageous all-encompassing transformative approach is required.

Looking back at the root of blockchain, one of the major values is to democratize financing. Here the potential is massive. However, the problem is not technological. It is legal. How do you disrupt the creation of wealth that maintains power for over 50 years?

Taxes are another component that must be brought to a next level. New technologies will increase market size and transaction-volumes. More and smaller shares in existing properties or in new real estate developments, as well as more cross-border investments will be made when fractional ownership with tokenization becomes mainstream in LaTam. This would be a huge transitional challenge for the current systems of taxation authorities and fiduciaries. Possible issues (like: where do you buy?, how do you declare? against what transaction price? measured in what currency? taxable in what jurisdiction?) need new and clear guidance for all involved. For those reasons, security backed tokens and perhaps stablecoins can be an alternative as they create an alternative for lenders to offer more competitive loans for developers.

What does Blockchain for Real Estate, Construction and Urbanism Look Like in 2027?

This article could describe many more types of blockchain protocols; Web3, cryptocurrencies, custodians, exchanges, payments, NFTs, tokens, DAOs, infrastructures, etc. We all understand the immense market cap for real estate; nevertheless, the future needs and challenges for housing, commercial developments and technological advancements such as autonomous fleet vehicles, EV stations, drones, robotics, urban farms, 3D housing, and more will require new business models. It goes too far to describe in this article the impact all of these developments will have on real estate. In my opinion cryptocurrencies are the tip of the iceberg. And cryptocurrencies and other blockchain developments are still very young and unknown which makes them highly speculative. We are in a “crypto winter” at the moment of this writing. I am convinced there will steadily be many many new things to come, but it will need some tough time to solve or work around the challenges described in this article. It will make the outcomes unpredictable

and addresses the need for strong leadership and determination from all involved. My experience across the LatAm region, makes me think that legal and regulatory issues are the hardest challenges for adoption. Blockchain might leverage the value of real estate assets as it raises trust in transactions intrinsically.

My intention here is to describe how two different markets may be impacted; blockchain solutions and conventional real estate processes aren't yet matched. The bigger the promise may be and large scale education and new, fresh leadership is needed for that. If we know the direction this will be heading, it will be easier to participate and harvest the benefits of it sooner. We have two options: to deny or embrace. I choose the second one because I believe that it offers a massive reallocation of value.

For me, blockchain will evolve in how we approach the buying and selling of real estate. It will not fail but will survive. I see a new generation of leadership in the industry; new types of buyers, users, products and segments. A new global industry is emerging; more globalized, efficient, transparent and inclusive. I see huge challenges in how to build to mitigate climate change, and how to deliver real estate as a service. Blockchain will be embedded in many societal and financial processes in Latin America, and similar I foresee estate providers starting to only use more blockchain technology in their processes. Blockchain is starting to make the real estate industry more accountable in Latin America. For 650 million people, this technology provides a new method to buy, sell, finance and trade real estate assets with more liquidity, in a much more trusted way.

If you would like to actively take part in shaping this future together in Latin America, you are very welcome to participate in FIBREE. We don't hold all the answers. However, we believe that by educating, sharing experiences, and constantly learning, we help new transformations in our society. ●

Why is the Preparation and Launch of a Security Token Offering for Raising Funds Not Complicated?

Author: Evangelos Lianos, FIBREE Co-Chair Greece

Digitalizing, tokenizing a real world asset is a process with interrelations of multiple tasks and actions. Those need to be performed internally by the issuer's team and/or outsourced to service partners. On top of that, an experienced project manager is needed to coordinate time and resources of all those interacting contributors.

If the tokenization is aiming at fundraising (equity, debt, etc.) through a regulated Security Token Offering (STO), then it may need to get the "approval" of, or at least a "notification" by one or multiple financial regulators or authorities. This means a few more tasks will be added to the project plan. Remember, STOs that are considered to be "public offerings to invest in a financial product or business" are most likely subject to supervision by authorities. One role of the authorities is to protect investors (especially retail investors). The STO issuer may benefit from that, though, because it creates a level of trust between the issuer and investor thereby helping to attract more ambivalent investors to place their money in your Digitized Asset Security (DiAS).

The STO process generally can be broken down into four phases: (A) preparation, (B) issuance, (C) marketing/launch/sales phase and (D) the "after-sales" phase.

But before starting the STO preparation, an issuer needs to analyze if the offered investment into a business or piece of real estate is profitable and attractive enough to investors. So, make sure that the business foundation is solid. Like in a classic shares Initial Public Offering (IPO), you must have a solid mid or

long-term business plan that shows and explains the proposed investment in numbers and in words. If you are confident that your offering stands a chance of appealing to prospective investors, then enter Phase A.

Phase A consists of setting up the project with its project plan and budget. This includes the selection of a preferred regulatory framework based on the investors' origin, the definition of the tokenomics and the framing of the core financial aspects of your offering.

The preparation phase can be time consuming if you don't know what information you need to collect, prepare and make available to the stakeholders. It is the responsibility of the issuer and its team to assemble and collate the business related information because ultimately they know best. Of course, asking advisors to help can be a good option where one's own expertise is in short supply.

Many institutional investors that are legally obliged to scrutinize their investment targets may require information related to risks. They want to understand or even mitigate the risks that are coming with the potential investment and the business proceedings. It is your obligation as an issuer to inform them about any risks. That an issuer has appraised the risks for investors is one of the areas that regulators are looking deeply into. Investing in (tokenized) securities will always be based on confidence that investors have towards the issuer's business, regardless of whether your token operates on a secure distributed ledger.

An important element in the preparation might be due diligence in the commercial, financial, health, safety, human resources, IT, IP, and legal aspects or any other area deemed necessary to review.

Furthermore, depending on the structuring of the offering, tax obligations for the issuer and the investors may need to be researched. Based on the chosen regulatory framework for your STO, what is the tax burden for the issuer, the asset or the company and the investors?? Maybe the creation of a new holding entity, an SPV or some other form of legal entity needs to be envisioned? Again, professional advice is compulsory.

Most of the gathered information in this phase will appear in the teasers, subscription agreement, private placement memorandum, STO launch websites, applications to regulators, etc. or any other documents that are stipulated by the chosen regulatory framework. If the fundraising is exceeding the thresholds of this framework, chances are that further information such as financial statements, valuation reports and other business details need to be examined. Those will be the bedrock for the “prospectus” if you are considering launching, for example, in one or more EU countries under ESMA (European Securities and Markets Authority) regulations.

Equally important is the selection of your technology providers. Starting at the blockchain network level, to the question where smart contract(s) are developed and audited, what wallets your STO will be compatible with, to considerations as to who will take charge of escrow, attestation, compliance, secondary exchanges and the registration of investor rights: all of these aspects essentially need to be sorted out before you consider an STO. If you don't know how to find these skillful providers your project manager should be able to help and run the show.

So what's next? Having collected all required data to draft all necessary documents for internal and external use you can enlist partners to help with reviews, finalize the paperwork and sign off for submission to the authorities or publication. Ideally this should help you stay on track with regulations and laws to avoid nasty legal surprises.

Entering the issuance Phase B: this is a rather mechanical phase of your STO launch where smart contracts get developed and audited, token conditions, attesters, compliance, sales timing, phases and volumes get defined or confirmed, and tokens finally being minted. Taking liquidity into account, you will need to think through how to make your STO into an attractive financial instrument that your investors would want to own and trade. Luckily, these days there are many options emerging such as organized and multilateral trading facilities, P2P marketplace bridges, secondary exchanges, liquidity pools and many more.

Phase C is preferable to be tackled in parallel to Phase B. This is all about attracting (retail) investors. Consider issuing a teaser (or teasers in multiple languages if your investors base is in multiple countries), launching a website, defining and executing a sound (digital) marketing strategy and preparing other promotional material. Just try to avoid getting into conflict with regulations in respect to advertising and promotions. As an example, the U.S. (the SEC - Security Exchange Commission) has very strict regulations on promoting public offerings of financial instruments. It is certainly advisable to pull in some legal expertise or work with a marketing agency that has experience in maneuvering in the digital and financial space.

Also, you will find that, as far as the STO launch process is concerned and depending on the regulatory framework(s) your STO is conducted under, you may have to use the services of transfer agents and a licensed broker-dealer. Assuming all goes well, you should now be able to comfortably attract investors.

Finally, let's have a look into Phase D, where the activities that might be legally required after tokens are in circulation. This phase is first and foremost about investor management and regulatory reporting obligations. It also includes aspects of cap table management and how to garner your investors for the next round of future finance. This is an area where we can talk for hours.

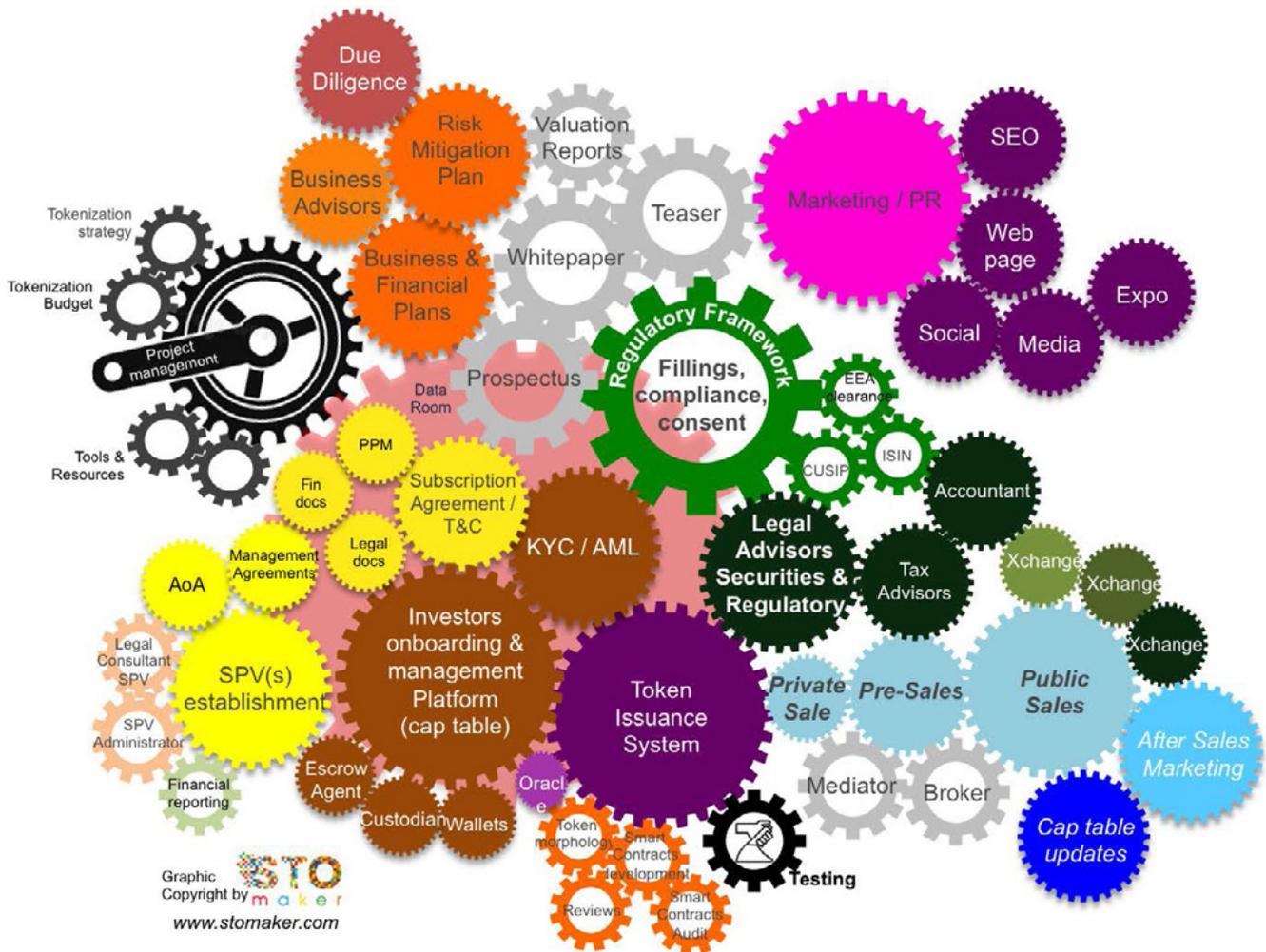
We will continue this conversation on the FIBREE Online Community Platform with frequent additional publications. As well, we will discuss the future development in the FIBREE Tokenization Working Group Tokenization and Consultancy Working Group Stay tuned and feel free to participate!



Find more information with the link or scan the QR code

.....
<https://community.fibree.org/topics/28752/feed>

Check out the graphic below, which visualizes some of the core elements and tasks involved that need to be performed for an STO launch. Just to emphasize: depending on the asset to be tokenized/securitized and depending on the regulatory framework the tasks may vary. Neither in this article, nor in the graphic below can we portray all angles and possibilities.



A Security Token Offering has many interrelated actions and tasks

But how and where to start? Who can help? What can I do myself to keep the costs of tokenizing a business, company, asset, real estate property or project at an acceptable level?

One of the keys for a successful launch of your STO is the entity or person that has the experience to coordinate the tasks and the service providers. And they need to be experienced in STOs. For help, you can contact FIBREE. The consultancy team and FIBREE members have the knowledge, can help you to manage the process and also find the right service providers and partners to perform the tasks.

On the other hand, if you prefer to keep the project management internally or you want to act as a project management consultant to a STO issuer, you could use a platform that can take you by the hand to guide you through the STO's interrelated tasks, telling you what you need to prepare and connects you to respective service partners when you need them. In that case, please contact FIBREE's Consulting Services Team to evaluate your needs and recommend the right platform. •



Find more info on the link or scan the QR code

<https://fibree.org/fibree-consulting-services/>

Blockchain as a Key Technology for the Circular Built World

Enabling a circular economy in the built environment through blockchain

Author: Stefanie Behrendt, Member of the Executive Board of FIBREE, Co-chair Athens, Greece

You don't have to fully understand blockchain to be able to use it, just like very few know how the internet works and still spend hours on it every day. However, understanding how blockchain can enable a circular economy in the built world can help to accelerate your ideas to transition towards sustainability in a heavily polluting industry.

"We are in a decade of digital transformation and data transparency, where trust has never been more crucial in the way we interact, communicate, and do business. Real estate is not immune to this transformation. Transparency is the keystone to future transaction efficiency and blockchain is an essential enabler of the process. It has the power to facilitate openness through smart contracts in property transactions, reduce costs and limit the potential for fraud. These are changes that do not shackle the sector but unite it."

Eva Morales¹.

So, if you are one of those brave change-makers in the building industry and want to learn what solutions are out there to make your move towards a circular built environment easy, you are in the right spot.

Construction is responsible for almost half the mess

Let's start with the status quo: the built environment is responsible for more than 40% of all greenhouse gas emissions globally. For circular and more sustainable solutions those materials need to have an identity, so they can be traded, tracked and their carbon footprint can be traced.

Blockchain is shown to be a feasible technology in support of a circular economy in the built environment. Full material and energy traceability enables us to track the source of material extraction, make predictions for the recycling and reuse of goods and trade them through a secure and accessible information network.

But before we start, let's have a deep dive into why circular solutions are inevitable for the built environment.

What is blockchain and why does it facilitate a circular built environment?

A blockchain is a digital information system that enables transparent, decentralized and trusted transactions. These can be financial transactions, but also digital signatures or the storage of data records.

In other words, an accumulation of "building blocks" that contain certain valuable information. Each transaction has a transaction ID (hash) and all of them are chained together. That means that traceability to the source of each transaction can be shown at any time.

"If the internet is considered the primary technology layer for the exchange of knowledge and information, blockchain technology can be considered a secondary layer that extends the first by enabling the secure exchange of value and the ability to permanently and verifiably store information about an asset. Both layers could help realise a truly Circular Economy."

Kevin O'Grady².

¹ Eva Morales, University of Cambridge, Programme Leader – Circular Economy and Sustainability Strategies and Founder at Circular Advisors

² Kevin O'Grady - Associate Director, Arup and Chief Executive Officer at Urban.MASS Ltd

Blockchain as an enabler in the circular economy

When it comes to a circular economy in the built environment, blockchain facilitates storing valuable data sets about a building's life cycle. This can include data about building materials, energy consumption, carbon emissions, water usage, contracts with facility management companies and so much more. The possibilities are endless.

"In the very near future everything will depend on how we manage the limited resources in our built world. Building materials have to be reused and there needs to be a centrally accessible and decentralized register of all the valuable materials used. (...) this database will only be meaningfully managed on a sustainable blockchain", says Sandor Horvath, Lab engineer, lecturer and PhD student at East Bavarian Technical University of Regensburg.

Blockchain can be seen as a decentralised software, not much different from any phone application we use, that favors the concepts of a circular economy and therefore supports sustainable approaches.

Isn't blockchain consuming loads of energy?

Blockchain is definitely consuming a large amount of energy. Nevertheless, it is not so much about how much it is consuming but more about how the consumed energy was generated by alternative energy sources, like wind, water or sun.

Besides that, the impact that blockchain can make in the built industry can not yet be predicted well due to a lack of a developed market. However, the way blockchain technology is able to cut through the noise and focus on the relevant information in a slow and data heavy industry like the real estate market is impactful. So the elimination of current energy consuming process steps due to blockchain implementation must also be taken into account to make the correct comparison. It can be seen as common sense that the impact it can make is bigger than continuing like we do today.

Why is blockchain relevant in the built environment?

The built world consists of multiple disciplines, stakeholders and materials that are traded through complex supply chain systems. To become 'Paris proof' in 2050, the real estate and construction industry not only needs to change its conventional sustainability approach, it also needs to significantly accelerate its pace to deliver its contribution in time. Releasing more sustainable impact with limited resources can be realised with smart and better orchestrated collaboration between all stakeholders. It is less a matter of doing more of the same, but more of doing things

way more efficiently together and avoiding spoiling of scarce resources. With more digital information available, but still too often in proprietary databases, reengineering of data-processes is needed to make information truly interoperable and available at the right moment for any stakeholder who needs to have it. And this is where we believe blockchain can be a very efficient tool. With a Blockchain-layer, trust, transparency and reliability to any digital file can be added automatically. Any software can then deal with large datasets and interconnect people on a neutral level. Comparison of the datasets on an environmental level and enabling all stakeholders making smarter decisions together is what makes blockchain a tool that creates benefits for the many. This environmental and social component contributes to creating better and healthier societies that are enabled to decide in a democratic way.

Why is circularity the future in the construction industry?

The construction industry is the largest industry worldwide and is also one of the biggest sources of pollution. Resources aren't endless and we need to rethink our behavior to avoid spoiling them. To integrate the concepts of the circular economy in this sector is a must if our intention is to stay within planetary boundaries and revive our planet.

In the long run, our linear systems are not sustainable and our societies need to learn how to use materials and resources in more efficient ways. Currently 70% of all demolition waste goes to landfill. Imagine the impact of those materials if they could be reused, remanufactured or recycled.

"There is much to be gained here with more circular models. A building then suddenly becomes a temporary storage place for materials and if the specifications of these materials, including the disassembly instructions, are kept well, the materials can be reused in a new building without much loss of the original quality. And that pays off rather quickly. An example from our own practice illustrates this: Suppose a high-quality steel beam is disassembled and the technical specifications are no longer known. Then the steel is treated as 'unknown quality' and melted down to return as low-quality steel on the market. This leads not only to significant loss of value, but also to an enormous waste of energy and avoidable CO2 emissions and it contributes to increased scarcity of high-quality steel",

says Jo Bronckers³.

³ Jo Bronckers, FIBREE Board Member and expert in the field of circular construction.

In the circular economy, blockchain can be a valuable tool to smart concepts for reuse and recycling of materials by facilitating highly automated tracing and trading functionalities for seamless deployment at large scale.

How is blockchain changing the real estate industry?

Changing culture to circular systems in the built world happens when, instead of disposing of materials at the end of their lifecycle, they are being reused.

Besides this, a circular real estate industry requires conscious design and sustainable material selection. Reduction of energy consumption seems to be relevant as well; however, compared to the environmental impact building materials have, it is only a minor contributor to carbon emissions.

Nevertheless it may happen, the transition from our current linear system to a circular one is demanding, especially in the real estate industry, where there is little consciousness and almost no space for sustainable solutions. Blockchain enables a simplified implementation of this challenge.

What are the challenges moving towards a circular built world?

Transition from linear to circular models does not happen overnight. Companies need to change whole business models and rethink their strategy while having a strong drive to make change happen.

"In real estate projects, in my opinion, there is a requirement that:

- 1. The materials that are already installed and would be interesting for reuse must be clearly identified: type, composition and quality must be checked*
- 2. they must then be located: this works best if there is clear documentation of the materials used; Planning and database, possibly from BIM, would be very helpful.*
- 3. The dismantling and recycling process must be economical compared to the construction of new materials",*

Dr. Klemens Braunisch MRICS⁴.

When it comes to transitioning to blockchain-based solutions, well structured databases are crucial. This goes far beyond BIM⁵ – the transition must be able to unlock the full lifecycle of a building for all stakeholders.

"Think about optimising supply chain planning, reducing costs caused by miscommunication between parties (failure costs), faster permit and financing processes, more efficient use of limited resources, and so on. 80% of the work that needs to be done is structuring processes and dataflows. I dare to say that the 20% that blockchain in the ideal situation then can add in a circular system will bring about 80% of the added value of the total solution. In my view, blockchain is therefore an important enabler for circular business models in construction, provided a number of important preconditions are met."

Jo Bronckers.

Nevertheless, there are many obstacles to overcome.

Obstacles when moving towards a circular built world

- » *Success is still measured by GDP*
- » *The circular building market is not developed yet*
- » *Business models are outdated, crucial information gets lost*
- » *Admin or legal barriers make it difficult to progress*
- » *Non-collusive collaboration*
- » *Incentives seldom encourage to change*
- » *10–15% of the building material wasted during construction*
- » *54% of all demolition materials are landfilled*
- » *And many more*

What are the benefits of using blockchain in the circular built environment?

Blockchain is first and foremost an enabler that facilitates trust and transparency to information. This is important to improve communication across networks to realise clear targets by all contributors in multiparty collaborations, therefore cutting through the noise in a heavily polluting industry.

- » *Smart contract energy deployment*
- » *Fraud-free emission management*
- » *Affordable, durable, shareable buildings*
- » *Better green finance, low enforcement costs*

⁴ Dr. Klemens Braunisch MRICS - Head of Real Estate Management at FH Wien WKW University of Applied Sciences for Management and Communication

⁵ https://en.wikipedia.org/wiki/Building_information_modeling

A circular economy requires taking a holistic view, in other words a decentralised network that is able to keep databases fresh, increase connectivity and remove traceability barriers to enable a circular built environment. Therefore, the main benefits of using blockchain in the circular built environment are as follows:

- » **Trust & transparency:** everyone that is part of the network can see and trace all transactions made on the blockchain.
- » **Accessibility:** a blockchain network is accessible to everyone at any time and shows transactions in real time.
- » **Co-creation:** blockchain enables cost sharing and facilitates collaboration.
- » **Security:** blockchain is a highly secure system that is very difficult to crack.

How can blockchain-based solutions in the field of construction be applied in practice?

Blockchain technology can enable tracing back to the source of the material, as well as facilitating the prediction of recycling and reuse rates of materials and their trade in the construction industry. It is referred to as a neutral system that is not tied to the owner of the materials and can also be used in the long term to evaluate the building life cycle.

In practice, this means that a brick can be traced back from the construction site to the source of the material and thus its carbon footprint can be calculated.

"By 2030, 50% of all materials in the construction industry will be reclaimed, i.e. either directly or via high-quality recycling. The current rate is 1%, i.e. until then we will still have major challenges to build an ecosystem."

Dominik Campanella⁶.

Building this ecosystem can be facilitated if all stakeholders of building projects use decentralised systems like blockchain. Nevertheless, we have a long way to go. The industry is still in its infancy.

„Building material companies like Holcim want to move to more circular models as quickly and as impactful (sic) as possible, and need to embrace the tools available today for transparency and collaboration in the built environment. Material passports and CDW marketplaces represent an important step into a circular future which can later on be migrated to more advanced technologies like the blockchain. Right now, even simple tools like marketplaces or local chat groups can represent a first step that every local building

material company can take."

Philipp Leutiger⁷.

As Arup, a sustainability consultancy firm, explains, blockchain can also be seen as an additional layer to the internet. Also called Web 3.0: If the internet is considered the primary technology layer for the exchange of knowledge and information, blockchain technology can be considered a secondary layer that extends the first by enabling the secure exchange of value and the ability to permanently and verifiably store information about an asset. Both layers could help realise a truly Circular Economy.

Conclusion

What starts with a WhatsApp group on a construction site to exchange local building materials can grow to a circular built world that is supported by blockchain-based solutions. Nevertheless, better than building is simply not building.

"Every square meter not built is the best square meter."

Janina Nieper⁸.

Success is still measured by GDP. But what about preserving and enhancing natural capital? Rapidly falling technology costs can change business models and enable us to live within planetary boundaries.

"Economic growth can be supported by monitoring and measuring performance over the duration of an asset's life – and the circular economy benefits can be realised. We can all see the value of service records when purchasing pre-owned cars, similarly in the future, infrastructure assets will have increased value if they have immutable records of composition, manufacture and service history."

In 2013, Arup started our Blockchain journey with the birth of OvaCoin in 2017 to better understand the tokenization and integrated platforms. With current developments within the material supply chain, EPD data and smart contracts domain; we are on a journey - building the digital infrastructure which we believe holds significant value for our clients"

Kevin O'Grady.

Time for a mindset shift in the building industry! Time for reinvention, resilience & regeneration! ●

6 Dominik Campanella, Co-Founder Concular & restado

7 Philipp Leutiger, Chief Digital Officer at Holcim

8 Janina Nieper, Circular Architect & Designer at D/DOCK & Furnify and Founder of Circular Economy Club Amsterdam

The State of Blockchain in Real Estate 2022

Author: Florian Huber, Member of the Executive Board of FIBREE, FIBREE Co-Chair - Vienna (Austria)

For the fourth edition of the annual product database research, a working group of twelve international experts was assembled to investigate the current state of blockchain technology in the real estate industry.

Methodology

The research team followed a similar procedure as previous years. Starting with analyzing last year's database, by checking all websites and LinkedIn profiles to make sure that the products already known are still up to date. All questionable products were initially earmarked not to be included in the product database by 2022, but not yet definitively removed.

As a second step, LinkedIn and online listing platforms such as ICO Bench and Crunchbase, were used to search for new products that were not yet in the global product database using keywords around the narrow space of blockchain and real estate. The prerequisite to be included in the database is an available and working website. The desktop research led to product findings in 60 countries.

In the same time we reached out to all FIBREE Regional Chairs with the request to check the listings in their region and provide additional or amend wrong information to the database.

By the end of April 2022 the database showed roughly 450 start-ups globally. Using this set of data we reached out to the listed companies via email with a detailed market survey to gain deeper insight within the industry. By the end of May, 22 fully answered questionnaires were returned to the research team. These results were then aligned with the findings of the desktop research and the estimations of FIBREE regional experts.

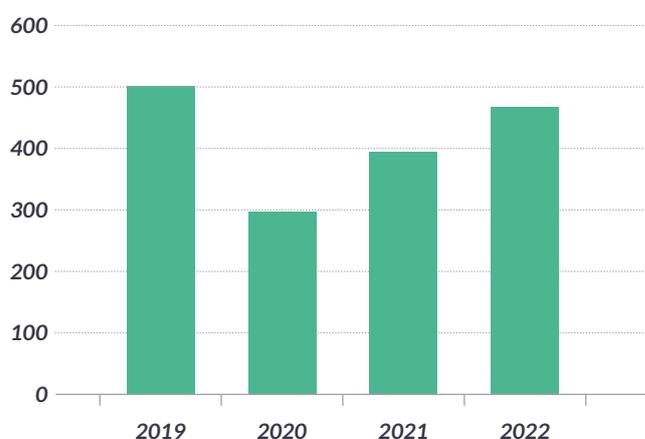
To finally verify whether any additional changes in the product database could be observed we left the desktop research open

until mid June 2022. By closing the research-period, we can announce 476 products are listed in the 2022-edition of the worldwide FIBREE product-database for blockchain and real estate.

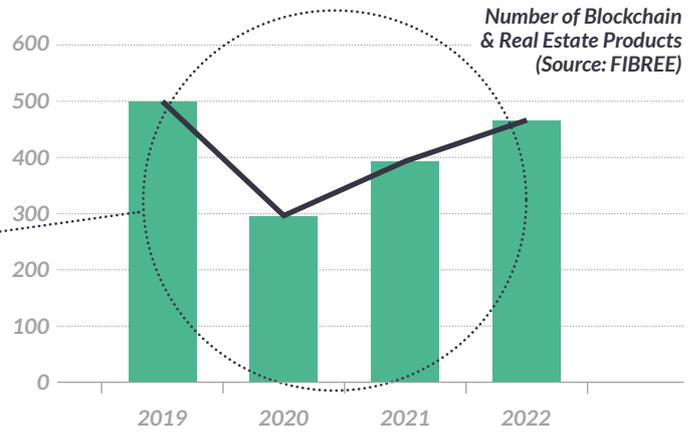
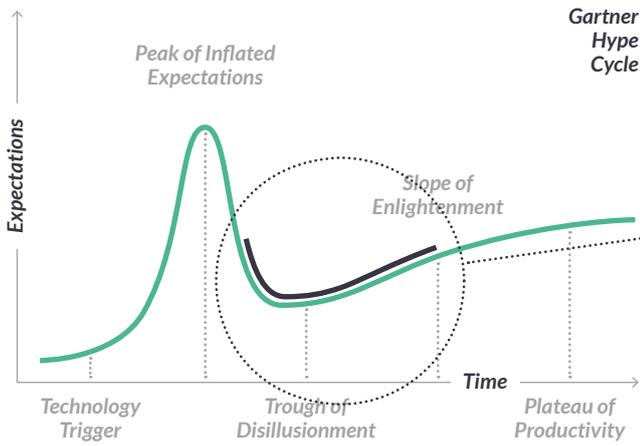
In the article below you will find our most important findings and results of this year's database research: the State of Blockchain in Real Estate 2022. It will also make several comparisons with previous years results.

Database insights

The first focus will be on general findings, eg. how many products are found and their geographical distribution. Secondly their product-focus, growth stages and entry points will be emphasized. An in depth analysis of the findings in each of the 8 different defined product categories will be then presented in detail.



Number of blockchain & real estate products in the database



Number of products

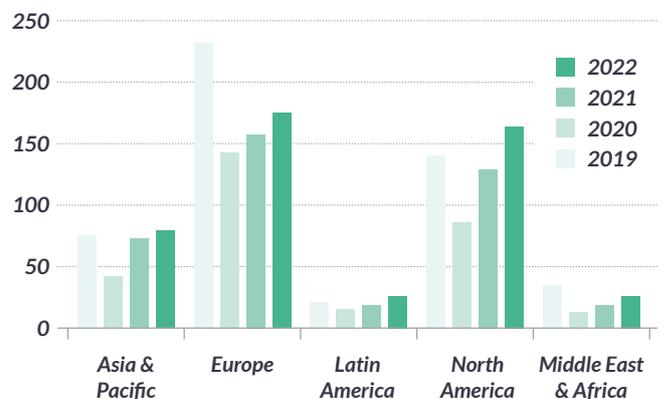
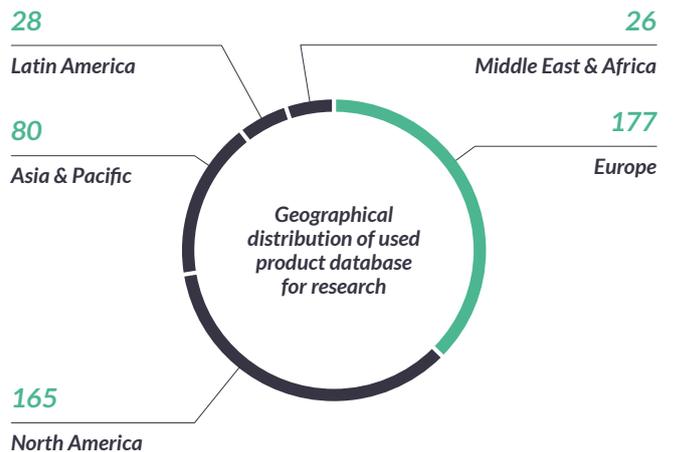
This year FIBREE conducts for the fourth time its global Blockchain and Real Estate-survey. Looking back into the previous years the comparison shows a clear picture. Starting in 2019 with 501 products, followed by a 40% drop towards 297 products in 2020, we see that the number of products increase again in 2021 with more than 30% to a total of 394 products. Looking into the numbers of 2022 a further rise of 16 % to 476 global products can be detected. In terms of the Gartner Hype Cycle¹ these figures might indicate blockchain and real estate is for the second year in a row - on a global level - step by step moving out of the so-called 'Trough of Disillusionment' towards the 'Plateau of Productivity'. With 476 products in 2022, the number of blockchain and real estate products supplied to the market is approaching on the all time high level of 2019.

this year's figures it is likely that North-America could surpass Europe next year already.

Asia & Pacific region comprises 80 products, Latin America 28 and Middle East & Africa 26.

Geographic spread

With the fourth edition we can say for sure that the action is happening everywhere around the world. Most blockchain and real estate products originate from Europe and North-America, with Asia & Pacific region in third place. Product availability in the regions of Middle East & Africa and Latin America are close up again. When looking at the figures for this year we notice that the regions of North America and Europe both show a big leap. Interestingly we discovered that only 6 products in the former region and 14 products in the latter region are no longer active. In general the growth-pace in all regions seems to be pretty simultaneous. Furthermore Europe remains in the leading position with a total of 177 products followed by North America with 165 products. For the third year in a row North America shows a significantly faster growth than Europe. Anticipating



1 See: <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>

Top 5	Fastest growing countries	Fastest falling countries
1	USA (+36)	Germany (-2)
2	France (+10)	Estonia (-2)
3	Spain (+5)	Slovenia (-1)
4	UK (+5)	Liechtenstein (-1)
5	Nigeria (+4)	China (-1)

When looking more closely at individual country-levels we see that although every global region shows growth, this is not happening in every country. The USA is in 2022 by far the country with the biggest growth rate, and fully responsible for the big expansion of the region of North America. Adding up new market entries and products stopping their activities gives us the picture of the fastest growing and fastest falling countries in the world.

The 476 products in the 2022 product database come from 60 different countries, of which 32 of them (54 %) have only one or two products listed. Only 14 countries are having more than 10 products in the product database, which results in four more than in 2021. The table below shows the 14 top-countries with the highest number of entries, together with the evolution of their ranking of these during the past 2 years.

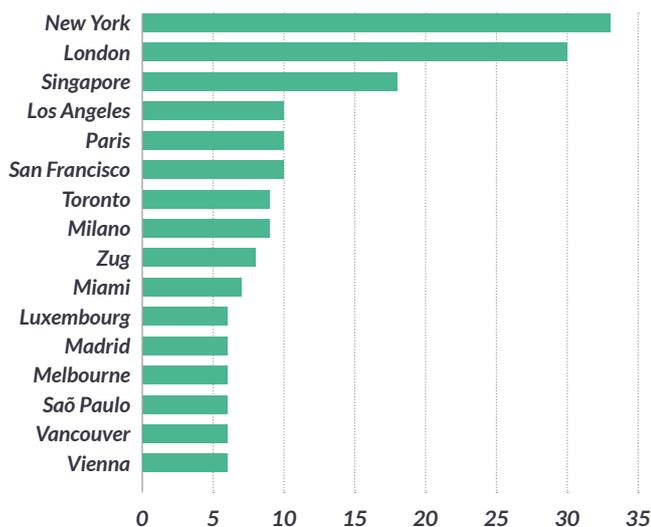
The USA and UK again maintained their position as leading countries in the world, far ahead of the following countries and both even strengthened it during the last year with new additional products. Third is Australia which could hold its position from last year. Canada dropped out of the top-ranking and is now in fourth place. Singapore and Italy consolidated their shared fifth position in the global country ranking despite

Country	Number of products 2022 (delta with 2021)	Number of products 2021 (delta with 2020)	Ranking 2022 (delta with 2021)	Ranking 2021 (delta with 2020)	Ranking 2020 (delta with 2019)
USA	144 (+36)	109 (+36)	1 (=)	1 (=)	1 (=)
UK	39 (+5)	34 (+10)	2 (=)	2 (=)	2 (=)
Australia	23 (=)	23 (+6)	3 (=)	3 (+2)	5 (+2)
Canada	21 (=)	21 (+6)	4 (-1)	3 (+3)	6 (+5)
Singapore	18 (+2)	16 (+8)	5 (=)	5 (+5)	10 (-7)
Italy	18 (+2)	16 (+9)	5 (=)	5 (+6)	11 (+5)
Spain	16 (+5)	11 (-1)	7 (+2)	9 (-1)	8 (+2)
Switzerland	15 (+2)	13 (-7)	8 (-1)	7 (-4)	3 (+1)
Netherlands	13 (+2)	11 (-3)	9 (=)	9 (-3)	6 (-1)
China	11 (-1)	12 (+3)	10 (-2)	8 (+1)	9 (+5)
France	11 (+10)	1 (+1)	11	n.a.	n.a.
India	11 (+3)	8 (n.a.)	12	n.a.	n.a.
Austria	10 (+2)	8 (n.a.)	13	n.a.	n.a.
Brazil	10 (+3)	7 (n.a.)	14	n.a.	n.a.

gaining new products to their country's database.

A jump from ninth position to seventh made Spain now present with 16 products. As in last year Switzerland once again couldn't hold its previous ranking and now dropped to the eighth place. Closely followed by the Netherlands which can for the third year in a row be found on the ninth place in the world ranking. China completes the top 10 but, like last year, but different from last year it now needs to share this tenth position together with France and India. France catches attention because of the biggest relative increase shown in the world. Expressed in absolute figures, it is after the USA, the country with the second biggest increase of products listed in this year's FIBREE product database.

Looking at countries with product availability with at least ten products we can now add four new countries. Austria and Brazil, both with 10 products, are two countries with a growing database and are steadily climbing the top-rankings towards position 13 and 14 in 2022.



Top cities in Blockchain & Real Estate

Overall we can see that not too many products from 2021 ceased their activities, in total only 35 products. This is true for only 21 countries. This seems to be a clear break from previous years. Looking at the balance between new products and those which stopped, only 9 countries show a negative balance and out of those Germany and Estonia only have 2 products less available. All the others have only lost 1 product.

For the third year in a row New York can be called the leading capital in the world for blockchain and real estate with 33 products ahead of the British capital, which remains strong this year. So the race between those cities is still ongoing. How strong their leading position is, is obvious because both New York and London each show more products than the number three country in the world, Australia. Singapore is once again a perennial third place in the global cities top chart.

Overall it can be noticed that North America is strongly represented in the city ranking. Place four goes to Los Angeles, place six to San Francisco and place ten to Miami. Toronto follows closely on place 7 and Vancouver on place 15.

It is evident that European cities still are strongly represented. Nevertheless as seen last year previously 'established' cities like Berlin, Amsterdam or Munich can not be found in this year's top ranking. Paris made it to rank 5 with a leap-jump. Other cities like Milan and Zug remain in the top ten.

The Asia & Pacific region is strongly represented by Singapore in fourth place and Melbourne in thirteenth place.

For the first time we can welcome a Latin American city among the top-cities. São Paulo is represented with 6 products.

Three Key-Criteria for a better overview

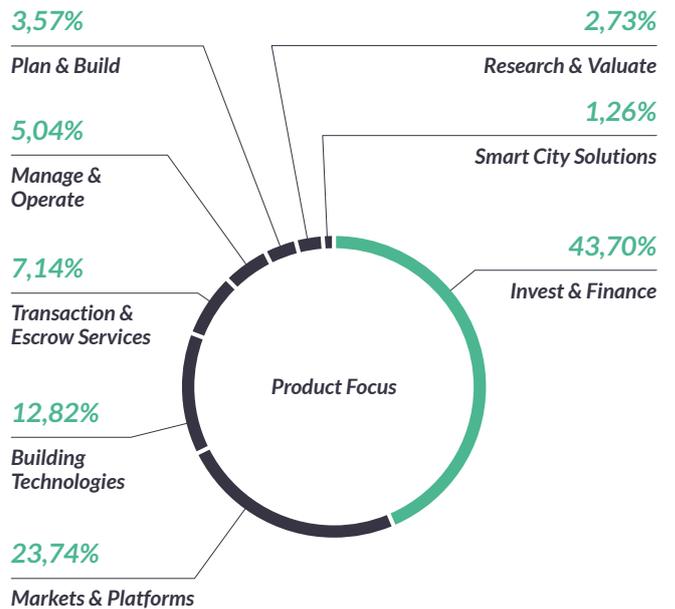
Our defined key-criteria of ‘Product category’, ‘Entry point’ and ‘Growth stage’, should help the market understand better what use cases blockchain is applied to, where the technology of blockchain is coming from and where start-ups are heading to irrespective of which growth stage they are in.

Product category

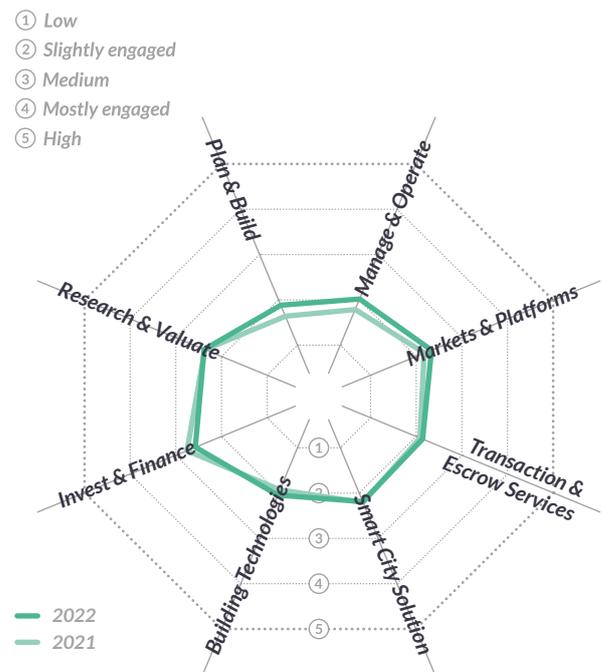
The eight product categories, which stand in close relation to the real estate life cycle, cover the most important segments of the market. This underlines the findings out of the perspective of our local representatives, current market players and the working groups’ desktop research. A brief overview can be seen below and more detailed in the specific analysis of each segment at the end of the article.

- » **Invest & Finance** - Any product that focuses on the investment and loan providing market for real estate. Varying from fragmented investments in real estate propositions with security tokens to peer-to-peer utility token solutions in support of real estate services.
- » **Markets & Platforms** - Any product that lists real estate related products or services and connects the needs of different market participants. This can be facilitating all kinds of markets, from investment platforms to land title records, to reporting platforms for trustworthy data and more.
- » **Building Technologies** - Any product that offers technology and software development to be deployed and embedded in third party software solutions.
- » **Transaction & Escrow Services** - Any product that supports market participants in any kind of transaction. Often the transaction service is combined with fully automated micro-payments registered in a decentralized ledger.
- » **Manage & Operate** - Any product that is designed to manage and operate buildings or manage real estate portfolios. Examples include facility and property management solutions.
- » **Plan & Build** - Any product that offers services and solutions as architects or construction, like material passports or BIM-solutions.
- » **Research & Valuate** - Any product that offers services related to any data out of the real estate market. A fast growing amount of hashed data and historical track records, create new levels of transparency about the real estate market. This is very valuable input for scientific research, valuation and many more purposes in the real estate industry.
- » **Smart City Solutions** - Any product that offers solutions for cities and municipalities. Varying from registration of building permits to micro grids for sharing utility services between neighbors.

The figure below shows the distribution of the different product categories in the total database of 2022.



The figure below shows the average level of engagement in the defined product categories estimated by the experts in the regions where FIBREE is currently represented.

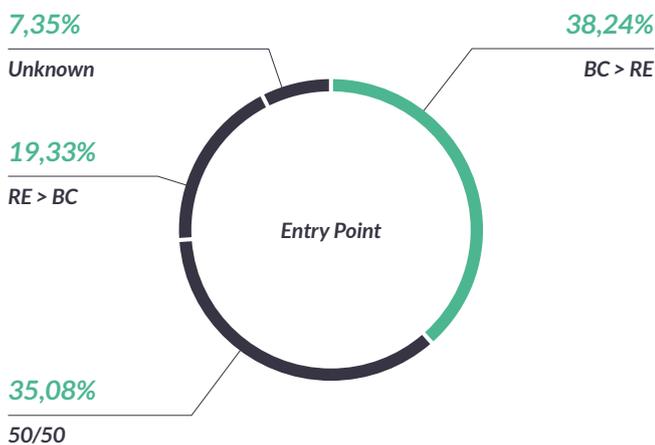


Entry point

Like in last year's research both the real estate sector as well as the technology sector show to be the main initiators for the development of blockchain products for the real estate sector. To give a better orientation the key criteria of 'Entry Point' will help to understand the origin of initiative.

The entry point of 'Blockchain to Real Estate/ BC > RE' are products initiated by technology start-ups and entrepreneurs to approach the real estate industry with new solutions while vice-versa the entry point of 'Real Estate to Blockchain/ RE > BC' explains that coming from the real estate market, solutions have been developed out of the need as digitization is an important means to change current processes in daily routines.

Often it was not quite clear which side actually is the driving force behind the product development, thus leaving it open to an equal approach of '50:50'.



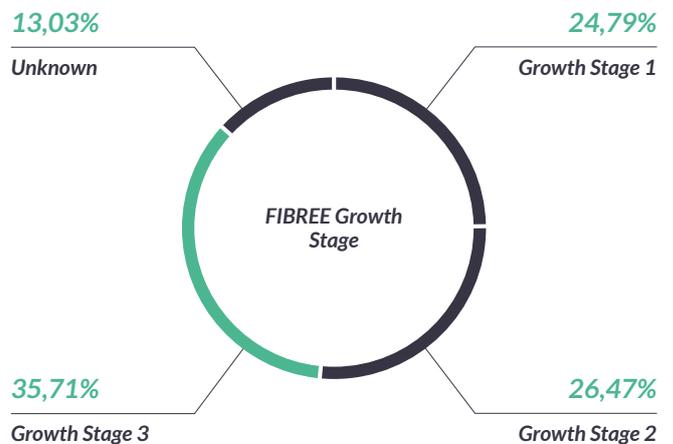
FIBREE Growth Stage

We defined 3 basic growth stages to easier distinguish product-suppliers which are closely aligned to the general understanding of the start-up culture. With a growing market adoption of products, additional growth stages may be added in the future.

Analyzing this key-criteria it underlines the fact that the market is slowly but steadily adopting. Start-Up entrepreneurs are ever better understanding the value of blockchain technology and how to leverage it into real estate use cases. Comparing the first three years of research we have seen mostly early adopters and early stage ventures and only a small percentage of products with a solid foundation - 'Growth Stage 3' - on the market. The second year in a row a shift towards solid, mature and sustainable solutions for the market can be seen.

The current 3 stage are:

- » **Growth Stage 1:** Still under development / Proof of concept / Prototype
Any start-up that clearly communicates via its website that the product is still under development and/ or traction can not be detected yet. This stage primarily was indicated by the year of incorporation stated in the imprint.
- » **Growth stage 2:** Between MVP and already in use by three external market players
Any start-up that shows first traction and success stories to be found on the website and/ or indicated by the year of incorporation stated in the imprint.
- » **Growth stage 3:** Already in use by more than three external market players
Any start-up that by year of incorporation indicated by the imprint shows a clear track record and/ or gives the impression of a full functional product.



A Close up on the Different Product Focuses:

Invest & Finance

Key Facts:

- » **Number of products: 208 (+ 34) / 43,70%**
- » **Average score spider diagram country pages: 2,62 (- 0,16)**

Again, it is the most common category in the 2022 product database. With 205 products, almost 50 % of all blockchain and real estate products fall into this category. Interestingly we discovered that the global opinion by FIBREE experts see the position of this segment at the same level or even with a slight decrease to last year (see spider diagram 'Level of Engagement').

This may be true to the fact that many other products such as 'Markets & Platforms' have common ground with the segment of 'Invest & Finance' and therefore we assume those other segments become more important. In this particular case as facilitators and service providers are enabling and scaling investing and financing to an ever more increasing target group.

Furthermore this statement can be underlined by the opinion of product suppliers which we addressed with an in-depth market survey. 'Invest & Finance' remains the strongest segment and is closely followed by 'Markets & Platforms'.

For what purpose in this particular segment products are being developed the answers of this year's in depth survey shows that tokenization and smart contracts are stated by almost every respondent, shortly followed by facilitating digital payments and transactions. It becomes also clear that creating transparency and a digital ledger are often included in this category.

We asked the in depth-survey participants about the challenges they faced when bringing their product to the market. In this category of 'Invest & Finance' regulatory constraints and compliance are most often mentioned, almost by every product supplier. Other frequently mentioned challenges are adoption and industry readiness. Technical hurdles and education are also mentioned but only a few times.

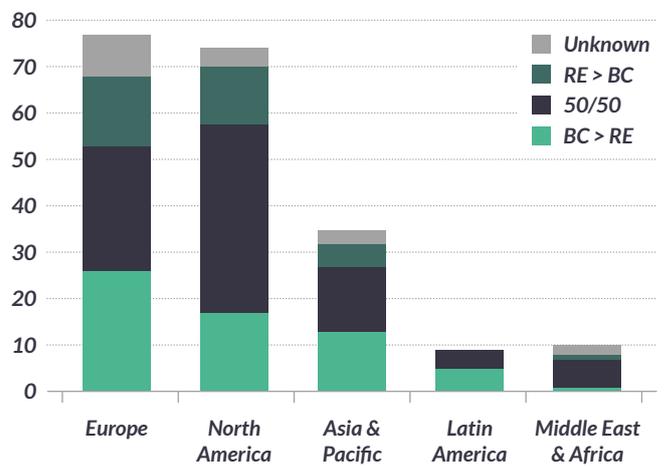
A majority also mentioned that getting the funding is one of the biggest challenges too. This leads into long way to create a scalable product which can be easily adopted by the industry moreover to the product market fit, thus finding the right clients. Nearly half of the participants explained that missing education on the topic of blockchain in real estate is still challenging. Technical hurdles like blockchain-, API- and database-integration still seem to be a big problem.

Looking at the blockchain-technology applied, again Ethereum is leading over all categories.

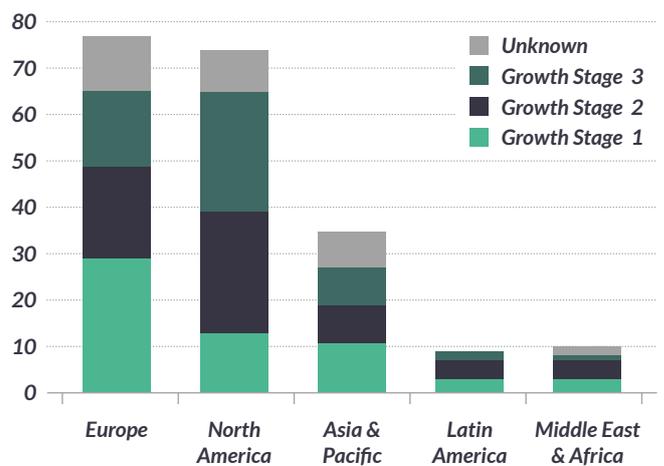
Entry point & Growth Stages

The 'Entry point' might be a clear indicator for market uptake showing from what direction the earliest engagement in the product ist coming from. It shows a clear picture that the initiatives for 'Invest & Finance' products are mostly not coming from inside the real estate industry itself, but often initiated by tech-startups.

Nearly one third of all products in this segment are initiated by pure blockchain-organizations or about 45 % from a blockchain-developer in a collaboration with a real estate organization. This fact is most evident in North-America maybe for the reason of being a very tech driven country with a strong financial market. Initiatives out of the real estate market only amount to 16 %.



Entry Point



Growth Stage

Looking at growth stage 2 and 3 together, in North-America (25 %) more products can be found compared to Europe (17 %). In this region more products are still under development (15 %) when looking at this particular segment. A similar relation counts for the Asia & Pacific region too. This general picture comprising all regions might indicate that market uptake is already strong in regions with a high number of growth stage 3 products and is about to become stronger in other regions where a higher percentage of products is still under development.

Looking at Latin America we see that most of the initiatives stem from the blockchain developer side with early stage products.

In line with the above, it will come as no surprise that the USA currently has by far the most suppliers of 'Invest & Finance' products that are already in a Growth Stage 3. No less than 25 products originate from this country in total.

Australia, India, the Netherlands, France, Germany and Italy share the second and third place on this list, albeit at a considerable distance behind the USA. The big difference between these countries and the USA illustrates once again that there is still a long way to go. But it also shows once again that blockchain and real estate is a global phenomenon and solutions are being developed and offered all over the world.

<i>Top Leading Countries</i>	<i>Already in use at >3 external market players</i>
USA	22
Australia	3
India	3
Netherlands	2
France	2
Germany	2
Italy	2

Markets & Platforms

Key Facts:

- » **Number of products: 113 (+25) / 23,74%**
- » **Average score spider diagram country pages: 2,37 (+0,19)**

The segment of 'Markets & Platforms' this year has the second highest number of products in the overall market database. A rise of nearly 25 % underlines the importance of these products. As stated above we see a very strong relationship between the segment of 'Invest & Finance':

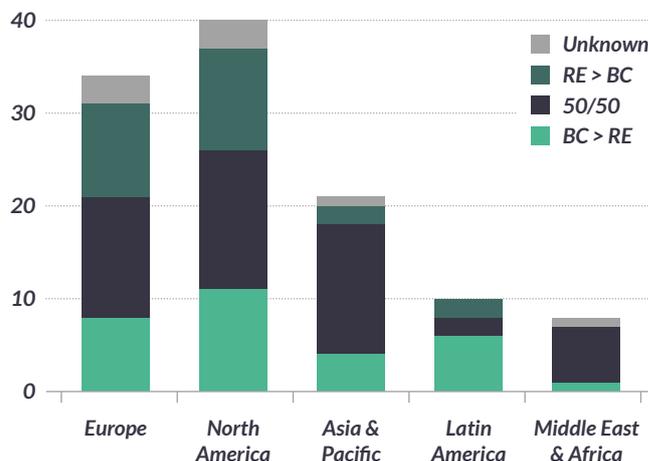
When looking closer into it we see that products in this category are offering solutions for different purposes, mainly for the segment mentioned above. Often tokenization is combined with facilitating smart contracts for targeting the real estate and construction-industry. Examples are focussing on land title and ownership transfer or rental contract-solutions, others on supply chain and workflow facilitating in the construction industry. Others are enabling digital transacting of real estate tokens or facilitating escrow processes. What they all have in common is that a digital distributed ledger is used to create data security or audit trails to facilitate the right transparency for the actors involved. Furthermore when analyzing the answers of the in depth survey it is therefore no surprise that the mentioned target groups are spread all over the entire industry.

Entry point & Growth Stages

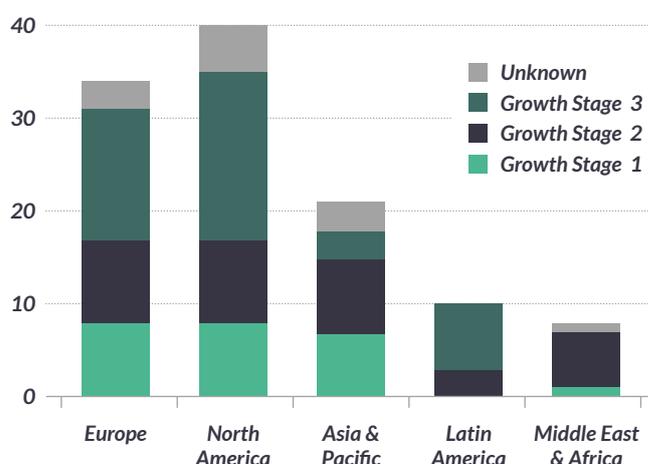
When comparing products of the segment 'Invest & Finance' and 'Markets & Platforms' they show that the initiatives come equally from both sides. Looking at last year's results we can see a shift towards technology providers, thus giving us a similar picture to the latter segment.

Interestingly most of the products in the segment of 'Markets & Platforms' already find themselves in growth stage 2 (30,97 %) and growth stage 3 (37,17 %). We assume that there is a strong correlation between the segment of 'Invest & Finance' and 'Markets & Platforms' where a high amount of products in growth stage 3 can be found. Both segments together amount for approximately 70 % of all products offered globally.

Looking at the leading countries in the segment of 'Markets & Platforms' we now see again USA in the top rank this year with 12 products in growth stage three. Canada lies in second place with half of the products, closely followed by Brazil in third place. Europe is well represented with the Netherlands, UK, Italy, France and Poland offering well established products in this segment.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	12
Canada	6
Brazil	5
Netherlands	4
UK	3
China	2
Italy	2
France	2
Poland	2

Building Technologies

Key Facts:

- » **Number of products: 61 (=) / 12,82%**
- » **Average score spider diagram country pages: 2,12 (+0,18)**

The third biggest category is 'Building Technologies' which has not changed in the number of offered products from last year. Assumably this could refer to the fact that technology providers still have enough resources supplying the growing market demand within all other segments mentioned. Products in this category are prone to be more technology-focused, like blockchain infrastructure for integrators and vendors or providing specific software for real estate organizations. The main target groups to be discovered in this segment are financial services sector (e.g. mortgages, loans, debt, bonds), large real estate investors (e.g. institutional investors, REITs, real estate asset managers, individuals), small/ medium real estate Investors (e.g. accredited and non-accredited investors, entrepreneurs).

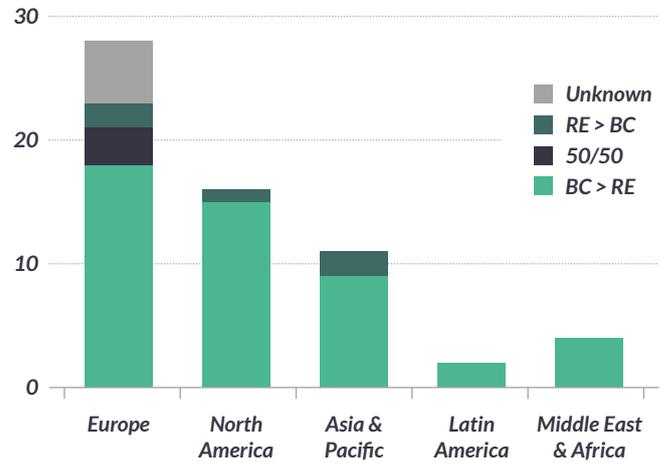
The value blockchain brings for their clients and users mainly is agility & flexibility, speed through automation, trust and reduced risk through immutability, transparency and to offer decentralized finance (DeFi) services to increase liquidity according to the answers of the in depth-survey.

Entry point & Growth Stages

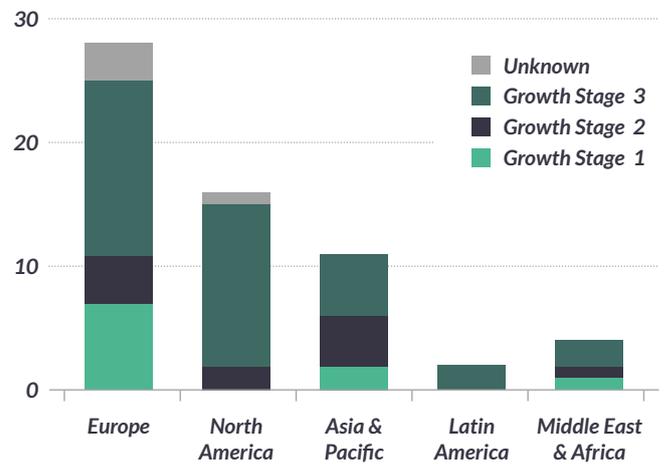
When looking at the spread of these products throughout the world it goes without any surprise that the initiatives (approximately 80 %) derive from the technology side. Europe is leading the field as a technology provider with 18 products from which nearly 77 % are already in growth stage three holding a strong position. Compared to last year's findings Europe has now overtaken North America with this key-criteria. North America follows closely with 15 products entering the market from the technology side. Nearly all of them are already well established in growth stage 3.

A similar ratio can be detected when looking at the regions in Asia & Pacific, Latin America and Middle East & Africa.

Examples of product providers that have outgrown the start-up stage can be found in regions like North America, Europe, Latin America and Asia & Pacific. Ranking on place 1 the USA is once again strongly represented with 12 products, followed by Austria which has a quarter of product providers and so does China. Germany and Brazil both are represented with 2 products equally.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	12
Austria	3
China	3
Brazil	2
Germany	2

Transaction & Escrow Services

Key Facts:

- » **Number of products: 34 (+14) / 7,14%**
- » **Average score spider diagram country pages: 2,22 (+0,08)**

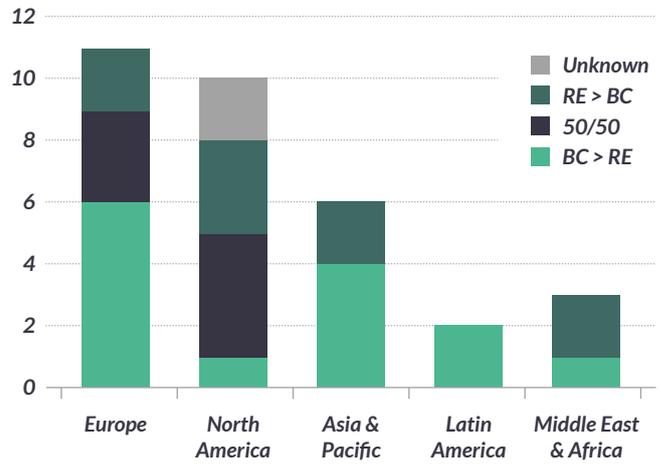
For the second year in a row this segment now is part of the overall analysis and finds itself in fourth place with 6,82 % of global product availability. We see a close relationship to the segment of 'Invest & Finance' and 'Markets & Platforms' as product suppliers in this field offer - mostly financial - transaction services, but different from capital market investments. As the number of available products grew by a third this year we carefully assume that a correlation with the growing number of products in the segment of 'Invest & Finance' is given, thus deriving a rising need of transaction services.

Entry point & Growth Stages

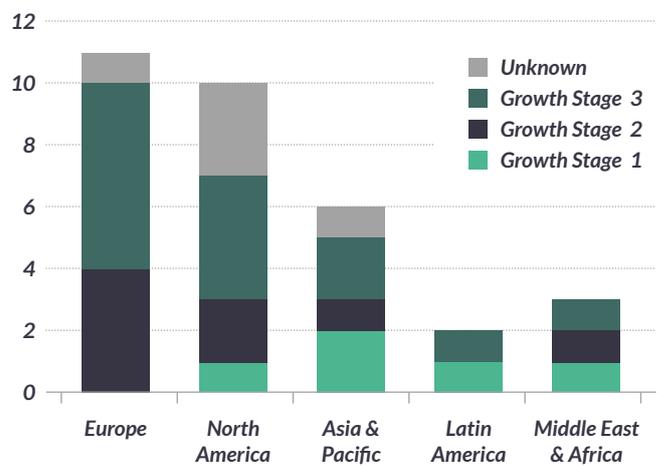
Obviously there has been a shift towards the technology side this year as nearly 45,5 % of product suppliers now come from this side. But still the growing need towards services providers is again being initiated by approximately 28 % by the real estate sector itself.

It is somehow understood that the entry point moreover comes from the real estate sector or with the involvement of a real estate organization, rather than from technology driven start-ups alone, as real estate transactions or investments in real estate related products have traditionally been guided by escrow agents. On a global scale this can be observed on nearly every continent that new solutions originate out of more than 50 % real estate related businesses.

As assumed last year that product suppliers and market participants are still trying to understand underlying new business models emerging around the new technology of blockchain we can underline that we were somewhat right as the growing number of new products are to a main extent already in growth stage 3. The majority is to be found in the USA and Italy. Furthermore 25 % of all available products already find themselves in growth stage 2 offering minimal viable products to the market especially in the USA and UK.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	4
Italy	3

Manage & Operate

Key Facts:

- » **Number of products: 24 (=) / 5,04%**
- » **Average score spider diagram country pages: 2,01 (+0,23)**

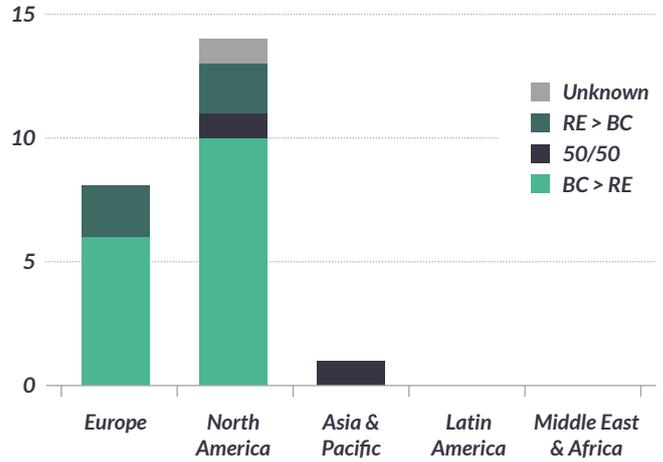
Looking at the overall spread of all segments globally the segment of 'Manage and Operate' only covers 4,91 % of total product availability and has been outpaced by the segment of 'Transaction & Escrow Services'.

Product suppliers only can be found in the region of North America and Europe offering 23 products, which mostly are initiated by blockchain-developers. A small exception is the Asia & Pacific region with 1 product in Australia.

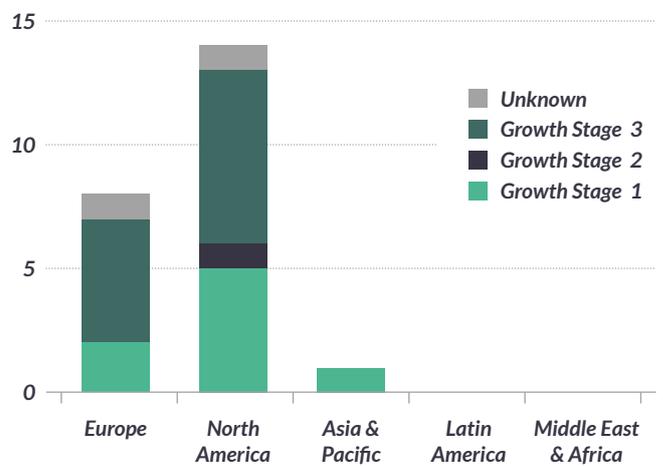
Secondly we found out that nearly 50 % of the supplied products find themselves in growth stage 3. The second half are still under development or not having a ready product yet.

What could be analyzed is that product suppliers in this segment often focus on creating solutions for large real estate investors and asset managers.

Participants at the in depth-survey indicate that they have only used their own sources to fund the development of their product. Similar to last year's findings, regulatory constraints and education are mentioned as the biggest challenges.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	7
UK	2

Research & Valuate

Key Facts:

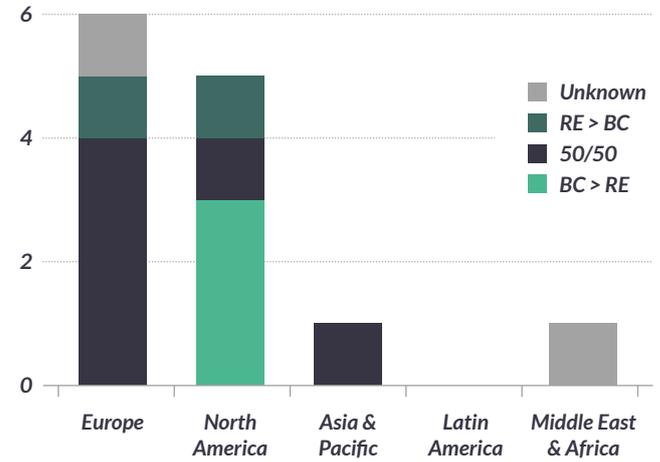
- » **Number of products: 13 (+1) / 2,73%**
- » **Average score spider diagram country pages: 2,40 (+0,02)**

Data driven start-ups not only play an important role in the real estate sector but in general are expected to be seen as masterminds in any industry: data is the new gold. Like last year it does not surprise that the vast majority of products with entry point out of the technology side stem from the USA. In Europe the picture did not change as it seems the demand for services and products in this category equally come from the real estate market and from tech driven start-ups.

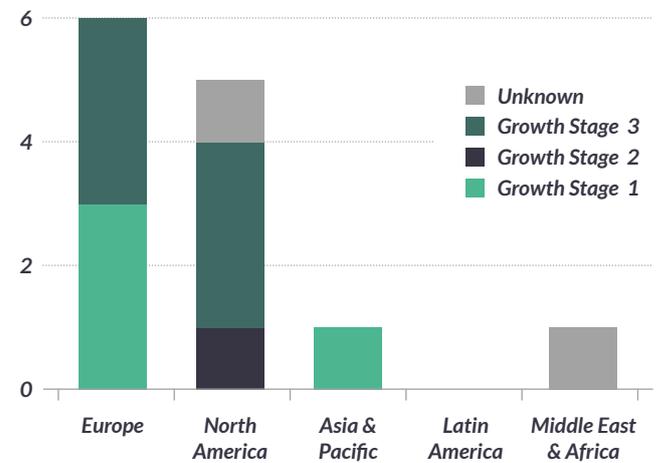
Nearly half of the product suppliers are already operating in the market offering services to more than 3 external players. They can be found in the region of North America (USA) and the region in Europe (UK, Switzerland, Italy). This year only a third of product suppliers in this segment are still under development, mainly in Europe.

Compared to last year’s findings we can see a small shift towards market uptake in this segment.

Still the expectations of the FIBREE’s local representatives remain high in this field compared with the products available on the global market. This could show that the demand for real estate data is strong but can not be covered yet.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	3

Plan & Build

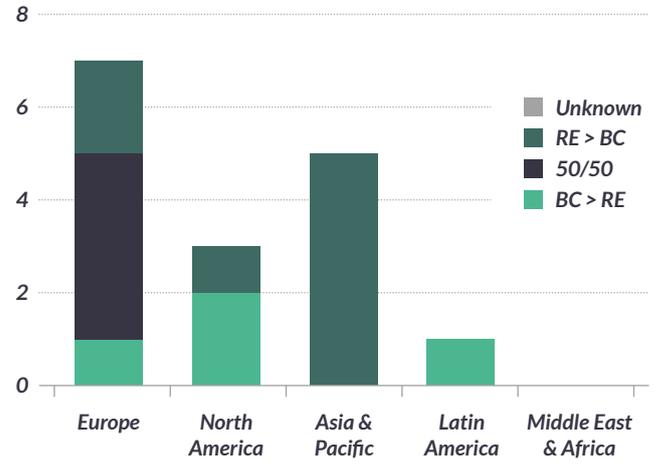
Key Facts:

- » **Number of products: 17 (+7) / 3,57%**
- » **Average score spider diagram country pages: 1,87 (+0,17)**

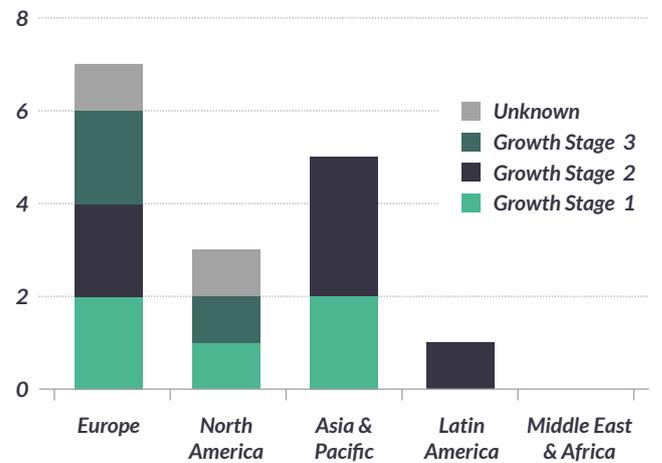
Construction seems a very traditional business and maybe digitization hardly finds entry points, as globally only 16 product suppliers are thinking of new solutions for this particular segment, which by all means plays an very important role in the value chain of the real estate life cycle. This segment slowly grows but still only covers approximately 3 % of the global product availability. 70 % of these products are still operating at an early stage. Generally initiatives derive more from the real estate industry by 50 %.

When looking at the market players we can find three products at growth stage 3 in the USA, Portugal and France.

Generally there is an equal spread of the products available globally. Despite Latin America and Middle East & Africa all regions are represented.



Entry Point



Growth Stage

Top Leading Countries	Already in use at >3 external market players
USA	1
Portugal	1
France	1

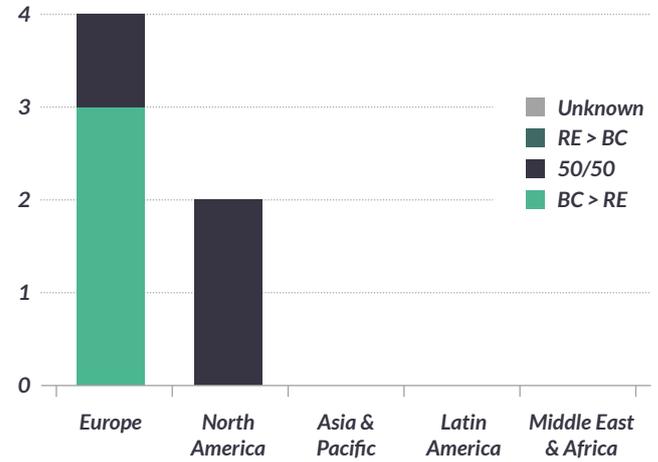
Smart City Solutions

Key Facts:

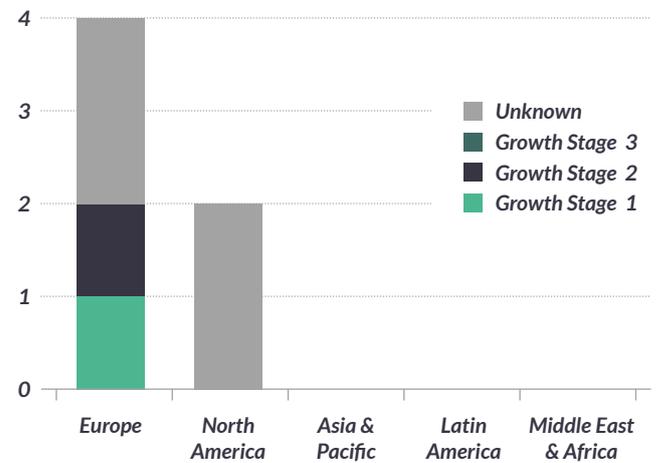
- » **Number of products: 6 (=) / 1,26%**
- » **Average score spider diagram country pages: 2,23 (+0,07)**

The field and segment of smart city solutions still remains the smallest group of product suppliers. The result of products researched shows the same picture as last year. More than 50 % are developing solutions with a strong technological background and those are prominently represented in Europe. Only one product originates out of the real estate market and can be found in South America.

Looking at the FIBREE growth stages we assume due to the fact that smart city solutions are closely related to political impact we on the one hand see so little initiatives and secondly those who started something are still at the very beginning. Also this category is more difficult to find, because the products often present themselves as a solution to other sectors, like the energy or mobility industry.



Entry Point



Growth Stage

Results of in depth market survey

To align the findings of the database analysis based on the desktop research and the input of FIBREE local representatives with the in depth survey of product suppliers we can sum up the results as follows.

In general the answers received (22) in the survey show a similar relationship to the global spread in product availability when compared with the market segments, entry-points and growth stages, thus strengthening the results stated above.

Additionally and far more important we asked six particular questions to get a better understanding of what is going on in the market giving the participants the opportunity to leave multiple answers and to select more purposes from the list. Each multiple choice value will therefore range between 0 % and 100 % depending on the number of respondents that selected the respective answer. The table below shows the results by all participants.

For what purpose are you using blockchain?	Percentage
Tokenizing (providing identity & ownership structure)	81,8 %
Facilitate digital (crypto) payments, crowdfunding & digitize fiat-currencies (DeFi)	68,2 %
Smart Contracts (proof of purchase)	63,6 %
Facilitate transactions (marketplaces)	50 %
Transparency, data security & audit trail	45 %
Digital ledger (asset, transaction, business registry)	36,4 %
Workflow management	22,7 %
Providing escrow services	18,2 %
Land registry	9,1 %
Supply chain management	9,1 %
NFT infrastructure	4,5 %

What challenges do/did you face?	Percentage
Regulatory constraints/ compliance	72,7 %
Funding	63,6 %
Adoption and industry readiness (scalability)	59,1 %
Product market fit/ finding clients	45,5 %
Education	40,9 %
Technical hurdles (development, database integration)	22,7 %
Data privacy	9,1 %
Reliability/ uncertain quality of input data	9,1 %

How does blockchain technology bring value to your clients or users?	Percentage
Transparency	72,7 %
Agility & flexibility	68,2 %
Cost reduction	68,2 %
Increased liquidity	68,2 %
Decentralized finance (DeFi)	68,2 %
Trust and reduced risk through immutability	63,6 %
Speed through automation	59,1 %
Decentralization (remove of silos/ data monopolies)	59,1 %
Disintermediatio	45,5 %
Reduces disputes	22,7 %
Digital assets tokenization, fractional ownership, mass adoption for NFT tech	4,5 %

What is/are the target groups for your product?	Percentage
Real estate owners (private home owners and commercial property owners)	81,8 %
Small/ medium real estate Investors (accredited and non-accredited investors, entrepreneurs)	72,7 %
Individuals/ corporates investing via blockchain solutions in real estate (tokenization, cryptoinvest, crowdfunding)	68,2 %
Large real estate investors (institutional investors, REITs, real estate asset managers, individuals)	68,2 %
Sales and transactions professionals (appraisers, real estate agents and brokers, SMB title and escrow, attorneys and notaries)	45,5 %
Financial services sector (mortgages, loans, debt, bonds)	36,4 %
Real estate supply chain (developers, constructing companies, suppliers, demolition)	36,4 %
Technical professionals (architects, engineers, facility managers, property managers, BIM and maintenance)	27,3 %
Institutions (governments and NGOs, real estate associations)	18,2 %
All entities in real estate universe	4,5 %

What blockchain-platform are you using?	Percentage
Ethereum	59,1 %
Polygon	9 %
Bitcoin	4,5 %
BSC (Binance Smart Chain)	4,5 %
Factom/ Accumulate	4,5 %
RSK	4,5 %
DAML	4,5 %
Polkadot	4,5 %
Tezos	4,5 %

Funding raised until now?	Percentage
> USD 1 million	13,6 %
< USD 1 million	31,8 %
< USD 200.000	18,2 %
None	36,4 %

Who are the investors?	Percentage
Own sources	77,3 %
Equity finance / venture capital	27,3 %
Family and friends	22,7 %
Crowdfunding	13,6 %
Public / Philanthropic grants	9,1 %
Bank finance	9,1 %
ICO/ IEO	4,5 %

Conclusion

It is evident that blockchain technology in real estate is not just a buzzword. Moreover when looking back since we initially published the first industry report in 2019, one year after founding FIBREE, a clear picture is given at present. Blockchain technology has come to stay.

Covering all segments of the real estate industry and more specifically the real estate life cycle this year again the global product availability has risen. Thus underlining last year's statement that we have left the 'Trough of disillusionment' behind and are moving towards the 'Plateau of productivity'. We clearly see that the market is showing more adoption than before as only a few start-ups have ceased their activities, a clear break with previous years. Rather products which have already had a strong position last year remain and give a sustainable outlook for the future.

Nevertheless the technology is still young and still slowly finding its way into the multi-billion dollar market of real estate. One must not forget that the real estate business has always been a people's business and it has always been a laggard when it comes to embracing digital solutions. But the latter seems to be changing, perhaps as a result of two years of pandemic and broader acceptance in the market of working remotely. A total digital disruption may not be expected, but on the other hand digitization is not to be stopped and therefore wise decisions have to be made when structuring digital real estate data to enable new technologies, such as blockchain technology. ●

FIBREE Academic Network Developments

Similar to how real estate is about 'location, location, location', blockchain for real estate is about 'education, education, education'. Blockchain is still a buzzword, difficult for many real estate professionals to understand. FIBREE often receives demands for education, not only from the real estate market, legal specialists or governments - call it the user side - from any part of the world, but also from the developers of blockchain products for real estate - the supply side. And on top of that there is a fast growing population of students and young professionals that want to educate themselves in this field. Younger generations are more bullish on crypto investments¹, so it should come as no surprise that they have more exploratory interest in blockchain in real estate than their previous generations.

Hence, there is a very clear and growing demand for more research and education in the market. As a result, in the first quarter of 2022 FIBREE has chosen to give more priority to collaborating with universities and education institutes in the widest sense. The launch of the FIBREE Online Community Platform at the end of 2021 was an important pillar enabling this strategy. It enables entirely new functionalities to engage, collaborate, or get in touch with professionals in our academic network.

¹ <https://www.investopedia.com/younger-generations-bullish-on-cryptocurrencies-5223563#:~:text=Generation%20is%20close%20behind,and%20ahead%20of%20mutual%20funds>.

New initiatives

Prioritizing education soon resulted in some exciting new initiatives. Recently, several universities and education institutions have decided to intensify their cooperation with FIBREE. As a result, several projects have already started or are in an advanced stage of preparation. Some examples are:



Student membership for FIBREE's Online Community Platform:

The student membership gives students and academic researchers all the benefits of the Full Personal Membership for only 25% of the normal price.

.....
community.fibree.org/memberships



Have your own Group in the FIBREE Online Community Platform to meet other academic researchers.

.....
community.fibree.org/topics/28783/feed

- » Participate in (fundamental) research initiated by the different FIBREE Working Groups, like tokenization, Unique Object Identification, ESG and Circular Economy, Land Title, etc.
- » Contribute in the realization of the annual FIBREE Industry Report. The FIBREE Industry Report, the most important issuance of FIBREE and as a referral document, one of a kind in the world. Share high quality content or contribute in state-of-the-art research on any possible aspect of blockchain and real estate and help create this document, be listed as one of the contributors. Help disseminating the result of this in your education programs, at webinars, events, online or in research papers.
- » Connect and benefit from having easy access to a fast growing network of scientific researchers (professors, lecturers, PhD's) with a specific expertise in the field of blockchain and real estate.
- » Connect bachelor and master students from all over the world with academic and market professionals to find internships, exchange programs, validate their research or find third party consultation on the topics of their research.
- » Development of a University Affiliate program. We want to create a framework for universities active in the field of blockchain and real estate (in its widest sense) to harvest the benefits and values of closer collaboration with leading market players on a global scale.
- » FIBREE Certification for blockchain and real estate education initiatives. FIBREE certified courses from universities and private institutions will be listed at the FIBREE Online Community Platform. Those courses can often offer certain advantages for FIBREE-members and, once completed you can add the course to your personal profile at the FIBREE online community platform and so start building your own curriculum in blockchain and real estate.



FIBREE Certification for blockchain and real estate education initiatives

community.fibree.org/topics/32484/ventures

This year FIBREE started collaborating with Cardiff University with a thesis-competition around the central theme: „Building Sustainable Supply Chains with Blockchain“. There were 80 students that submitted. These were shortlisted to 4 entries enclosed to this post. Out of these we selected 1 winner who will get 1 year free FIBREE student membership, and the article published in the FIBREE Industry Report 2022.

This year's winning thesis is coming from: Xinyu Zhang and is titled: Using blockchain technology Enhancing environmental resilience, A case study in Apple. The winning assignment will be published in the following pages.



All 4 shortlisted assignments can be found at the FIBREE Online Community Platform.

community.fibree.org/topics/28783/feed

» **Motivation for the winner:**

This article shows very clearly how Apple manages to focus on circularity throughout the entire supply chain (thousands of suppliers) and using blockchain for proving this recycle-pledge. We think this research-output gives a very good example of how more transparency and irrefutable evidence can be created with blockchain to underpin sustainability claims. We believe the researched concept can be duplicated on a wide scale within the real estate & construction industry.

» **Congratulations:**

FIBREE would like to thank all 80 participants, our congratulations go to the winner and the 3 other selected outstanding assignments.

» **Next year again with more Universities:**

The setup of this thesis-competition is the result of examining closer collaboration of FIBREE with Cardiff University, as a model to be duplicated to other Universities.

It is our aim to encourage students and PhD-researchers to share their relevant research output via the FIBREE-community with other Researchers, Blockchain-start/scale ups, Real Estate Professionals, Legislative and legal experts and anyone else interested in better understanding the value of blockchain technology in real estate processes.

We would be delighted to get in touch with your university if you are thinking of motivating your students to take part. Please contact us via ask@fibree.org

Also we are intensifying collaborations with various other international platforms and networks for enhanced content, research and education purposes:

- » *Collaboration with CREDA² (USA) and E-Creda³ (EU), the (European) Commercial Real Estate Data Alliance. These organizations organize regular webinars, seminars and events to create a platform to discuss and connect on the latest applied research, data and methodologies. FIBREE is a founding member of E-CREDA.*
- » *Real Estate Crypto Asset Podcasts (R.E.C.A.P.) is a collaboration of FIBREE with the Institute for Digital Crypto Asset Professionals (IDCAP)⁴, a spin-off of University of Nicosia. Every week a new episode will be released with a deepdive-interview with a leading real estate tokenization practitioner about one of the many different aspects of crypto asset issuing and trading.*



Real Estate Crypto Asset Podcasts

community.fibree.org/media_center/folder/
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- » *Support and collaborating in (inter)national research programs, seminars and working groups where universities collaborate with legislators to shape the conditions for more efficient digital real estate markets.*

Like to also be involved? Join the FIBREE Academic Network or Academic Board!

At this spot in the Industry Report we would like to issue a call to all professors, lecturers, PhD researchers or otherwise professionals related to universities or research institutions who would like to get involved. Would you like to actively contribute to the above stated ambitions of FIBREE or do you have some additional ideas that you would like to realize together with colleagues from around the world? If you would like to engage with the FIBREE Academic Network, please inform us by sending an email to ask@fibree.org

In September 2022 an online kick-off meeting will be organized, together with the Executive Board and working group-chairs within our organization. All those who have applied to join the Academic Board will be invited to attend. The group will then be able to decide from among themselves the agenda and desired implementation. From its midst, the group can then choose the composition of the new Academic Board. ●

² <https://kenaninstitute.unc.edu/event/commercial-real-estate-data-alliance-creda-conference/>
³ <https://e-creda.com/>
⁴ <https://idcap.org/>

Using blockchain technology Enhancing environmental resilience A case study in Apple

Author: Xinyu Zhang, student Cardiff University (UK), Building Sustainable Supply Chains
Lecturers: Dr. Qian Li & Dr. Ruoqi Geng

1. Introduction

Gunawan, Permatasari and Tilt (2020) noted that climate change affects the global community, national economies and livelihoods of people in vulnerable conditions. It has contributed to natural disasters like floods, hurricanes and droughts. Greenhouse emissions are contributing towards pollution of the environment leading to climate change. Organizations are encouraged to use renewable sources of energy as well as enhance efficiency in energy use (Kimuli, et al., 2021). Supply chain management determines the way an organization is sustainable in its operations especially in sourcing its raw materials. Apple makes use of its supply chain management to lower carbon emissions with the aim of helping to manage climate change. Climate change is linked to the increased release of greenhouse gasses into the atmosphere. Apple is expected by its stakeholders, especially local community and customers to work towards minimizing the release of toxic gasses into the atmosphere. It has shown commitment towards being environmentally friendly through reducing carbon emissions. This essay focuses on Apple makes use of new technologies like blockchain to lower the emission of carbon in manufacturing its electronic devices. It further embraces recycling innovations to ensure it is sustainable and environmentally friendly.

2. Company background

Apple Inc. is an American company that deals with smartphones, personal computers, computer software and tablet computers. It was founded by Steve Jobs in the year 1976 (Kraemer, Linden, and Dedrick, 2011). Apple operates in the electronic market where it offers consumer electronics like iPad, iPhone and iPod among others. Apple purchases materials and components from different suppliers then ships them to the assembling plant. Products are then shipped to consumers who make purchases from Apple's online stores. Apple has worked towards protecting the environment in the way materials are sourced (Lockamy, 2017). The company focuses on achieving energy efficiency and eliminating wastage in the process of manufacturing products. Apple has improved its supply chain network through embracing digital technologies like big data analytics and the Internet of Things.

The key stakeholders in Apple's supply chain include suppliers, the local community, customers and employees. They are mainly concerned about the quality and sustainability of the way Apple sources its materials and components (Kraemer, Linden, and Dedrick, 2011). This has made Apple come up with the appropriate approach that can assist in making its supply chain sustainable to protect the environment. Apple has established good relationships with suppliers to make them committed to operating in a way that is environmentally sustainable. Apple has remained carbon neutral in its supply activities. It has partnered with suppliers to eliminate wastage and conserve resources in its supply chain. Apple has set a goal to reach net-zero carbon emissions in its operations by the year 2030 (Lockamy, 2017). It has increased the utilization of recycled materials in packaging and its products, renewable energy use, and emphasis on designs that are environmentally conscious.

3. Literature review

A study conducted by Shekarian and Mellat Parast (2021) revealed that supply chain management involves the movement of services and products from company suppliers to distributors. The goal of supply chain management in organizations is to maximize value. Profitability is maximized through making sure that the supply chain operations are efficient. According to Stank, et al. (2019) revealed that supply chain management focuses on environmental issues that influence climate change. Strategic Supply chain decisions in organizations focus on making sure sourcing of raw materials is efficient and environmentally friendly. Logistics networks have significant influences on the way supply chains perform in organizations. Therefore, strategic decisions are usually needed in distribution centers, warehouses as well as in the determination of the best transportation modes. Organizations are using blockchain driving supply chain transparency and accountability in the way raw materials are sourced. New technologies present promising opportunities for organizations to improve their supply chains (Brinch, et al., 2018). Integrating blockchain in supply chain systems enhance traceability and reduce administrative costs thus helping organizations to achieve efficiency. Blockchain increases supply chain efficiency, reduces risks and costs across the supply chain. According to Zhu and Kouhizadeh(2019), blockchain supply chain technologies improve public trust, and credibility of data shared hence reducing potential public relation risks. Stank, et al. (2019) argued that supply chains can be made environmentally conscious and efficient through embracing sustainable practices. Incorporating blockchain technologies into supply chain management enables organizations to improve their collaboration with suppliers to remain environmentally friendly. Through reporting carbon emissions in the entire blockchain networks, a single platform can be created in the supply chain for measuring carbon emitted in the process of supplying the needed supplies to companies (Treiblmaier, 2018). Carbon footprint in supply chains can be measured through smart sensors that are compatible with the Internet of Things. Blockchain technology is considered to be a powerful tool in improving the transparency, and traceability of carbon emissions.

4. Case study: Blockchain in Apple

Apple has shown commitment towards addressing climate change through its supply chain management practices. SCM entails the flow of products and information between supply chain stages with the aim of maximizing profitability. The Main functions of SCM include raw material procurement, marketing, distribution, operations, product development, customer

services and finance (BirasnavandBienstocK, 2019). It engages its suppliers to make sure that they work towards protecting the environment in their operations (Cheung, et al., 2018). For example, through a sustainable supply chain, Apple has managed to reduce carbon emissions. Apple has great value for sustainability in its supply chains where it focuses on reducing the environmental pollution in the process of sourcing raw materials. Its new products such as Mac and MacBook Air are manufactured from 100 percent recycled aluminum (Gouda and Saranga, 2018). Apple is increasingly using renewable energy in its global facilities leading to a reduction in carbon footprint by around 35%(Barley, et al., 2020). It has remained transparent in its measures geared towards reducing the environmental impacts of its operations. For example, Apple designs products that are energy efficient as well as recyclable (Giuffrida and Mangiaracina, 2020). Apple has invested in renewable energy projects to address supply chain emissions and reduce the impacts of climate change. It educates suppliers on the best ways of being sustainable in order to reduce environmental pollution. Apple has introduced a clean energy program through partnering with suppliers. The partnership with suppliers has enabled Apple to avoid greenhouse gas pollution of approximately 20 million metric tons (Son and Kim, 2022). This has been crucial in reducing the impacts of climate change by reducing the emission of greenhouse gasses. In addition, Apple has developed a supply chain that is sustainable through making products without necessarily taking them from the Earth. This helps in reducing carbon emissions where it calculates carbon footprint, especially in product manufacturing, corporate facilities, product transportation and product use.

Zimon, Tyan and Sroufe (2020) noted that cloud-based technologies allow companies to manage inventories in a way that is efficient to avoid shortage or overstocking. For example, systems that companies implement to achieve effective supply chain management include inventory management solutions, warehouse and point of sale. Tracking the changes in customer demand is crucial for organizations to ensure they have enough supplies needed to meet customer needs (Saber, et al., 2019). New technologies allow real-time communication with the vendors to identify locations of raw materials and finished goods. Apple has also built flexible information technology support for its supply chain, enabling it to change suppliers more quickly, find and integrate new suppliers, restructure quickly without affecting its production costs, have control over suppliers and have more flexibility in supplier selection. By collecting and analyzing big data on demand in the global market, information technology can better control production, reduce waste, address the mismatch between supply and demand and effectively reduce carbon emissions. Information

technology can also support Apple's „Trade-in“ programme, which provides subsidies for the purchase of new phones by recycling old phones, enabling the use of materials, extending the life of usable parts and maximizing the use of materials and energy needed to manufacture them, while enabling Apple to reduce its overall environmental footprint through recycling. According to Apple's 2021 environmental progress report, product recovery and recycling programs will continue to be offered in 99 percent of countries, and these programs will result in more than 39,000 metric tons of e-waste being recycled in 2021. Apple is also working with recyclers to cascade these programmes to downstream material recyclers through training programmes and ongoing support strategies such as recycling guides and guidance on how to properly disassemble Apple products, ensuring that every Apple product has a recycling solution in place while maximizing resource recovery rates and maximizing resource recovery. Apple is currently working with Carnegie Mellon University's Robotics Lab to develop robotic models that will enable it to better sort e-waste and further improve the efficiency of recycling used devices. The reuse of gold and copper extracted from recycling schemes in this way is equivalent to reducing the equivalent amount of gold and copper extracted from the earth. Apple is making progress towards its goal of reducing its overall environmental footprint.

According to Pavia (2021), Apple has managed to transition to 100 percent renewable energy, particularly for electricity energy it utilizes in its retail stores, data centers and offices in over 43 countries globally. This has helped in reducing emissions that come from direct operations by around 2 percent of its carbon footprint (Zhang, et al., 2020). Apple has managed to decrease product energy utilization by over 70 percent across its product lines (Walenta, 2021). Apple is deepening its engagement with the supply chain and suppliers because over two-thirds of its emissions originate from the product manufacturing process. It makes use of carbon life cycle assessments in the product design to ensure carbon emissions are reduced. Apple has put plans in place to help in becoming carbon neutral in its manufacturing supply chain as well as product lifecycle by the year 2030 (Elia, Gnoni and Tornese, 2020). For example, Apple has made sure that suppliers are transitioning to the use of renewable energy sources to lower carbon emissions. Apple creates electronic devices using recycled raw materials. Through the use of renewable energy sources and recycling materials, Apple has managed to save carbon emissions by over 14 million metric tons (Trowell, et al., 2020). According to Sun and Fang (2022), Apple contributes funds to assist in removing carbon from the atmosphere through Conservation International and The Conservation Fund. This contributes greatly towards reducing the impacts of climate change on human lives. Apple invests

in nature-based solutions like forests to help in the removal of carbon from the atmosphere. For example, Apple has been funding programs that are aimed at restoring forests as well as natural ecosystems (Patil, Ghisellini, and Ramakrishna, 2021). Through engagement with its suppliers and other stakeholders in the supply chain, Apple encourages initiatives geared towards protecting the environment.

According to Piontek, Herrmann and Saraev (2021), recycling innovations are making it easy for Apple to recover materials like rare earth magnets used in manufacturing its products. The innovations are assisting in the recovery of steel in order to recycle it to manufacture its electronic devices. Recycling technologies used by Apple are helping in protecting the environment through being sustainable in the way it uses natural resources (Kalaitzi, et al., 2021). Apple has reduced its carbon footprint by over 4.4 million metric tons through the use of recycled content innovations to manufacture electronic devices (Gopalakrishnan, et al., 2021). The Company embraces low-carbon aluminum in manufacturing its electronic devices. Sinha (2019) argued that strategic SCM has helped Apple in coming up with decisions that have assisted in protecting the environment. For example, Apple has developed supply chain strategies that are focused on lowering carbon emissions and encouraging the use of renewable energy sources that are friendly to the environment. Suppliers can be monitored through the use of blockchain technologies to ensure they reduce carbon emissions in the way they source raw materials. Khan and Yu (2019) noted that blockchain technology is among the strategic management approaches that can be used in enhancing supply chain integration to reduce carbon emissions. It can be embraced in organizations in tracking carbon footprint, improving efficiency and streamlining the process to minimize emissions in the supply chain. Apple has ensured over 70 suppliers use 100% renewable energy sources as a way of addressing climate change (Bataille, 2020). It has established a crucial partnership with suppliers to make sure that they understand their role in reducing climate through being sustainable. This has helped Apple in making its supply chain more sustainable where it has reduced emission of fluorinated gasses. Fluorinated gasses are used in manufacturing of consumer electronics and can increase global warming (Moshrefi, Kara, and Hauschild, 2021). As a result, reducing the emission of fluorinated gasses helps in minimizing the impacts of climate change.

The strengths of Apple's supply chain practices include the fact that it collaborates with suppliers to reduce carbon emissions. Through collaboration with suppliers, Apple has managed to come up with strategic SCM policies that can reduce the impacts of climate change (Sodhi and Tang, 2019). For example, Apple

Encourages suppliers to use renewable sources of energy in order to minimize the emission of greenhouse gasses that are responsible for polluting the environment. Apple uses recycled materials in manufacturing its electronic devices like iPhone (Choudhary, et al., 2018). It uses recycled rare earth elements to make sure that it is sustainable in the way it manufactures its products. According to Andersson (2018), rare elements are usually considered energy-intensive in the process of mining leading to air pollution. As a result, recycling such rare elements is crucial for Apple to assist in minimizing the presence of greenhouse gasses in the atmosphere. Apple has a robot that helps in recovering materials from its devices thus improving its recycling efforts (Jing, 2018). However, Apple has some weaknesses in its supply chain activities. For example, Apple has been criticized for using some suppliers who pollute the environment and rely on dirty energy. Apple is rated as a corporation that is environmentally friendly but in reality that is not the case. The company has been accused of using public relations and the internet to make internet users believe that Apple is environmentally friendly (Dong, et al., 2019). This gap existing between reality and customer perceptions concerning the environmental sustainability of Apple can be dangerous to the environment.

5. Conclusion

Across supply chains, Apple is working towards transitioning to an electric model where materials and minerals are extracted sustainably. The device manufacturing as well as the product assembling process is entirely sustainable to minimize carbon emissions. Apple is carbon neutral in global corporate operations as the company aims at ensuring its devices sold have zero climate impacts. Apple Embraces innovations to manufacture energy-efficient products. Climate change has been caused by activities that lead to environmental destruction hence the fact that Apple is recycling its used products helps in protecting the environment. For example, Apple has manufactured innovative electronic devices like iPhone, Mac, and iPad from recycled content. The supply chain management practices of Apple are focused on revamping the manufacturing supply chain as well as the product life cycle. Recycling raw materials has remained a major strategy of reducing the impacts of climate change in Apple through minimizing carbon emissions. Through working with suppliers Apple has managed to advocate for shifts in the way raw materials are sourced. The supply chain of Apple has focused on making sure there is efficiency and sustainability.

6. Recommendations

Apple Company can move towards climate resilience by increasing its use of blockchain to build a supply chain that is highly transparent. For example, Apple can make use of technologies like machine learning and artificial intelligence to enhance the transparency of its supply chains. According to Sulkowski (2018), blockchain technologies can improve visibility to enhance the traceability of products through different layers of supply chains. Apple can be using blockchain technologies to verify products' authenticity and ensure suppliers are sustainable in the way they operate. The supply chain data of the company cannot be changed by any person as all authorized parties are able to trace data concerning activities taking place. The Presence of end-to-end transparency in supply chains can help Apple in monitoring the commitment of suppliers towards minimizing the emission of greenhouse gasses in their operations. Technological improvements can assist Apple in tackling climate change through improving the measures put in place to recycle raw materials (Zhu and Kouhizadeh, 2019). For example, through the use of new technology Apple can improve its carbon-free aluminum smelting process. Also, improving relationships with suppliers can assist Apple in moving towards climate resilience. For example, through improved relationships, Apple can encourage suppliers to reduce emissions hence helping in reducing impacts of climate change. ●

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NEW: Start of ongoing FIBREE Research into Real Estate Tokenization Projects

Since 2019, FIBREE has been researching the development of blockchain applications in the real estate industry. Every year it becomes clear that tokenization of real estate is by far the most common business solution in this space. It is found all over the world and we have seen a growing number of products successfully launched in the market in recent years.

At the same time, regulations in a rapidly growing number of countries are being prepared and amended to allow for the introduction and marketability of digital assets in a responsible manner.

Finally, we see that public awareness and knowledge of trading digital assets is rising among a rapidly growing segment of the population and this is visible in all parts of the world. In other words, tokenized real estate investing is fast becoming a mainstream investment alternative for a large population.

As a result of these developments, the Tokenization working group within FIBREE has recently taken the initiative to launch an ongoing survey specifically aimed at active real estate tokenization providers.



We invite every active provider in the world to participate in the ongoing survey via the following website:

.....
fibree.org/tokenization

What are the research results used for?

FIBREE's primary goal is to return the insights gained from this ongoing research to all participants and the market. As a not-for-profit organization with authority as a global thought leader, we believe we can make a significant contribution to the further development of the market for real estate investment in the dialogue that it requires with stakeholders. Feedback will, for example, be provided in future editions of the FIBREE Industry Report or through specific periodical research publications or thematic in-depth studies within the FIBREE Tokenization Working Group.

We also want to use the aggregated data for fundamental scientific research. FIBREE is increasingly working with universities and research centers all over the world. These insights are also increasingly sought after by governments and regulatory authorities. In their preparation of new regulations, they want to know what can be learned from experiences elsewhere in the world; what developments are being observed, and what measures the marketplace would like to see taken. FIBREE wants to be able to use well-founded figures in this dialogue, so that it can speak with authority to these market authorities.

By participating in FIBREE's ongoing real estate tokenisation survey, you are, in effect, promoting your own market development. Only if your tokenized real estate proposition is already offered in the market, we invite you to participate in the study. Filling the survey is required on a proposition-level instead of a company-level! If your company is offering more than one proposition, please fill the questionnaire for each proposition. For participation, connect via the above mentioned qr-code to the start of the survey. For any other questions about this survey, feel free to contact FIBREE at ask@fibree.org.

In the survey, questions are about the following topics:

- 1. Identification of participant**
- 2. Identification of project entity**
- 3. Identification of FIBREE Growth Stage**
- 4. Location of the project**
- 5. Issuer type**
- 6. Milestone dates of the project**
- 7. Offering specification**
- 8. Asset(s) value**
- 9. Investment model**
- 10. SPV type**
- 11. Jurisdiction**
- 12. Instrument employed / Type of token**
- 13. Denomination (price) of each token**
- 14. Investment threshold**
- 15. Regulatory body involvement / exemptions**
- 16. Target investor(s) profile**
- 17. Marketing campaign**
- 18. KYC / AML process**
- 19. Issuing / secondary trading platform / agent**
- 20. OTC / ATS**
- 21. Trade volume**
- 22. Plans for additional offerings in the future**
- 23. Experiences**

About FIBREE: Our Proposition & References

In recent years, FIBREE experts have been regularly involved in projects with regulators and authorities. It seems that national authorities are increasingly looking at how regulation should move with the growing digital economy in cross border settings. As a result, it is increasingly understood by legislative institutions that the most effective economic advantages of digitalisation ask for local governance that matches with international developments.

The know-how and expertise from other countries is valued as a welcome input by national regulators that are exploring their future roadmaps. And in this matter the global professional network and involvement of FIBREE-experts is highly valuable. Based on a growing number of references from such developments, FIBREE has sharpened its proposition and has developed a new slidedeck for Regional Chairs called **“The Ultimate Legislator Program 2022”** or TULP’22 in short, which is presented on the following pages.



The original slidedeck is available for own usage by RCs in the Media Center at the FIBREE Online Community.

community.fibree.org/media_center/folder/c5d22b6f-7736-4dba-970d-590c272d9729

With TULP’22 FIBREE calls upon its Regional Chairs to engage with national authorities and to start the dialogue on how digitalisation can be framed by regulation and how FIBREE can contribute to that.

By presenting it here in the FIBREE Industry Report, we would also like to bring it directly to the attention of national authorities and call upon them to get in touch with our regional representatives in your region or with the central FIBREE organisation via ask@fibree.org.

In TULP’22 we identify 3 stages of engagement, in which FIBREE can offer particular tailored services:

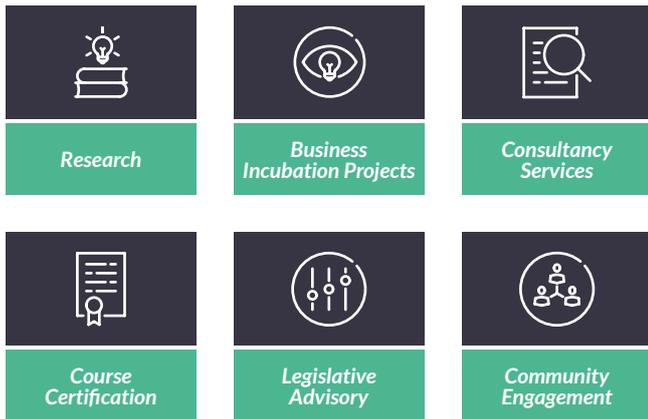
- » *Effective pioneering;*
- » *Future proof Legislating;*
- » *Meet industry expectations.*

In each of these stages FIBREE has multiple products or services that can be offered in a tailored way. A growing list of references shows the variety of how our services can be deployed by individual organisations or in multi-party settings.

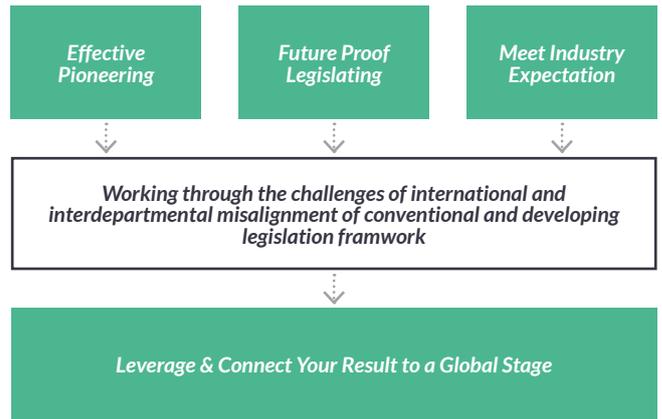
With our offerings, we would like to assist legislators in any country in the world working through the challenges of international and interdepartmental misalignment of conventional and developing legislation frameworks. The result for legislators of our contribution is that their output is leveraged and connected to a global stage.

If you are curious to know more about our offerings for your challenge(s), please do not hesitate to let us know and write an email to ask@fibree.org.

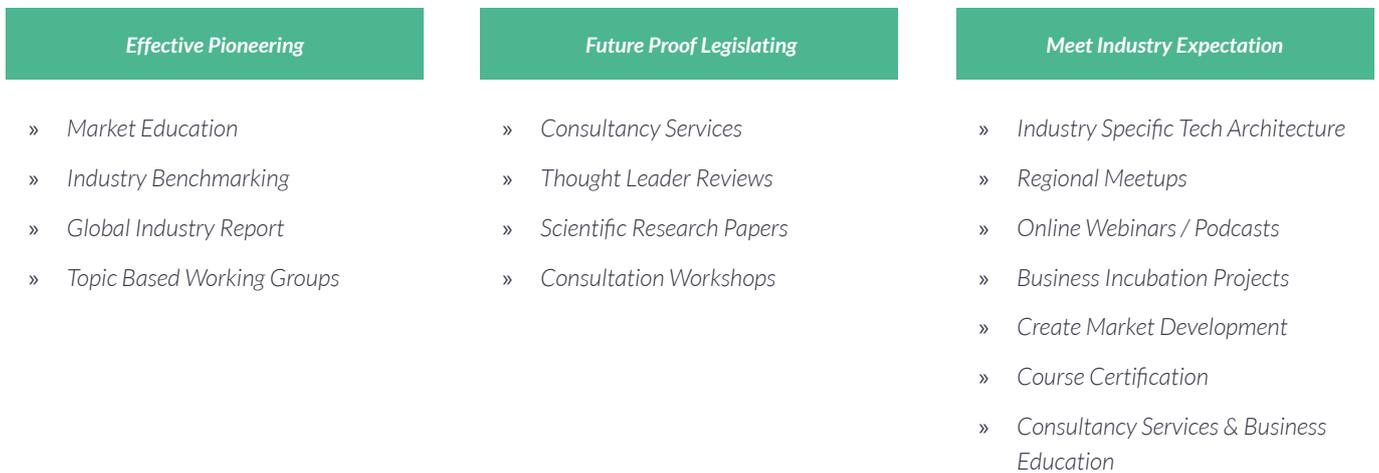
FIBREE General Offering



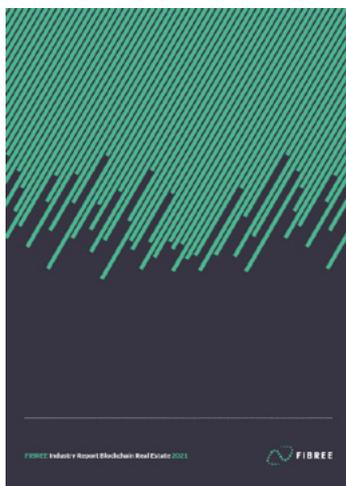
The Ultimate Legislator Program



What we offer Legislators?



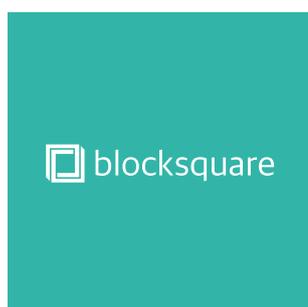
References



- » Annual FIBREE Industry Report 2019 / 2020 / 2021 (Available in English, Mandarin, Spanish & Portuguese)
- » FIBREE Online community Platform
- » MOU Ministry of Urban Development and Housing, Ecuador
- » Unique Object Identifier (UOI) Project with Dutch Ministry of Interior & the National land title office in the Netherlands (Kadaster)
- » Tokenization Challenge - Incubating businesses of the future
- » FIBREE Webinar on Land Title with UN OITC (Office Information Technology Communication)
- » Our sponsors & partners & members

Featured Companies

FIBREE is not only a network of experts but also a network of innovative startups. Next to the support we receive from our corporate sponsors it is also of crucial importance to us to have a close link to the international startup scene. 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 2022.



Blocksquare

blocksquare.io

Structuring and digitizing real estate is about strategy, not financing. Our tokenization protocol increases value and liquidity of real estate assets in your portfolio, while our customizable white-label platform allows you to easily manage the lifecycle of tokenized real estate properties.

CEO Denis Petrovic

Blocksquare d.o.o.

Tržaska cesta 118
1000 Ljubljana, Slovenia

future@blocksquare.io



Chromaway

chromaway.com

We are an innovative blockchain software company with offices in Stockholm, Kiev, Tel Aviv, and Washington, DC. ChromaWay has introduced blockchain and smart contract technologies to companies and government entities in the US, Canada, Europe, South America, Australia, and India. Its public blockchain platform, Chromia, is hosting dapps across the gaming, DeFi, financial services, and real estate sectors.

CEO Henrik Hjelte

ChromaWay AB

Centralplan 15, S-111 20,
Stockholm, SE

info@chromaway.com



Digishares

digishares.io

We provide a platform that enables you to tokenize your assets and get more control and flexibility over the process. We enable you to automate, reduce administrative cost, fractionalize and increase liquidity through trading — and we help give access to exchanges and the DeFi ecosystem.

CEO Claus Skaaning

DigiShares A/S

Th. Staunings Vej 48
DK-9210 Aalborg
Denmark

info@digishares.io



Netspaces

netspaces.org

Netspaces is a B2B platform that integrates and enables all players in the real estate value chain to create nfts that are tied to the deed, unlocking instant and easy transactions and new business models.

CEO **Andreas Blazoudakis**

Netspaces Gestão de Patrimônio e Renda Ltda.

Av. Carlos Gomes, 75, 303/B,
90480-003, Porto Alegre, RS, Brasil

adm@netspaces.org



RealBox

realbox.io

Democratizing the real estate markets. Our mission is to make real estate investments more accessible, reliable and flexible to everyone. Realbox (REB) is a technology-driven real estate platform that will innovate property investment by offering opportunities to everyone to co-invest in a fraction or share of assets. REB is built on the Binance Smart Chain platform, a utility token is to enable users to use services of the Realbox platform.

CEO **Alex Pham, PhD**

Realbox Pte. Ltd.

200 JALAN SULTAN #05-02
TEXTILE CENTRE
Singapore 199018

info@realbox.io



Realto Group

realtoapps.com

RealTo Group, a Silicon Valley based Web 3.0 technology company, focuses on Real Estate Digitization through Tokenization & NFT Solutions. Our flagship platform RealToApps, built on secured Blockchain & AI technologies enables real estate asset managers, property owners, portfolio and fund managers to raise capital, sell real estate assets, and launch real estate NFT marketplaces in an efficient, secure and cost-effective manner.

CEO **Prasanth Kalangi**

REALTO GROUP INC

3375 SCOTT BLVD SUITE 320,
320, Santa Clara, Santa Clara, CA,
95054, United States

hello@realtoapps.com



Ubitquity

ubitquity.io

Ubitquity offers a simple user experience for securely recording and tracking property with our Blockchain-as-a-Service (BaaS) blockchain platform, ecosystem, and API called unanimitySM.

CEO **Nathan D. Wosnack**

Ubitquity, LLC

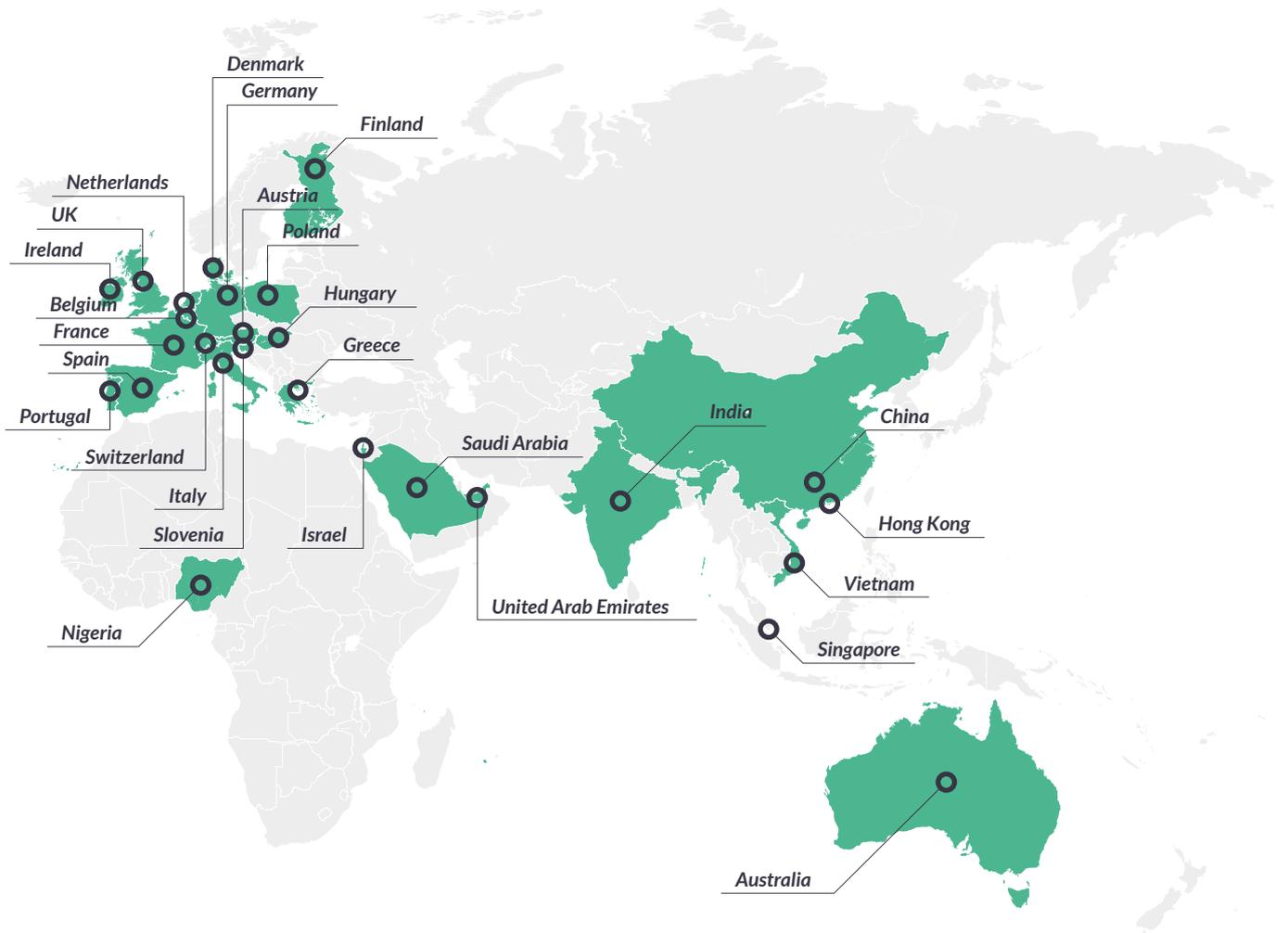
300 Delaware Avenue, Suite 210-A
/ Wilmington, Delaware, USA,
19801

team@mountx.io

Global Network

As of June 2022 FIBREE is represented in 32 countries at 72 locations with 89 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 does not claim to be complete or accurate, but is intended to provide an indication of the current state of the industry.





Country Map

Find your local chapter



Regional Chairs

- **Agnes Water**
Gordon Christian gordon.christian@fibree.org
- **Brisbane**
Lindy Chen lindy.chen@fibree.org
- **Perth**
Julia Buchholz julia.buchholz@fibree.org
- **Sydney**
Bradley C. Hughes bradley.hughes@fibree.org
Alex Pham alex.pham@fibree.org

Country Facts

Source: Wikipedia

- **Canberra**
 Capital
- **26,016,400**
 Population
- **Australian Dollar**
 Currency
- **English**
 Language
- **\$1.748 trillion**
 GDP

FIBREE Facts

- | **December 2018**
 First chapter
- | **5**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Bitcoin, Ethereum, Algorand**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

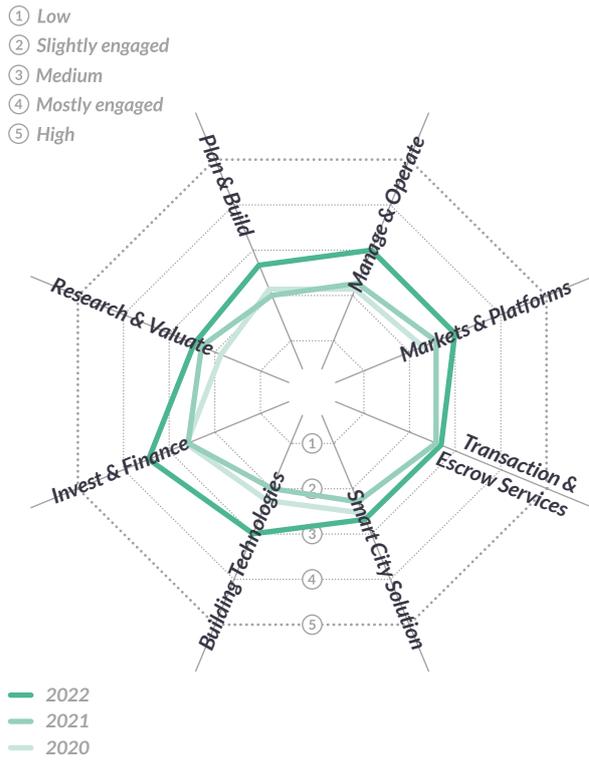
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

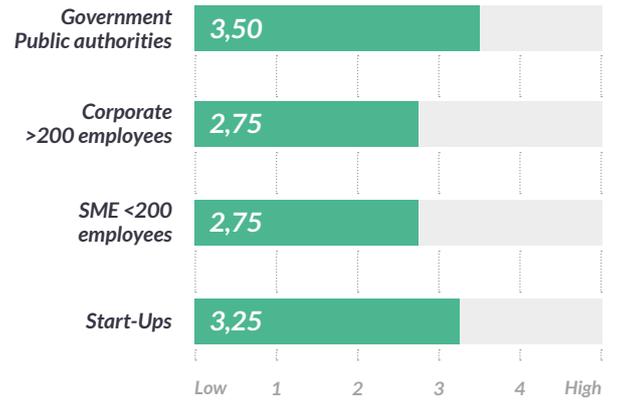
MIT, Western Sydney University, TecStack Pty Ltd / REIWA Training, Curtin University, RMIT and QUT

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



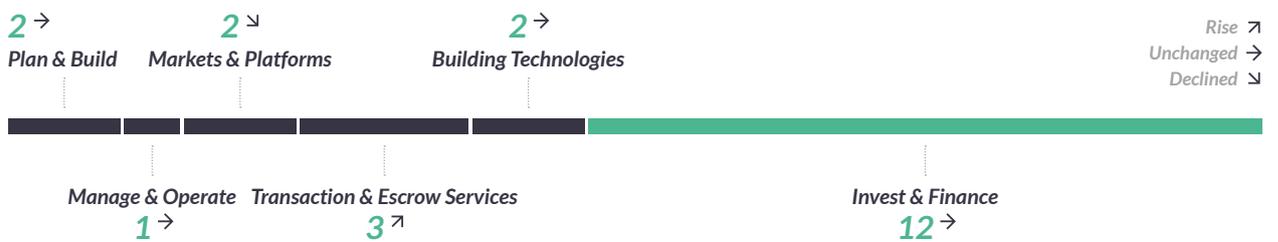
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

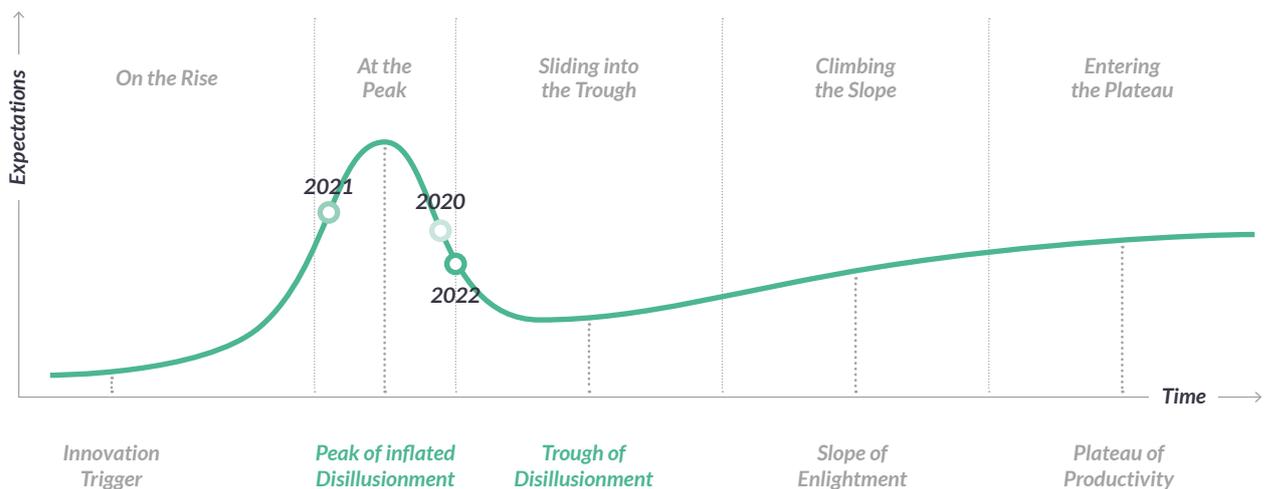
	2019	2020	2021	2022
Number of products	19	15	23	23
Global ranking	#7	#5	#3	#3

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Vienna**
Dominik Alphart dominik.alphart@fibree.org
Florian Huber florian.huber@fibree.org
- **Graz**
Marco Neumayer marco.neumayer@fibree.org

Country Facts

Source: Wikipedia

 Vienna Capital	 8.978.929 Population
 Euro Currency	 German Language
 \$446,315 billion GDP	

FIBREE Facts

July 2018 First chapter	3 Regional chairs
-----------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **No**

Awareness of ESG topics in the real estate sector?

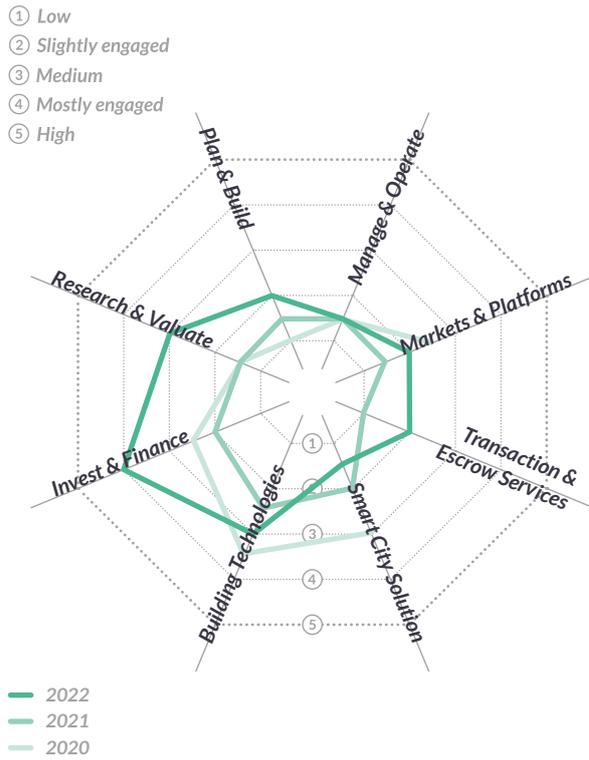
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

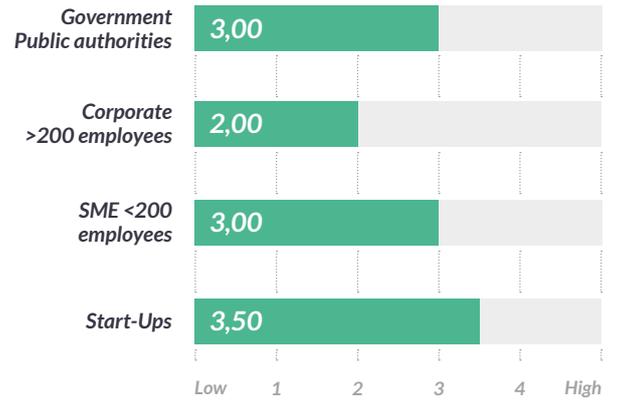
ABC Research GmbH, FH Wien, University for Economics and Business Administration Vienna

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

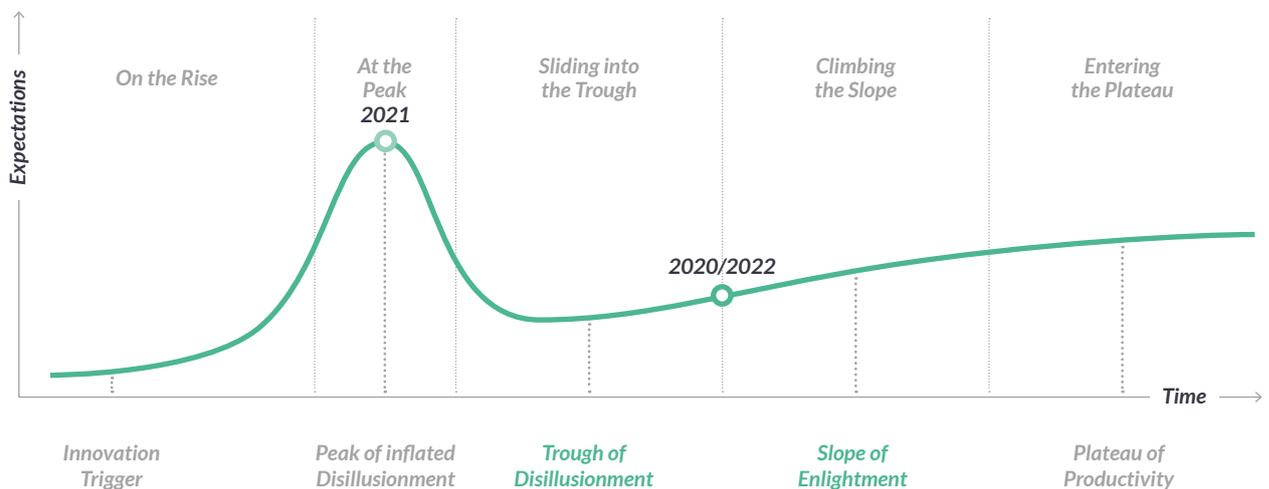
	2019	2020	2021	2022
Number of products	4	4	8	10
Global ranking	#16	#13	#13	#13

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Brussels**
 Alexander Appelmans alexander.appelmans@fibree.org

Country Facts

Source: Wikipedia

 Brussels Capital	 11,492,641 Population
 Euro Currency	 Dutch, French, German Language
 \$609.887 billion GDP	

FIBREE Facts

- | | |
|------------------------------------|-----------------------------|
| March 2019
First chapter | 1
Regional chairs |
|------------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

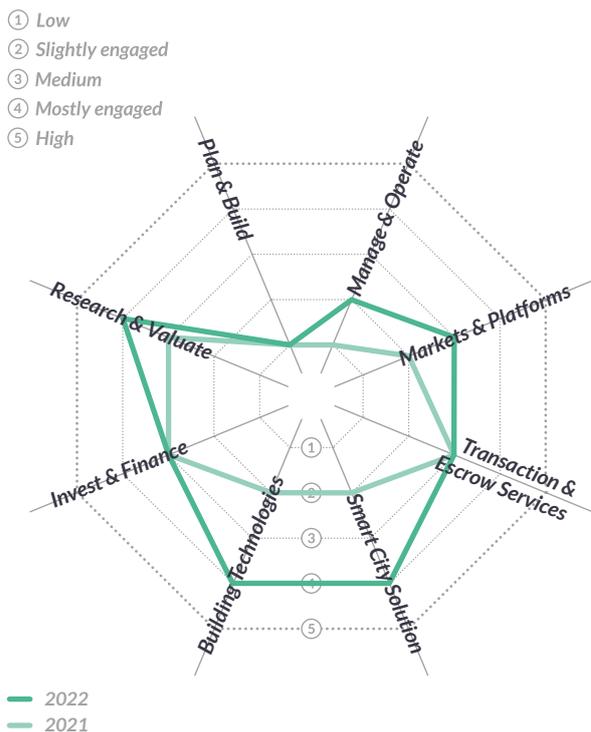
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

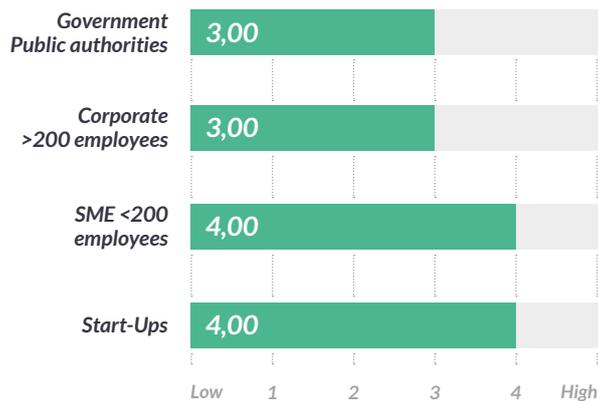
- KU Leuven**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



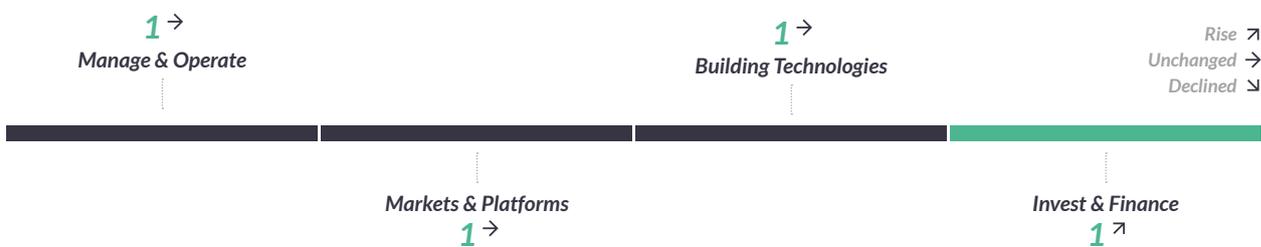
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

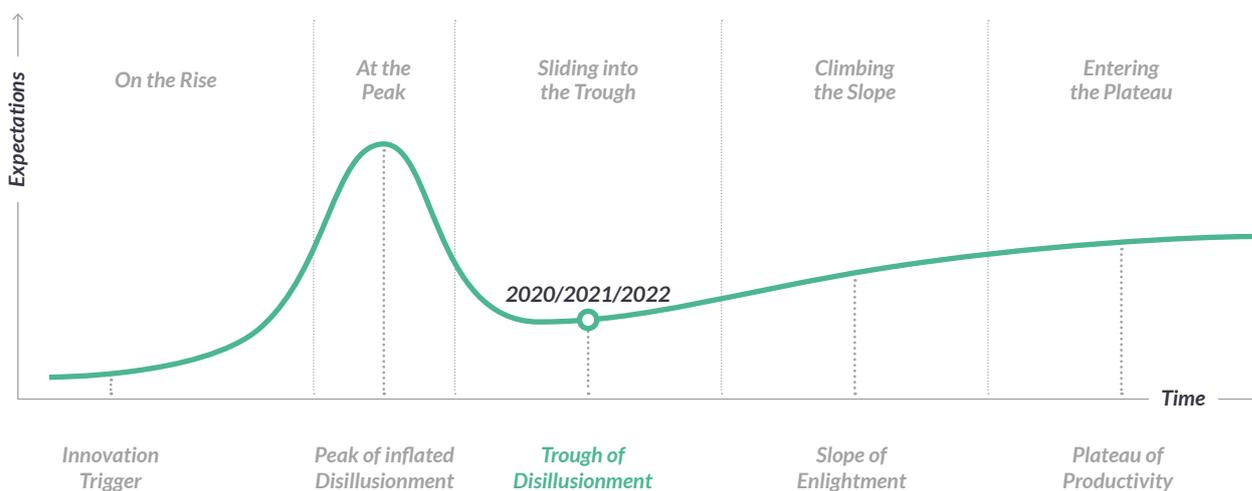
	2019	2020	2021	2022
Number of products	2	5	3	4
Global ranking	#34	#12	#23	#21

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- São Paulo**
Rubens Neistein rubens.neistein@fibree.org
Rafael Stocco rafael.stocco@fibree.org

Country Facts

Source: Wikipedia

-  **Brasilia**
Capital
-  **214,047,375**
Population
-  **Real**
Currency
-  **Portuguese**
Language
-  **\$1.810 trillion**
GDP

FIBREE Facts

- November 2018**
First chapter
- 2**
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

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- » **Yes**

Awareness of ESG topics in the real estate sector?

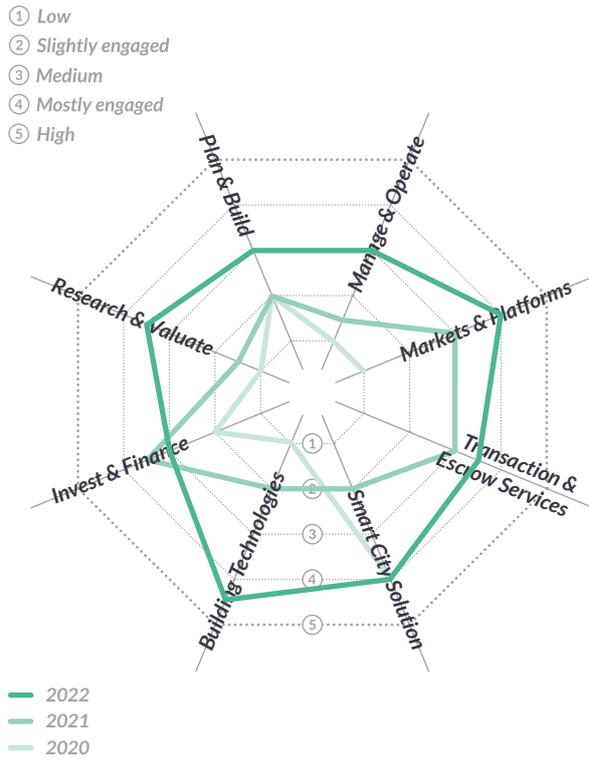
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

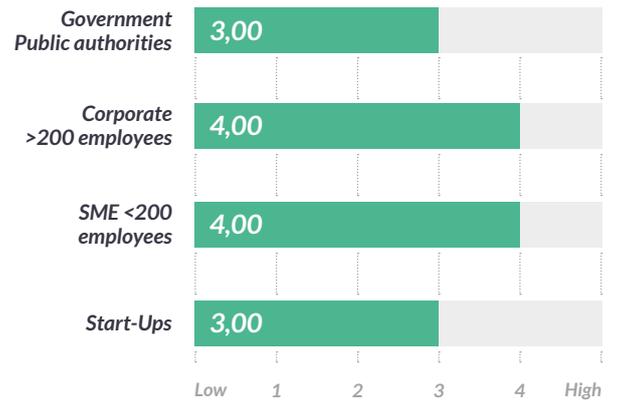
- UNICAMP, FIAP**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

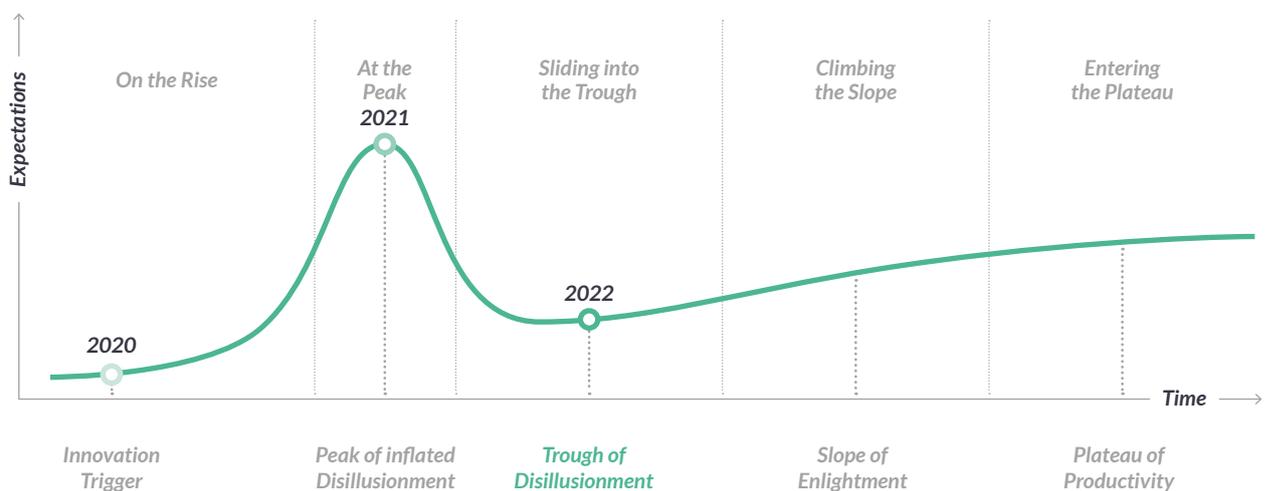
	2019	2020	2021	2022
Number of products	1	3	7	10
Global ranking	#41	#17	#15	#14

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Toronto**
Nathan Wosnack nathan.wosnack@fibree.org

Country Facts

Source: Wikipedia

 Ottawa Capital	 38,526,760 Population
 Canadian Dollar Currency	 English, French Language
 \$2.221 trillion GDP	

FIBREE Facts

- | | |
|------------------------------------|-----------------------------|
| March 2019
First chapter | 1
Regional chairs |
|------------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Yes**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

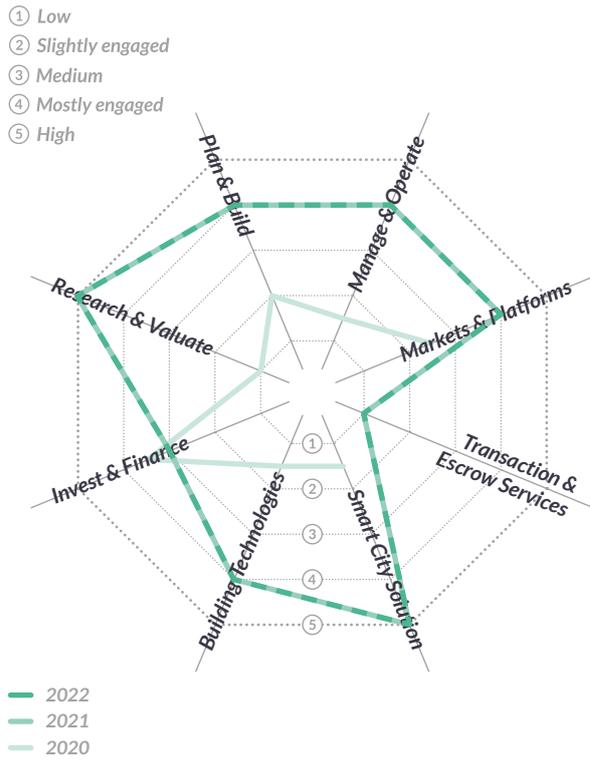
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

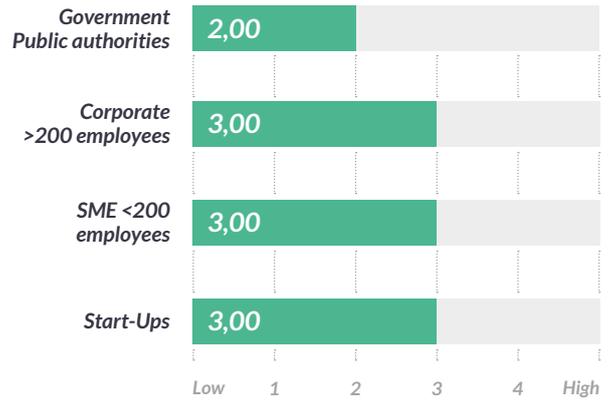
University of Toronto, George Brown, Toronto School of Management, Ryerson

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



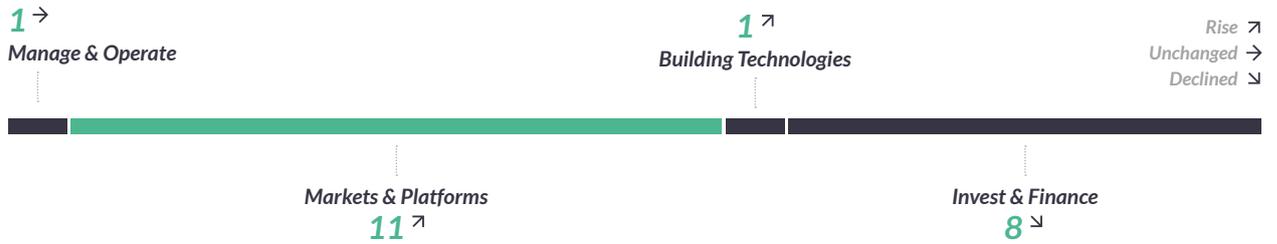
Product Database Keyfigures

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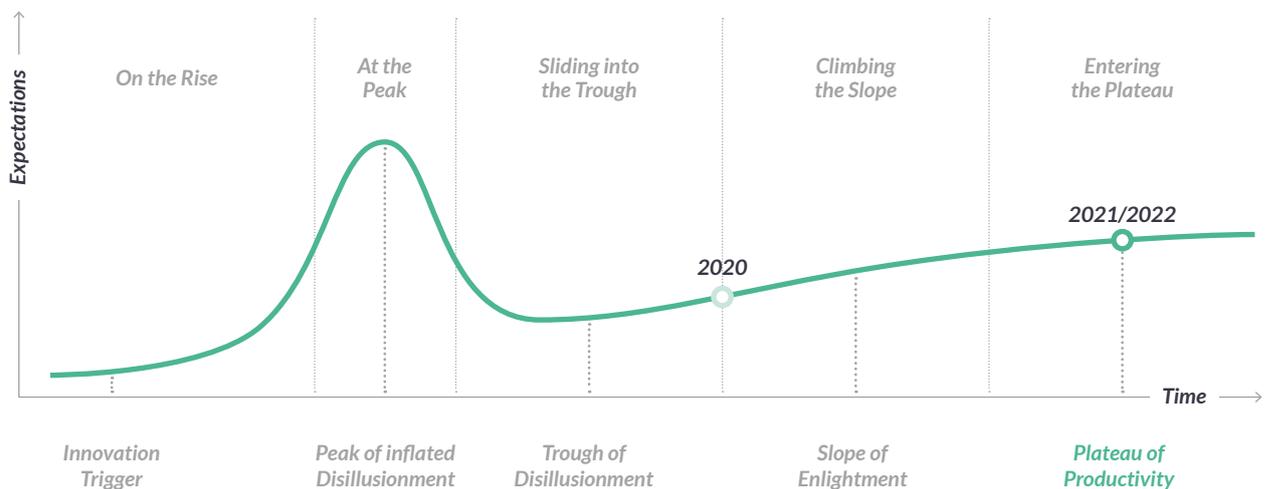
	2019	2020	2021	2022
Number of products	14	14	21	21
Global ranking	#11	#6	#3	#4

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Qingdao**
Brian Suin brian.suin@fibree.org

Country Facts

Source: Wikipedia

 Beijing Capital	 1,412,600,000 Population
 Renminbi Currency	 Standard Chinese Language
 \$19.91 trillion GDP	

FIBREE Facts

- | | |
|------------------------------------|-----------------------------|
| March 2020
First chapter | 1
Regional chairs |
|------------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **EOS**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

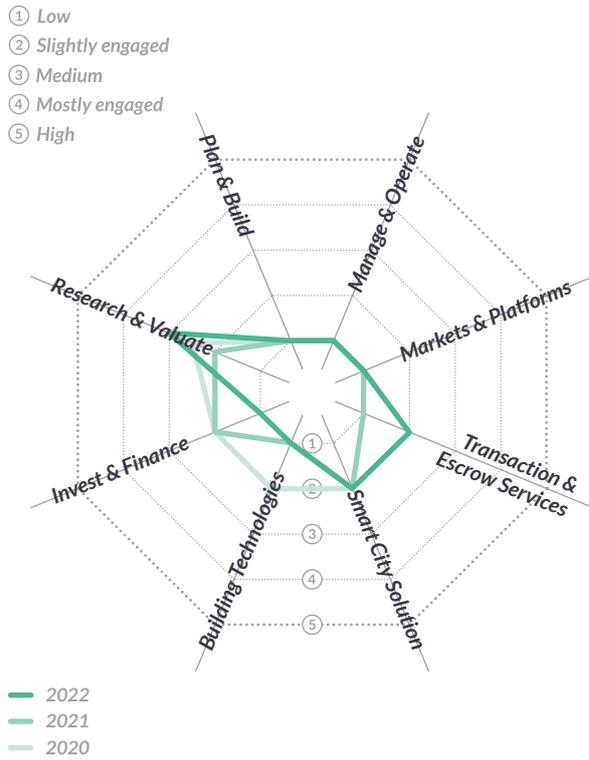
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

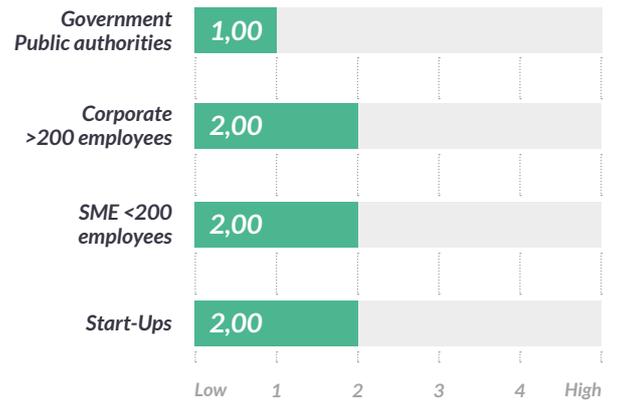
-

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



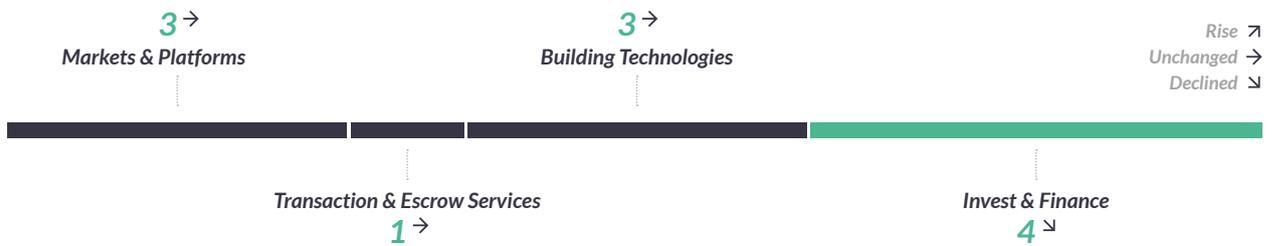
Product Database Keyfigures

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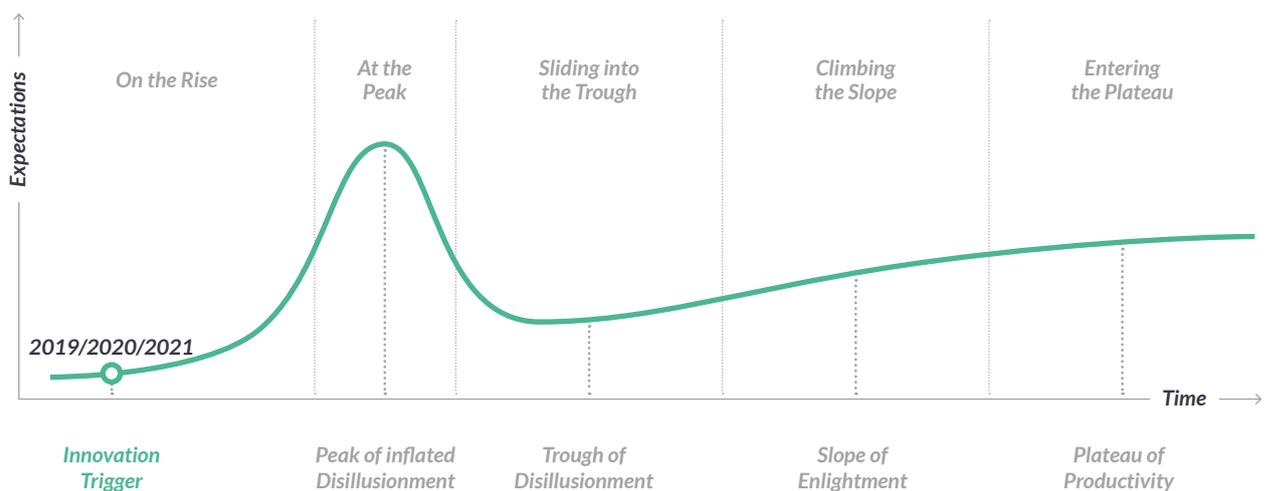
	2019	2020	2021	2022
Number of products	7	9	12	11
Global ranking	#14	#9	#8	#10

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Bogotá**
 Andrés Assmus andres.assmus@fibree.org

Country Facts

Source: Wikipedia

 Bogotá Capital	 50,372,424 Population
 Colombian Peso Currency	 Spanish Language
 \$351.281 billion GDP	

FIBREE Facts

- | | |
|---------------------------------------|-----------------------------|
| February 2020
First chapter | 1
Regional chairs |
|---------------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Bitcoin**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **No**

Awareness of ESG topics in the real estate sector?

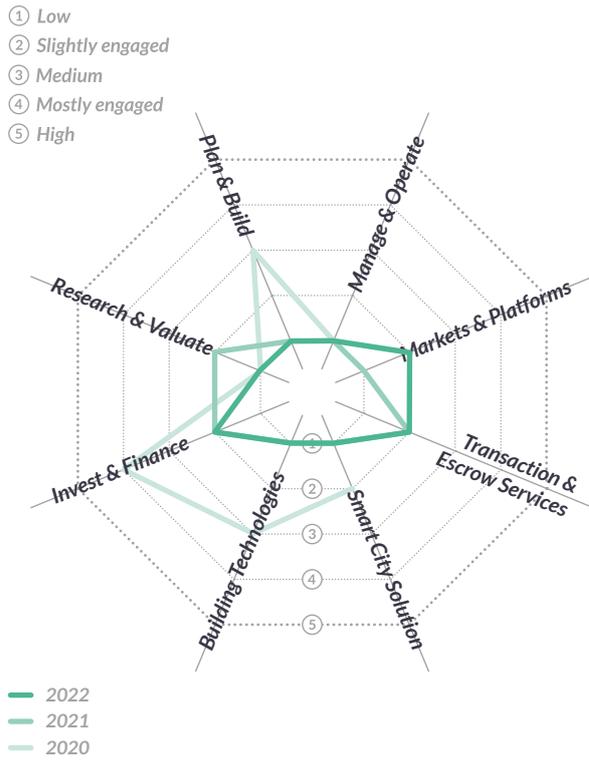
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

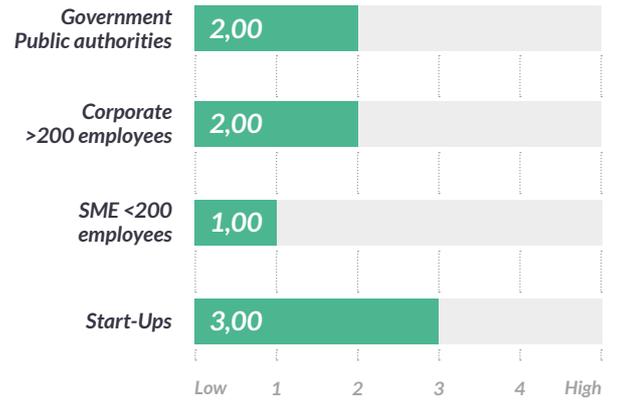
- Univ Externado, Univ Sabana, Univ Rosario, Univ Sergio Arboleda, Univ Nacional, EAFIT**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

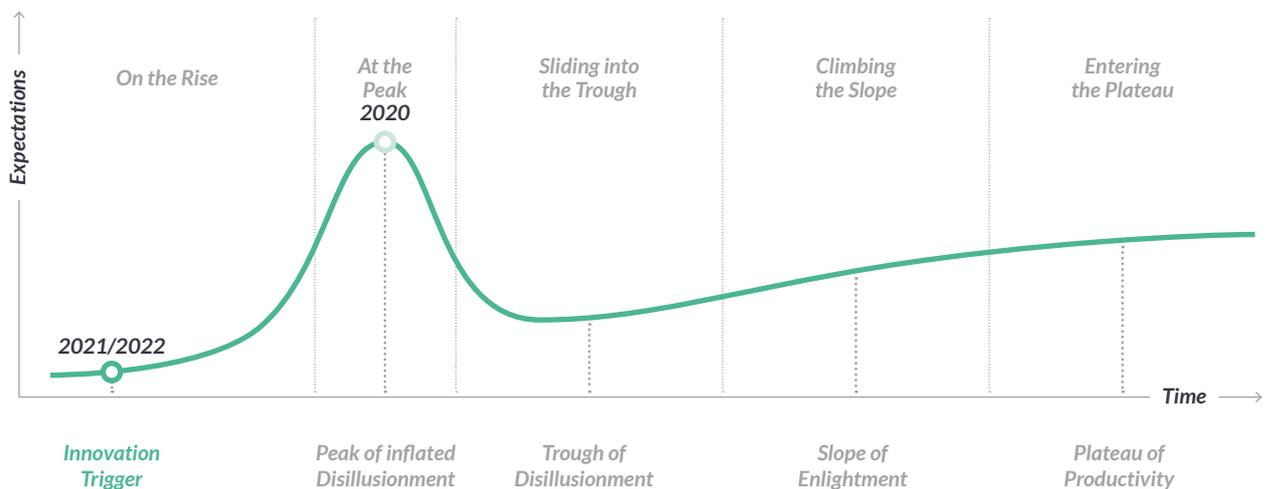
	2019	2020	2021	2022
Number of products	3	0	0	3
Global ranking	#25	#0	#0	#27

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Copenhagen**
Claus Skaaning claus.skanning@fibree.org

Country Facts

Source: Wikipedia

 Copenhagen Capital	 5,873,420 Population
 Danish Krone Currency	 Danish Language
 \$399.100 billion GDP	

FIBREE Facts

October 2020 First chapter	1 Regional chairs
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Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Yes**

Will Metaverse play an important role in the near future?

- » **No**

Awareness of ESG topics in the real estate sector?

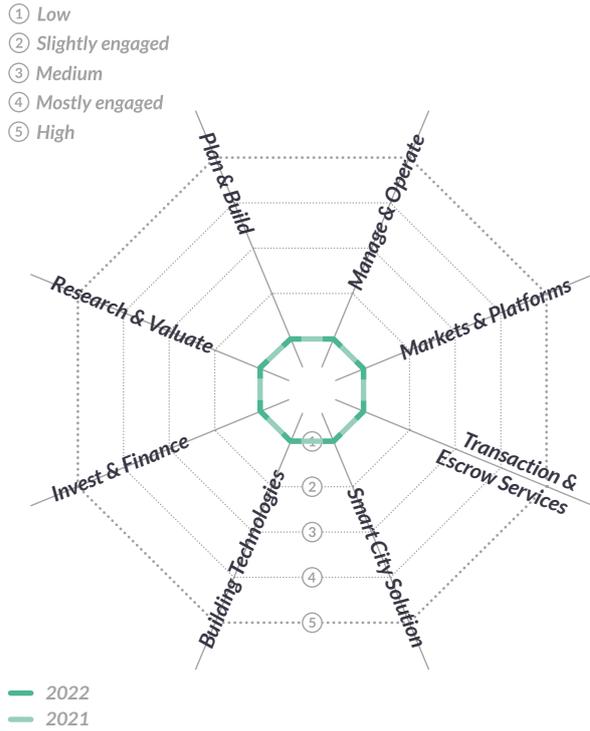
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

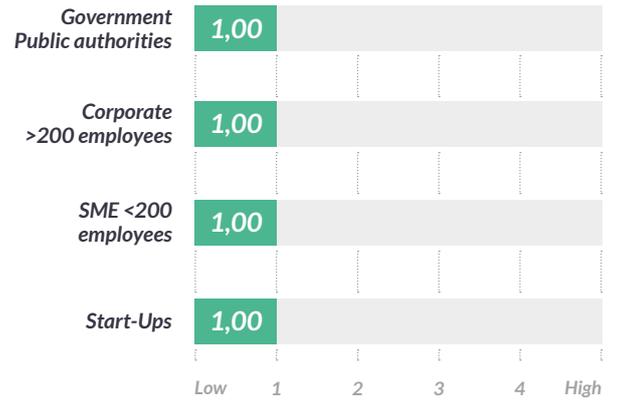
- CBS, KU**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

	2019	2020	2021	2022
Number of products	-	-	1	1
Global ranking	-	-	#40	#44

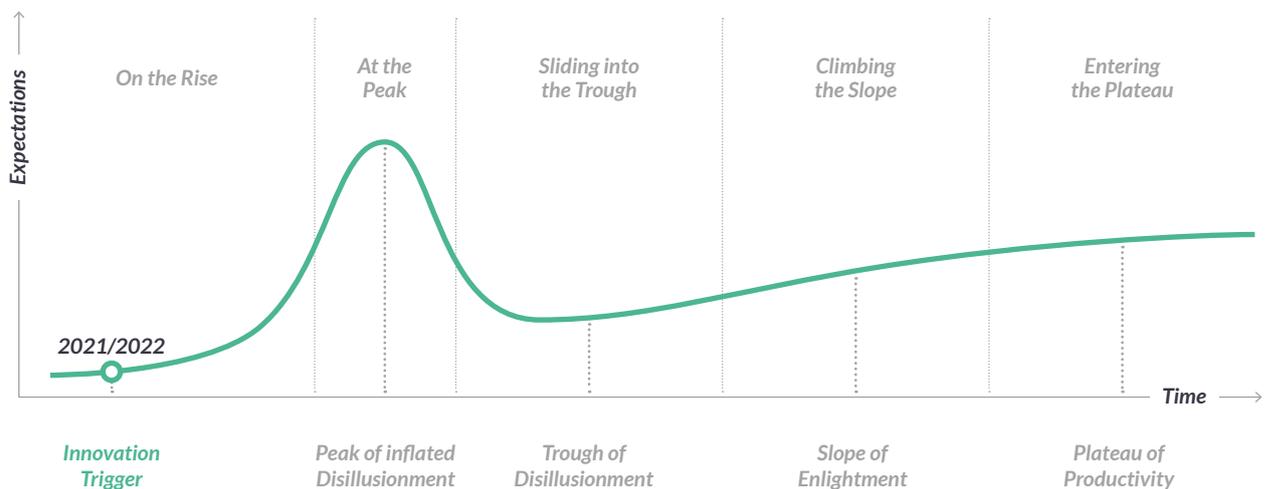
Product Database by Segment

Active products 2022 and change directions since 2021.

1 →
Invest & Finance

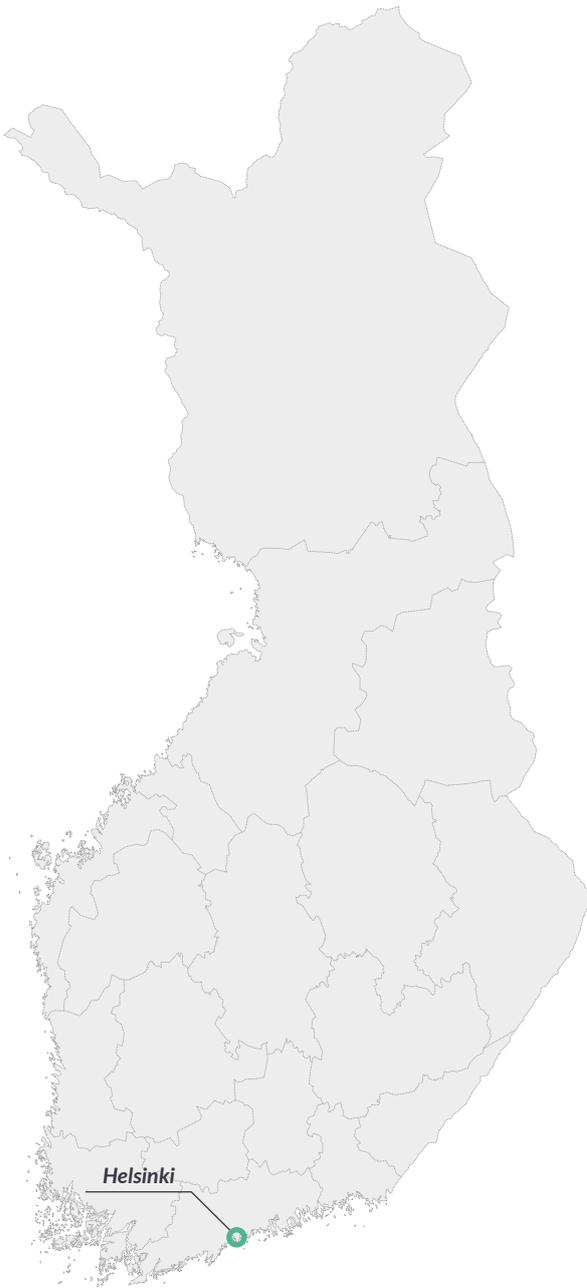
Rise ↗
Unchanged →
Declined ↘

Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Helsinki**
 Ivan Nokhrin ivan.nokhrin@fbree.org

Country Facts

Source: Wikipedia

- **Helsinki**
 Capital
- **5,536,146**
 Population
- **Euro**
 Currency
- **Finnish, Swedish**
 Language
- **\$267.61 billion**
 GDP

FIBREE Facts

- | **August 2020**
 First chapter
- | **1**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

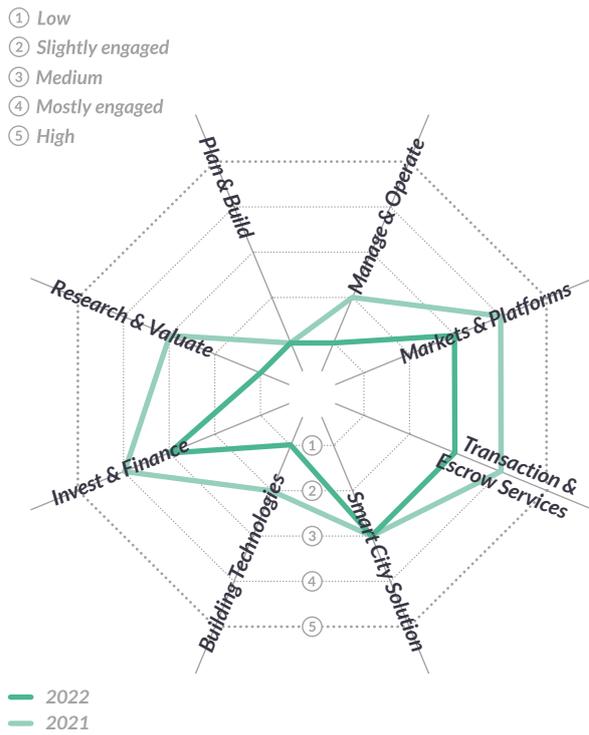
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

- » **Tampere University of Applied Sciences, LUT, Aalto University**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

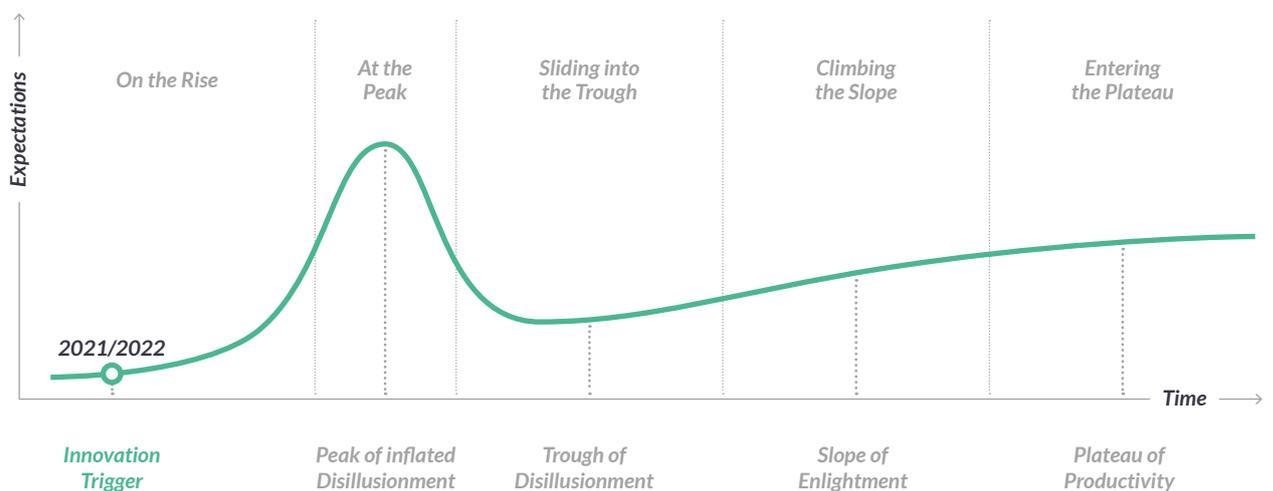
	2019	2020	2021	2022
Number of products	-	-	4	1
Global ranking	-	-	#17	#60

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Paris
 Grégoire d'Avout gregoire.davout@fbree.org

Country Facts

Source: Wikipedia

 Paris Capital	 67,413,000 Population
 Euro Currency	 French Language
 \$2.936 trillion GDP	

FIBREE Facts

- July 2020**
First chapter
- 1**
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Yes**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

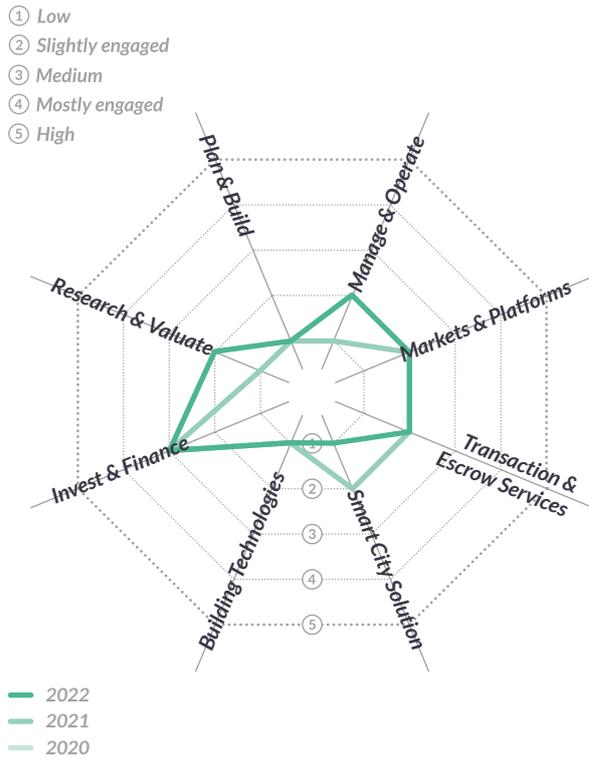
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

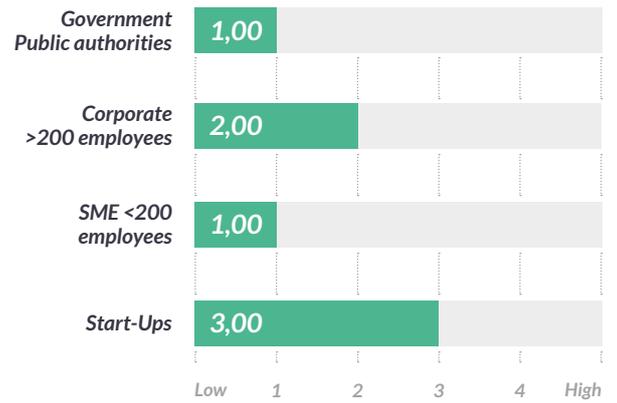
-

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



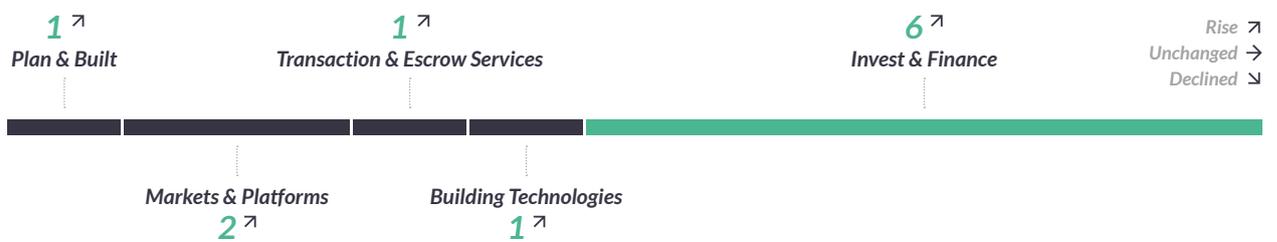
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

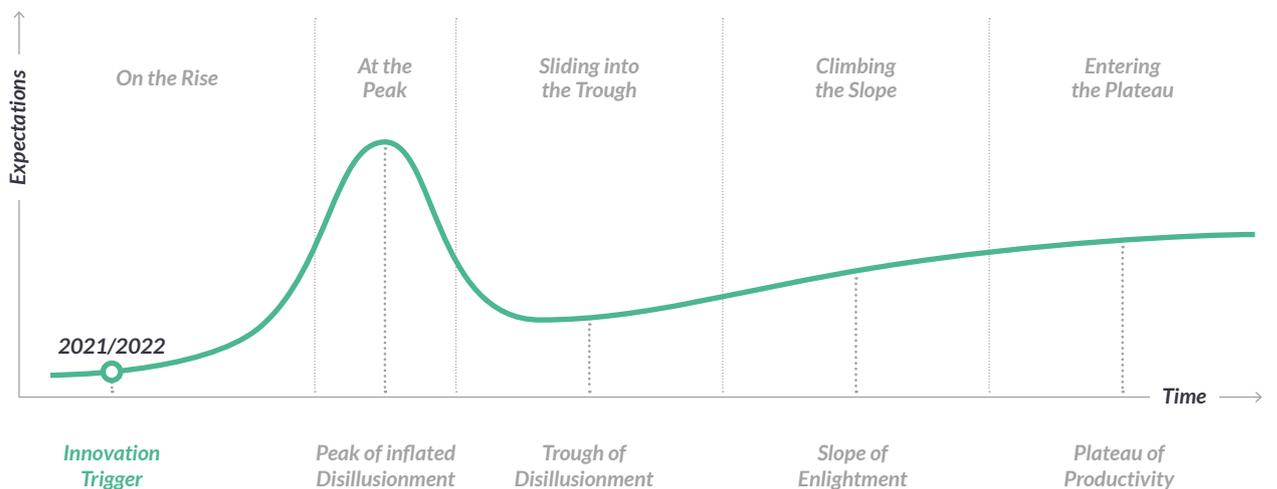
	2019	2020	2021	2022
Number of products	9	4	1	11
Global ranking	#12	#13	#40	#11

Product Database by Segment

Active products 2022 and change directions since 2021.

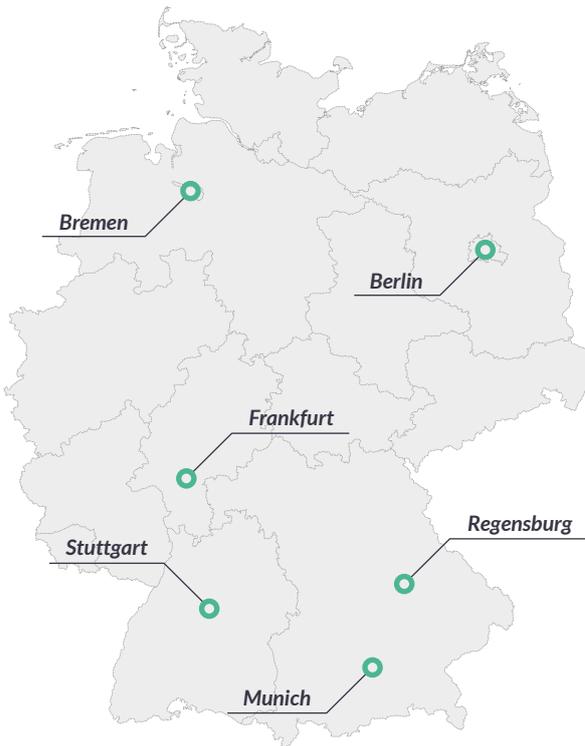


Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Berlin**
Axel von Goldbeck axel.von.goldbeck@fibree.org
Achim Jedelsky achim.jedelsky@fibree.org
- Bremen**
Balte Jorns balte.jorns@fibree.org
Jan-Philip Suchara jan.philip.suchara@fibree.org
- Frankfurt**
Roland Farhat roland.farhat@fibree.org
- Munich**
Michael Reuter michael.reuter@fibree.org
- Regensburg**
Sandor Horvath sandor.horvath@fibree.org
- Stuttgart**
Sebastian Steimer sebastian.steimer@fibree.org
Fabian Süß fabian.suess@fibree.org

Country Facts

Source: Wikipedia

- Berlin**
Capital
- 83,190,556**
Population
- Euro**
Currency
- German**
Language
- \$4.319 trillion**
GDP

FIBREE Facts

July 2018
First chapter

9
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Yes**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

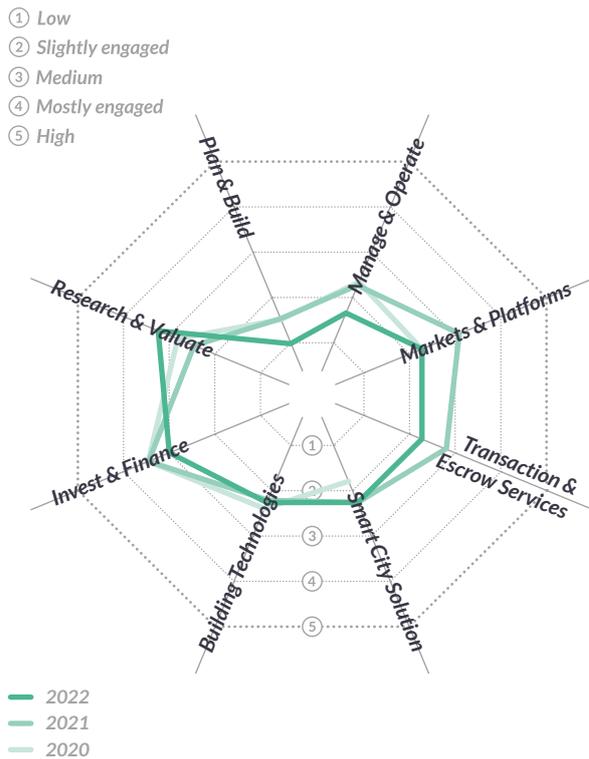
» **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

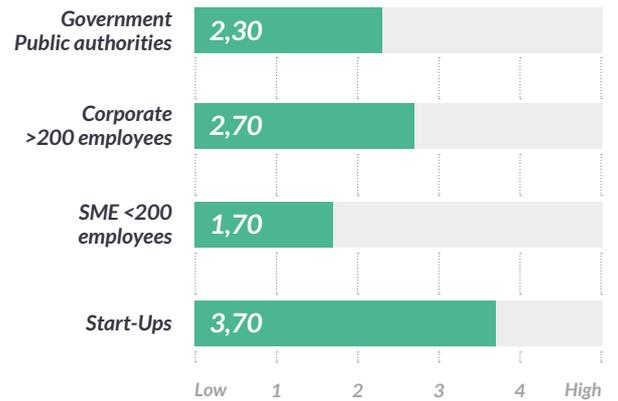
Frankfurt School of Finance and Management, Frankfurt School of Finance - Blockchain Center, Frankfurt School of Business

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

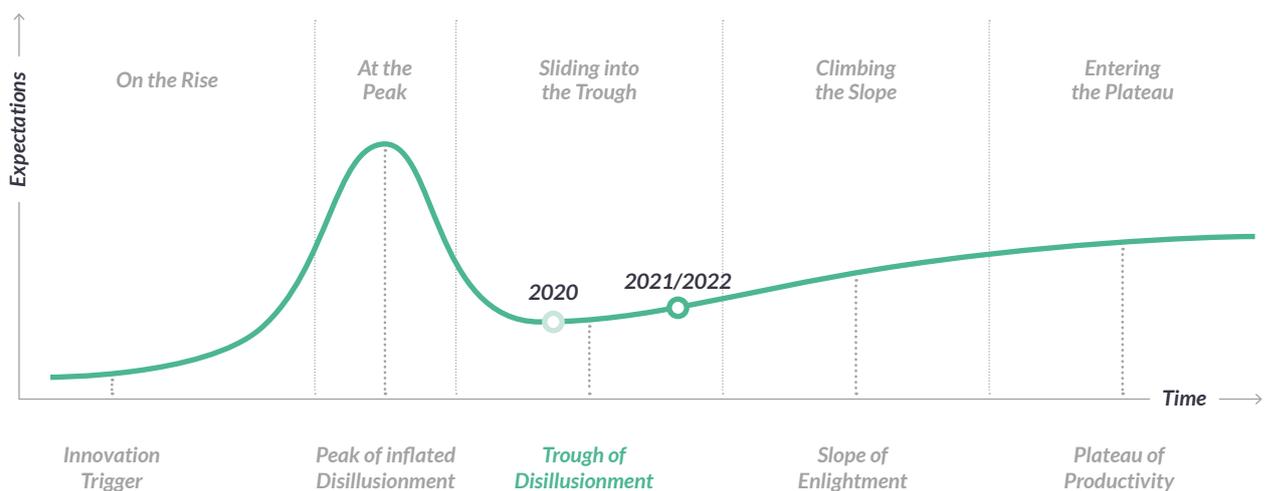
	2019	2020	2021	2022
Number of products	17	20	11	9
Global ranking	#8	#3	#9	#15

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Athens**
Stefanie Behrendt stefanie.behrendt@fibree.org
Evangelos Lianos evangelos.lianos@fibree.org
Paul Tzelepis paul.tzelepis@fibree.org

Country Facts

Source: Wikipedia

 Athens Capital	 10,678,632 Population
 Euro Currency	 Greek Language
 \$222.770 billion GDP	

FIBREE Facts

October 2019 First chapter	3 Regional chairs
--------------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» Internet Computer, Ethereum

Readiness by Financial Authorities to Accept Blockchain Applications

» Open, but not there yet

Will Metaverse play an important role in the near future?

» Yes

Awareness of ESG topics in the real estate sector?

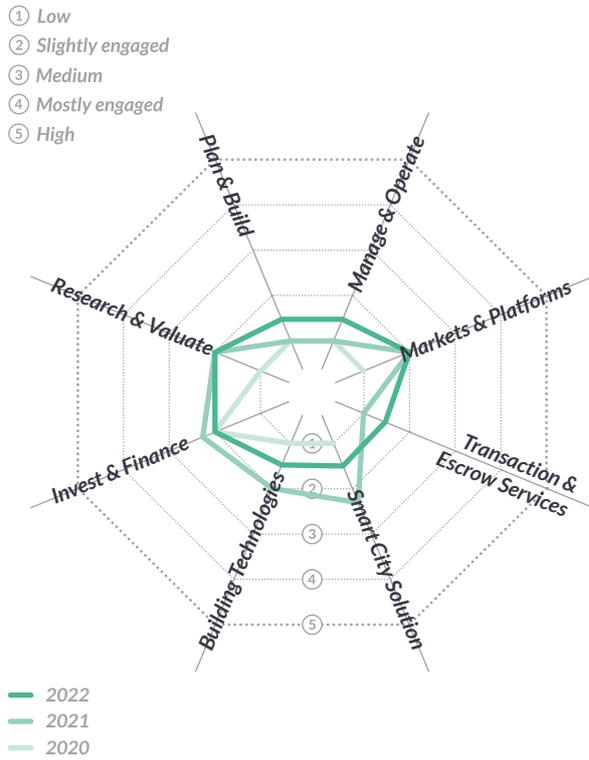
» The market shows initiatives and action is being taken

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

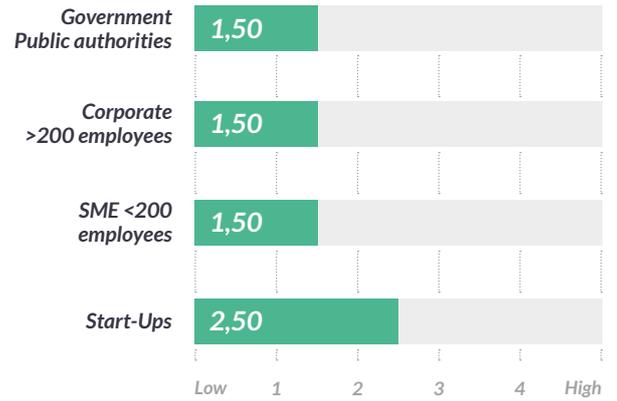
University of Cyprus, University of Athens, Panteion University, University of Patras

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



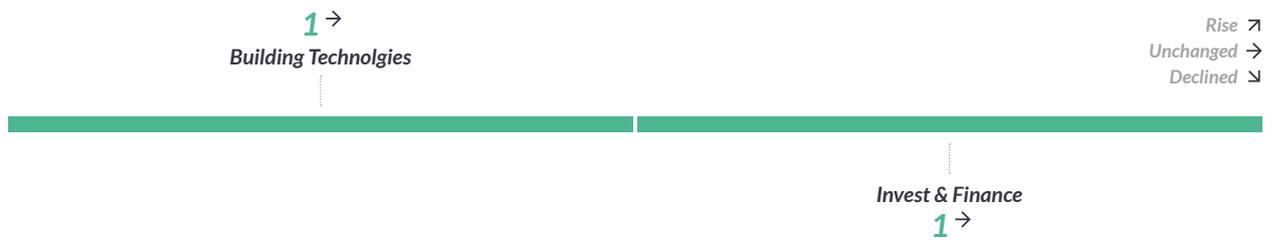
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

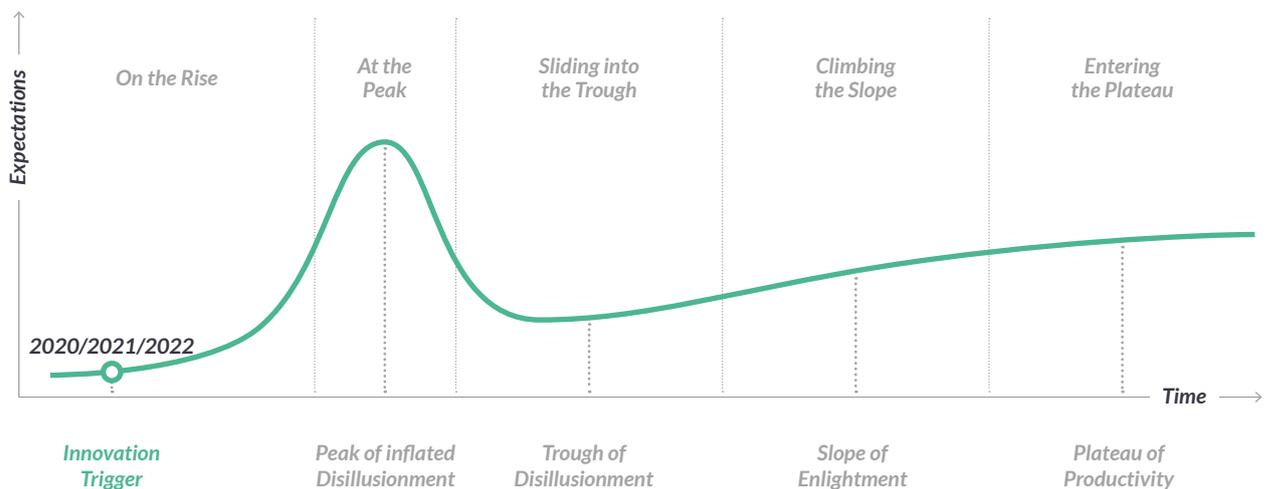
	2019	2020	2021	2022
Number of products	1	3	2	2
Global ranking	#41	#17	#30	#30

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Hong Kong**
 Paul Chen paul.chen@fibree.org

Country Facts

Source: Wikipedia

- **Hong Kong**
 Capital
- **7,413,070**
 Population
- **Hong Kong dollar**
 Currency
- **Chinese, English**
 Language
- **\$369.486 billion**
 GDP

FIBREE Facts

- | **January 2022**
 First chapter
- | **1**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **No**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

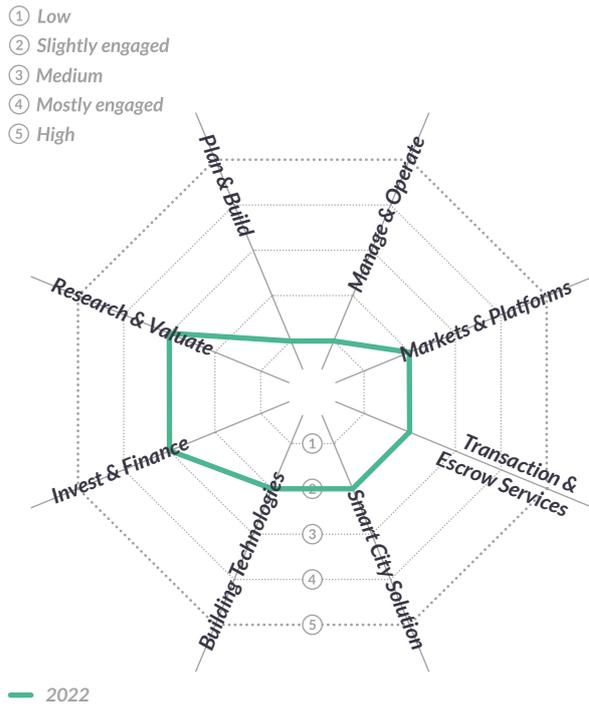
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

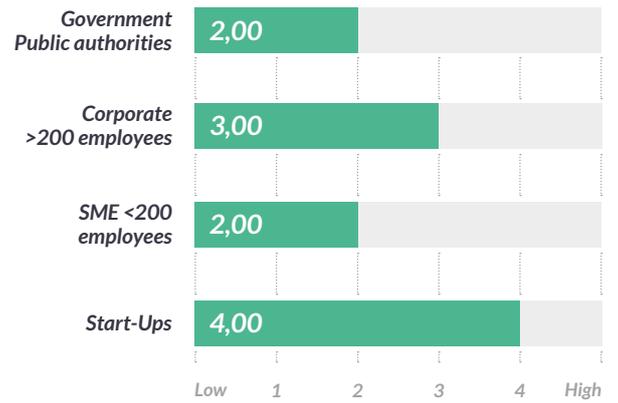
-

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

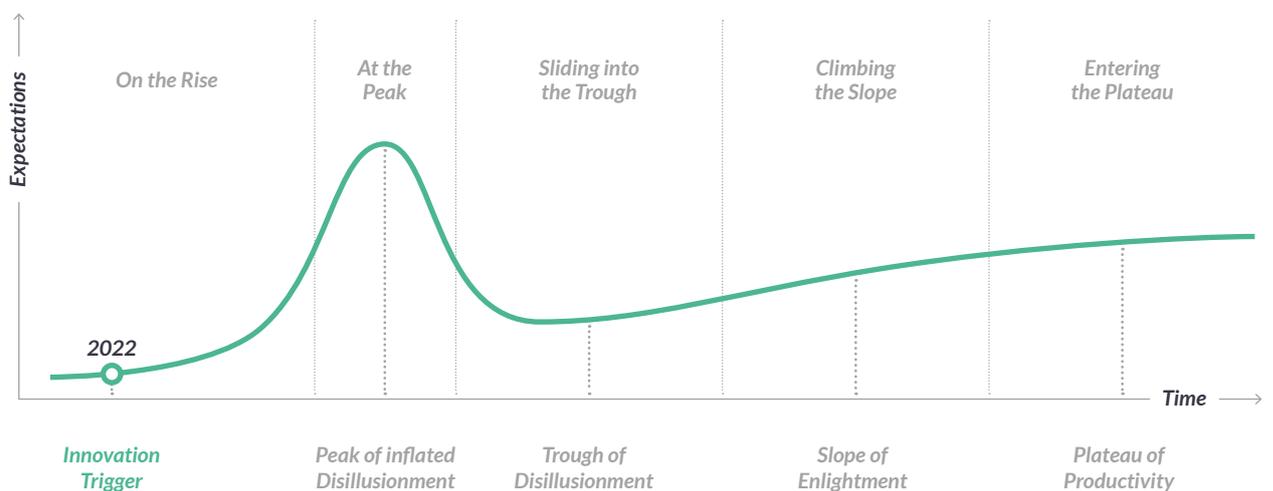
	2019	2020	2021	2022
Number of products	-	-	-	4
Global ranking	-	-	-	#23

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Budapest**
Kornel Kalocsai kornel.kalocsai@fbree.org

Country Facts

Source: Wikipedia

 Budapest Capital	 9,730,000 Population
 Forint Currency	 Hungarian Language
 \$180.959 billion GDP	

FIBREE Facts

- | | |
|----------------------------------|-----------------------------|
| May 2019
First chapter | 1
Regional chairs |
|----------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Hyperledger**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **No**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

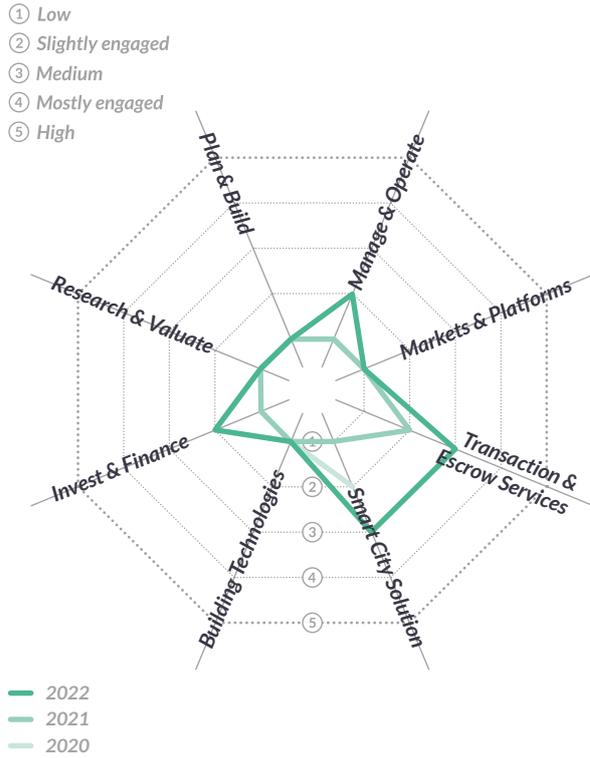
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

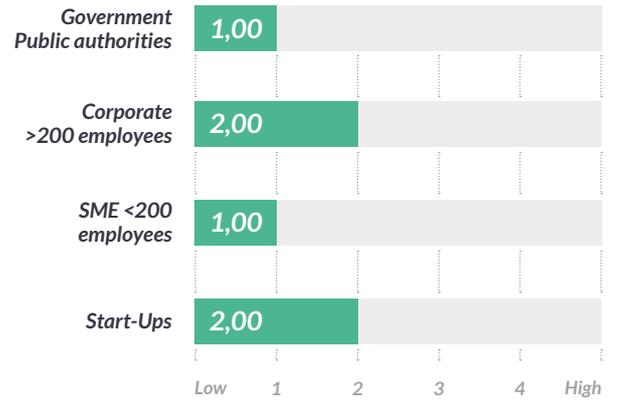
- Budapest University of Technology and Economy**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

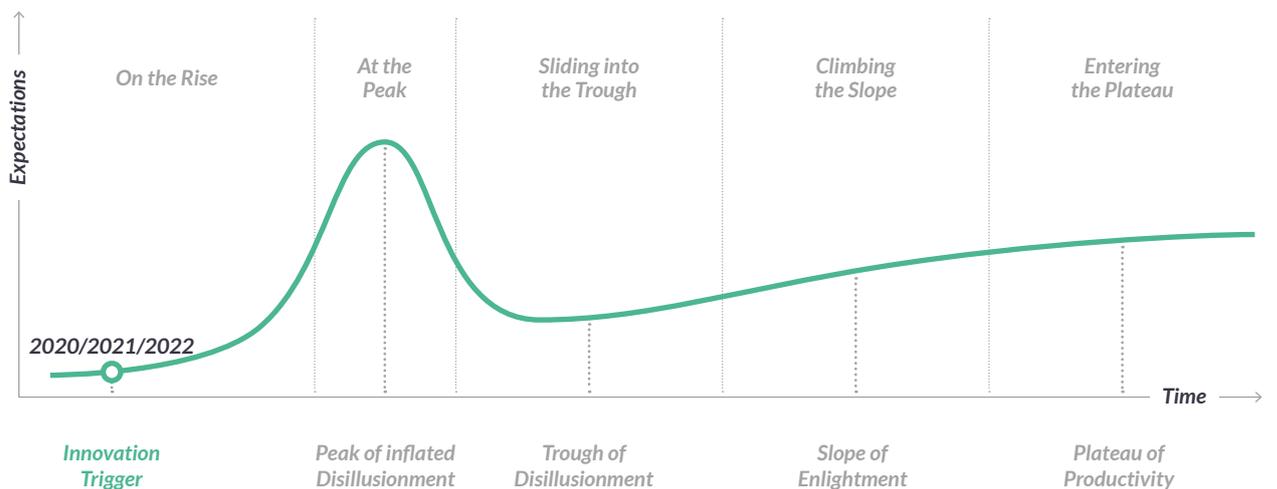
	2019	2020	2021	2022
Number of products	-	1	2	2
Global ranking	-	#33	#40	#31

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Kolkata**
Arnab Paul arnab.paul@fibree.org
- **Pune**
Darshana Parmar Jain darshana.parmar.jain@fibree.org

Country Facts

Source: Wikipedia

- **New Delhi**
 Capital
- **1.380.004.000**
 Population
- **Indian Rupee**
 Currency
- **Hindi, English**
 Language
- **\$3.535 trillion**
 GDP

FIBREE Facts

- | **October 2018**
 First chapter
- | **2**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Hyperledger**

Readiness by Financial Authorities to Accept Blockchain Applications

» **No**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

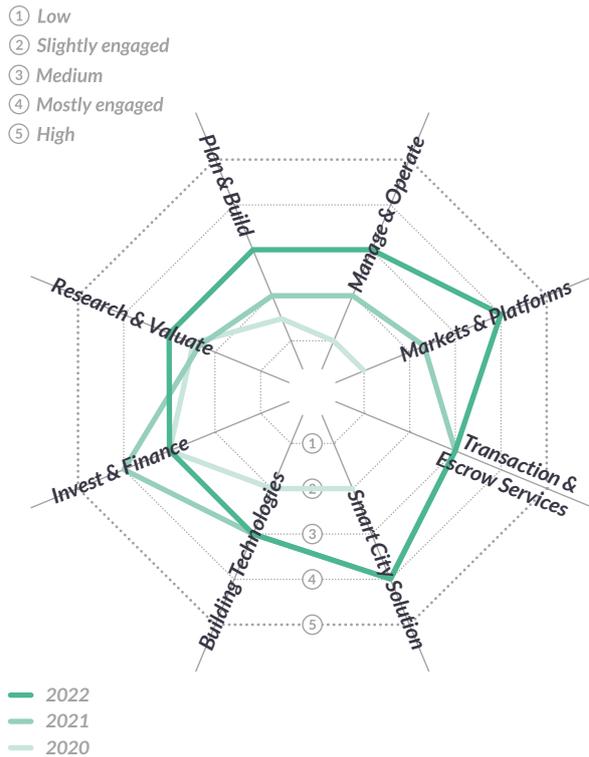
» **There is awareness, but no-one is really talking about it**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

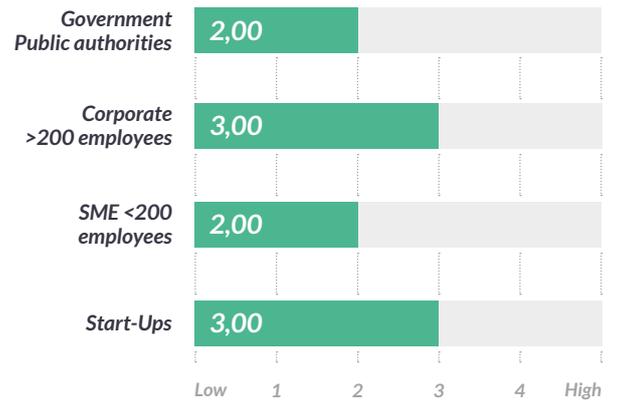
IITB FOR BLOCKCHAIN in partnership with UPGRAD

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

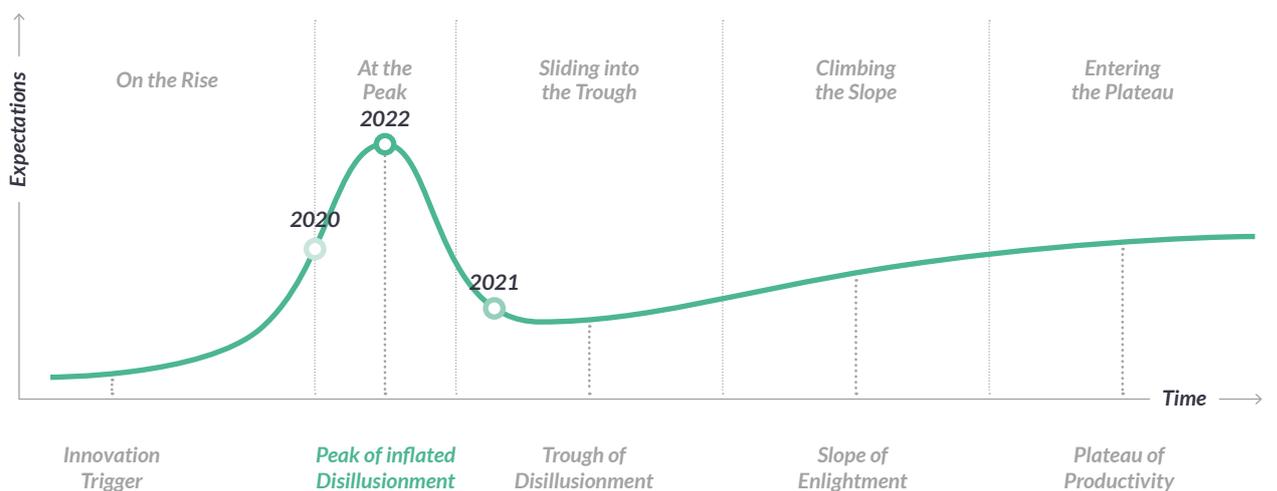
	2019	2020	2021	2022
Number of products	1	3	8	11
Global ranking	#41	#13	#13	#12

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Dublin**
 David Lyons david.lyons@fibree.org

Country Facts

Source: Wikipedia

 Dublin Capital	 5,123,536 Population
 Euro Currency	 Irish, English Language
 \$516 billion GDP	

FIBREE Facts

July 2020
First chapter

1
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

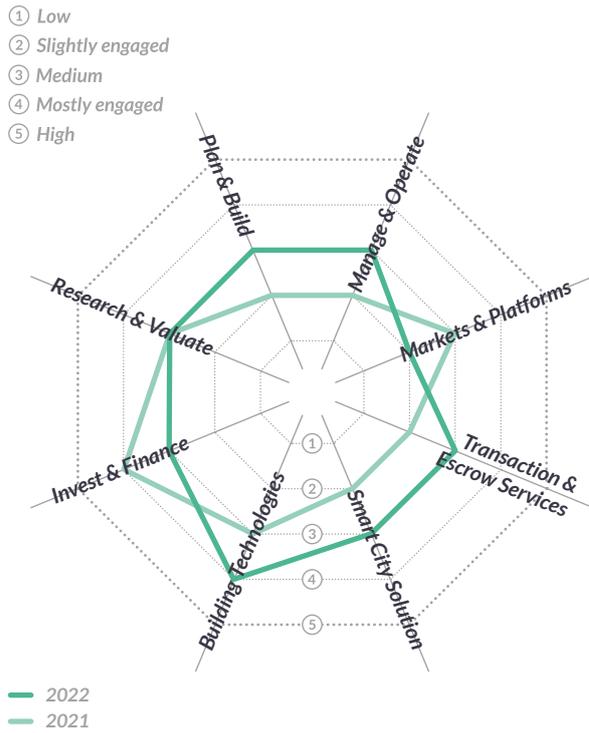
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

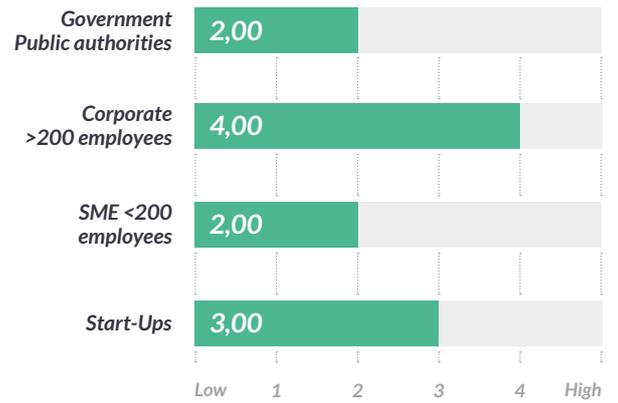
TCD TUI UCD

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

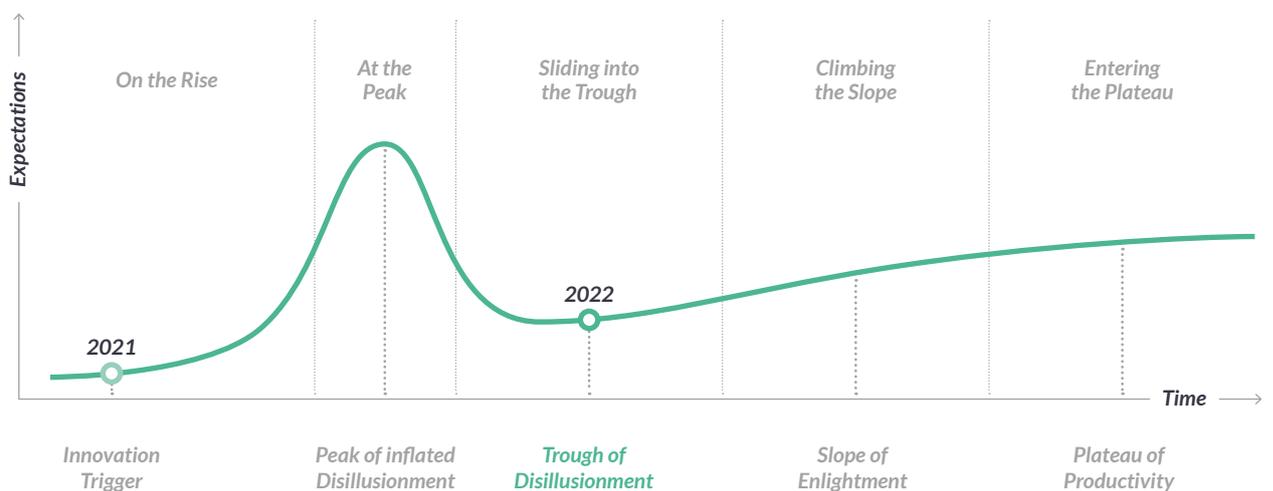
	2019	2020	2021	2022
Number of products	1	-	4	4
Global ranking	#41	-	#17	#24

Product Database by Segment

Active products 2022 and change directions since 2021.

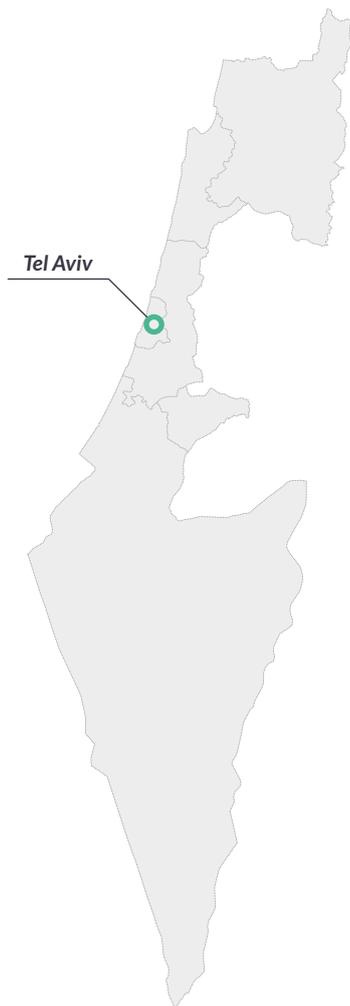


Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Tel Aviv**
Yael Tamar yael.tamar@fibree.org

Country Facts

Source: Wikipedia

- **Jerusalem**
 Capital
- **9,537,020**
 Population
- **New Shekel**
 Currency
- **Hebrew**
 Language
- **\$520.7 billion**
 GDP

FIBREE Facts

- | **August 2018**
 First chapter
- | **1**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Internet Computer**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

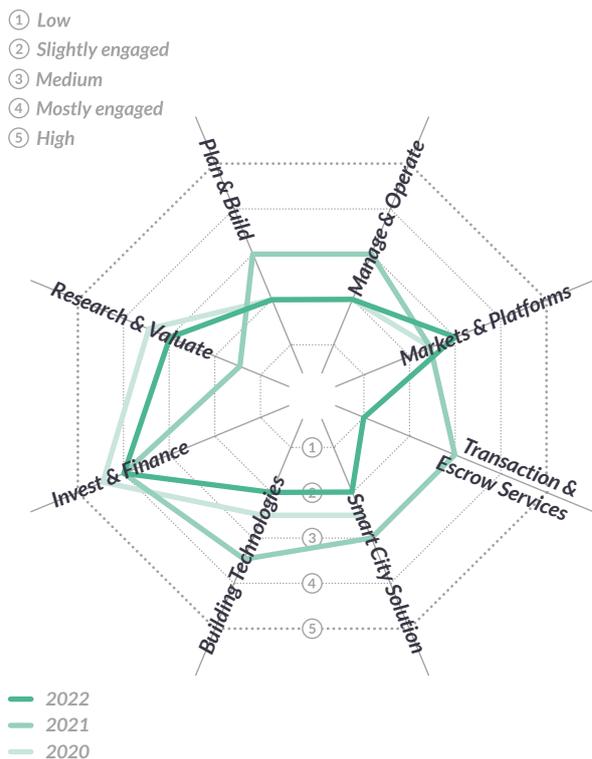
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

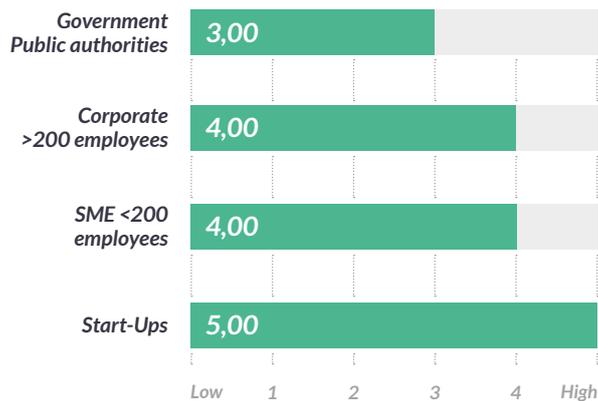
- » **The Technion, Ben Gurion University, Bar Ilan**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



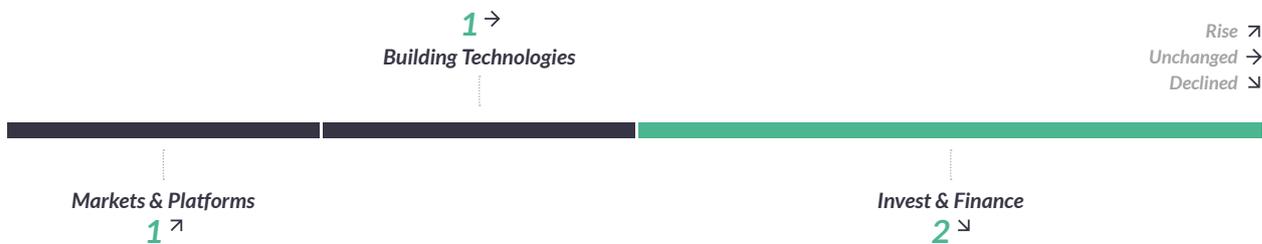
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

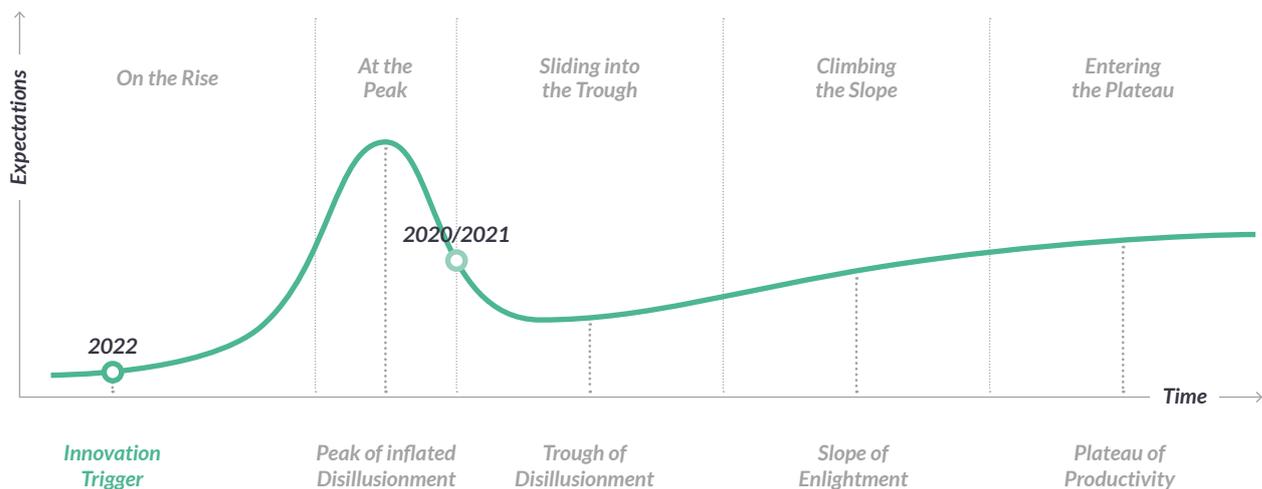
	2019	2020	2021	2022
Number of products	2	4	4	4
Global ranking	#34	#13	#17	#25

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Bari**
Vito Burdi vito.burdi@fibree.org
- **Genoa**
Federico Garaventa federico.garaventa@fibree.org
- **Florence**
Gianfranco Dote gianfranco.dote@fibree.org
- **Milan**
Alex Dell'Orto alex.dellorto@fibree.org

Country Facts

Source: Wikipedia



FIBREE Facts

July 2018
First chapter

4
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **No**

Awareness of ESG topics in the real estate sector?

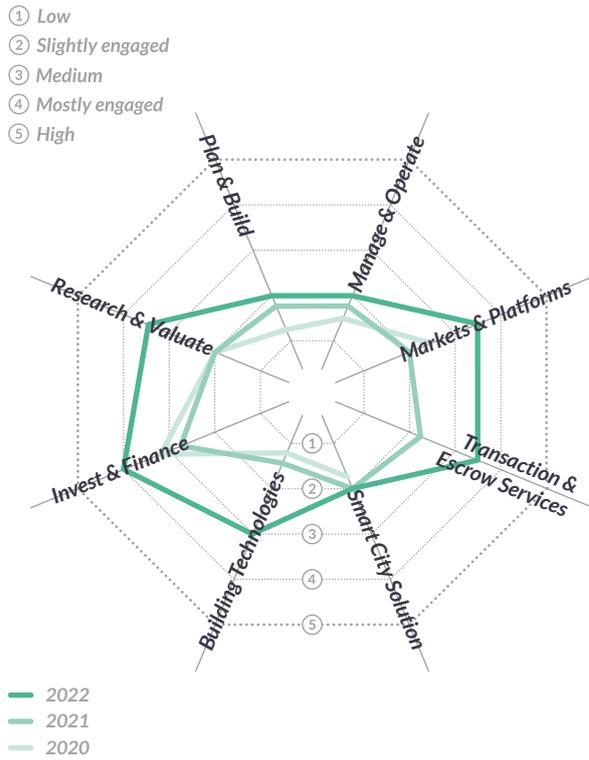
» **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

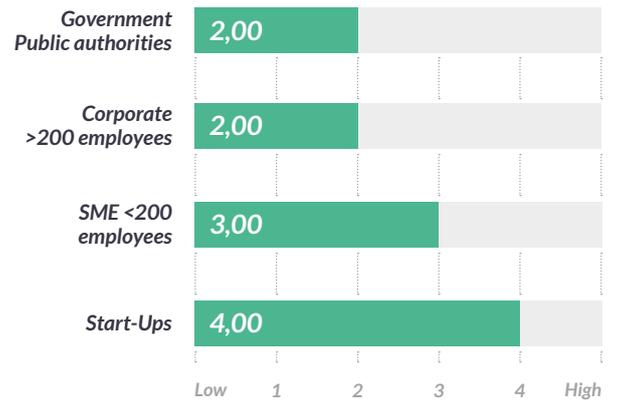
Politecnico Milano, La Sapienza Roma, Università di Firenze, University of Bocconi, Politecnico of Turin

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



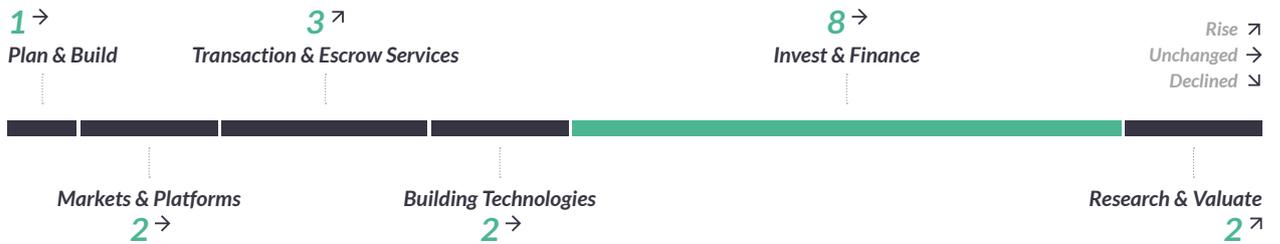
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

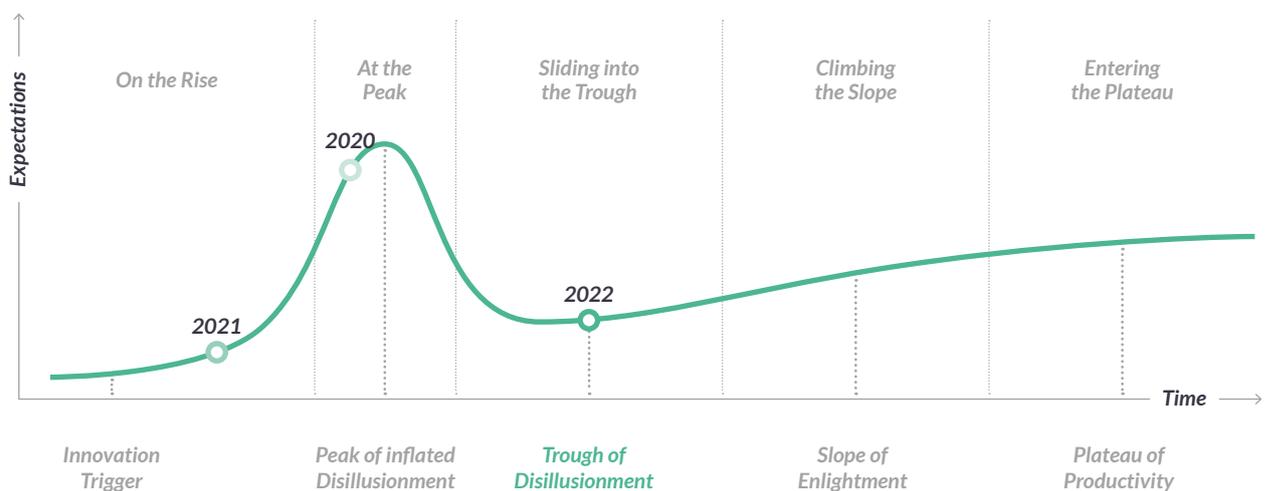
	2019	2020	2021	2022
Number of products	4	7	16	18
Global ranking	#16	#11	#7	#5

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Mexico City**
Enrique J. Suárez Avilés enrique.suarez@fibree.org
Carlos Vazquez carlos.vazquez@fibree.org
Alejandro Vélez alejandro.velez@fibree.org

Country Facts

Source: Wikipedia

 Mexico City Capital	 126,014,024 Population
 Peso Currency	 Spanish Language
 \$1.322 trillion GDP	

FIBREE Facts

- February 2020**
First chapter
- 3**
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Bitcoin, Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

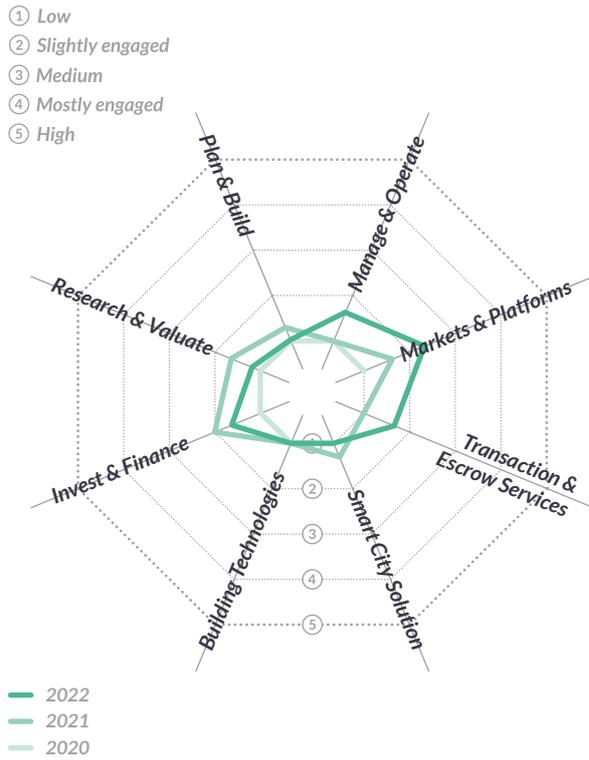
- » **There is awareness, but no-one is really talking about it**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

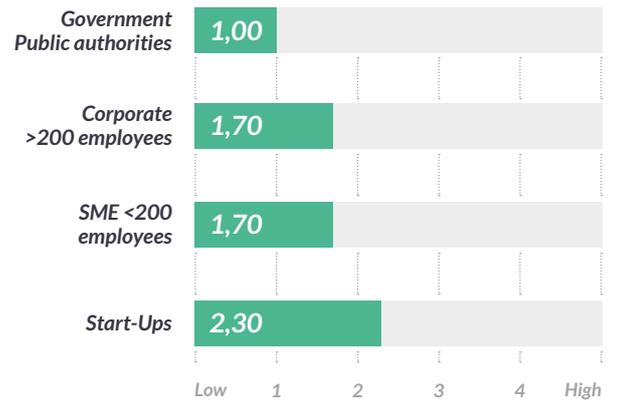
Blockchain Academy México, Parque Tecnológico Instituto San Miguelense

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

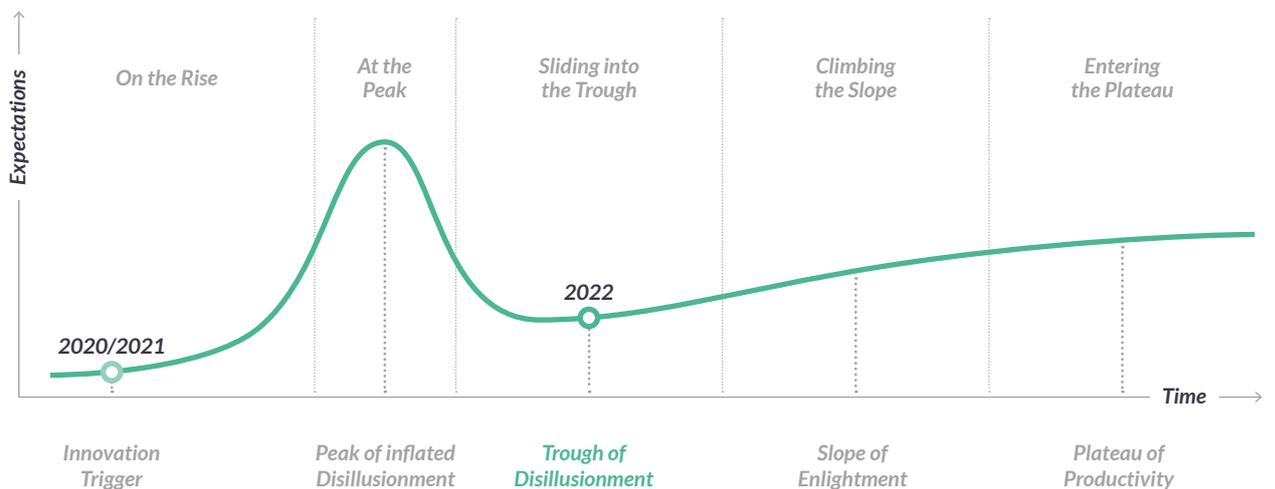
	2019	2020	2021	2022
Number of products	4	4	3	8
Global ranking	#16	#17	#23	#16

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Amsterdam**
Jo Bronckers jo.bronckers@fibree.org
- **Enschede**
Jan Veuger jan.veuger@fibree.org

Country Facts

Source: Wikipedia

- **Amsterdam**
 Capital
- **17,736,300**
 Population
- **Euro**
 Currency
- **Dutch**
 Language
- **\$1.012 trillion**
 GDP

FIBREE Facts

- | **July 2018**
 First chapter
- | **2**
 Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **No**

Awareness of ESG topics in the real estate sector?

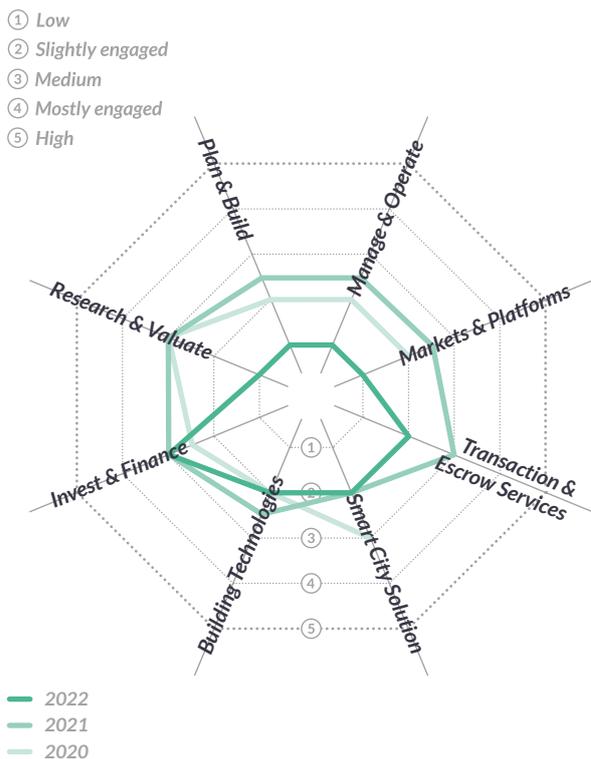
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

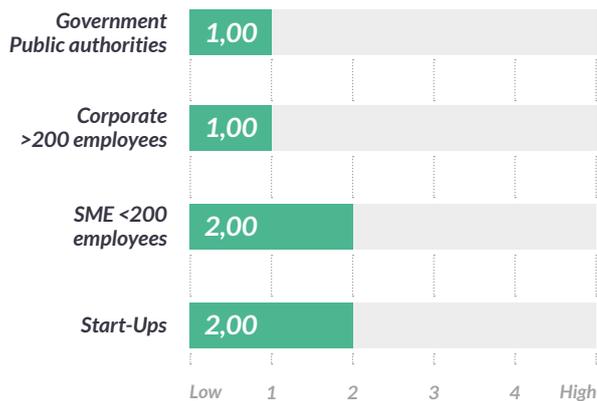
- » **Technical University Eindhoven / Technical University Delft**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



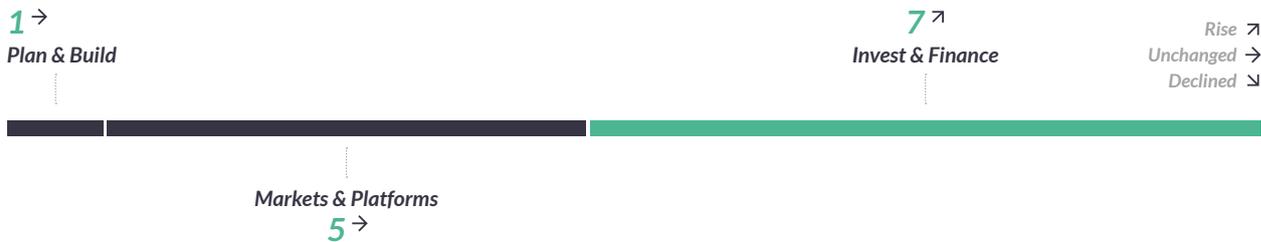
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

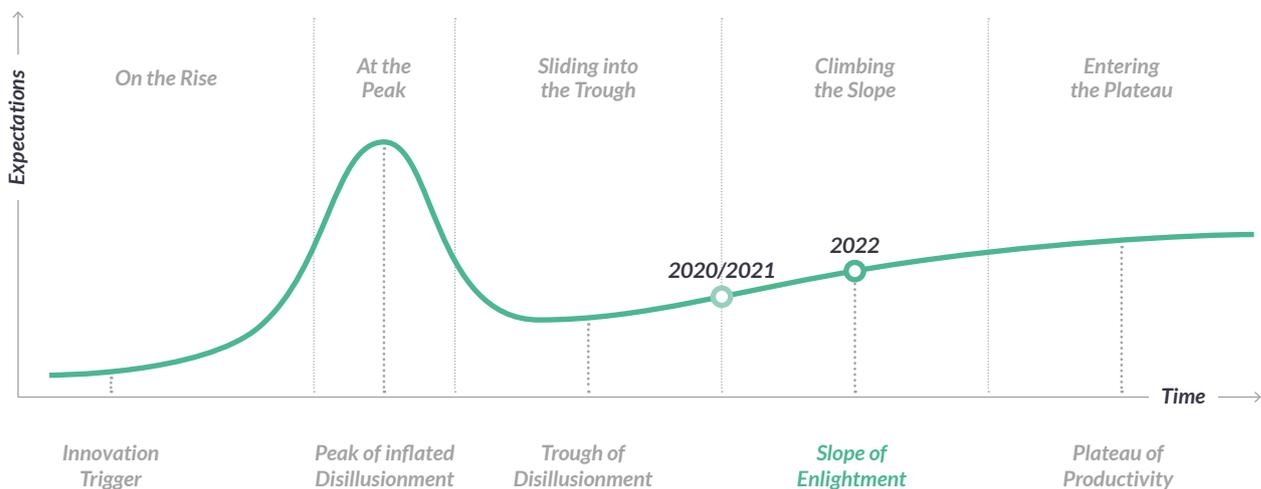
	2019	2020	2021	2022
Number of products	26	14	11	13
Global ranking	#5	#6	#9	#9

Product Database by Segment

Active products 2022 and change directions since 2021.

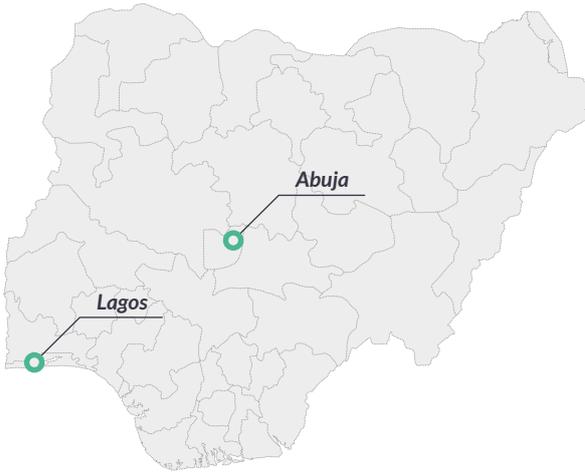


Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Abuja**
Justin Okpu justin.okpu@fibree.org
- **Lagos**
Sola Enitan sola.enitan@fibree.org

Country Facts

Source: Wikipedia

-  **Abuja**
Capital
-  **216,746,934**
Population
-  **Naira**
Currency
-  **English**
Language
-  **\$498.060 billion**
GDP

FIBREE Facts

- April 2020
First chapter
- 2
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » Bitcoin, BSC (Binance Smart Chain)

Readiness by Financial Authorities to Accept Blockchain Applications

- » Open, but not there yet

Will Metaverse play an important role in the near future?

- » Yes

Awareness of ESG topics in the real estate sector?

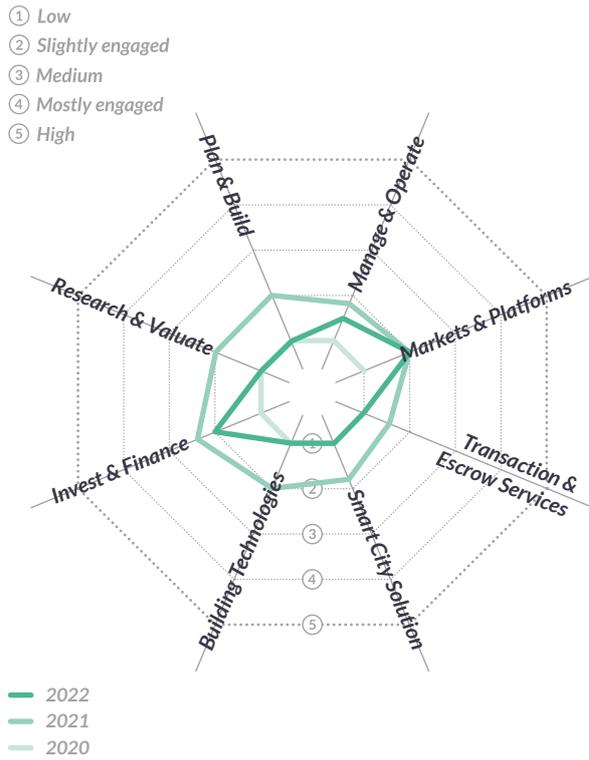
- » Don't know

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

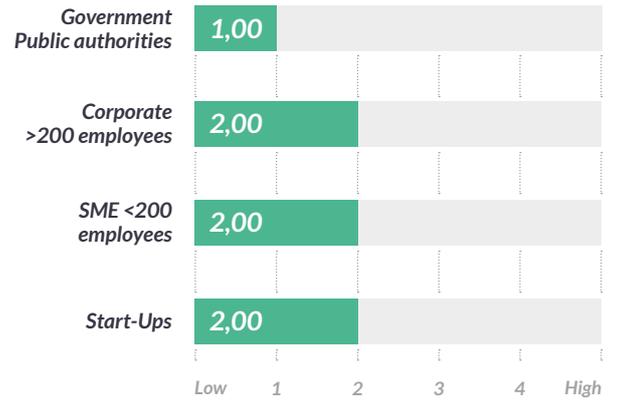
- » **RealX Chain Academy**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

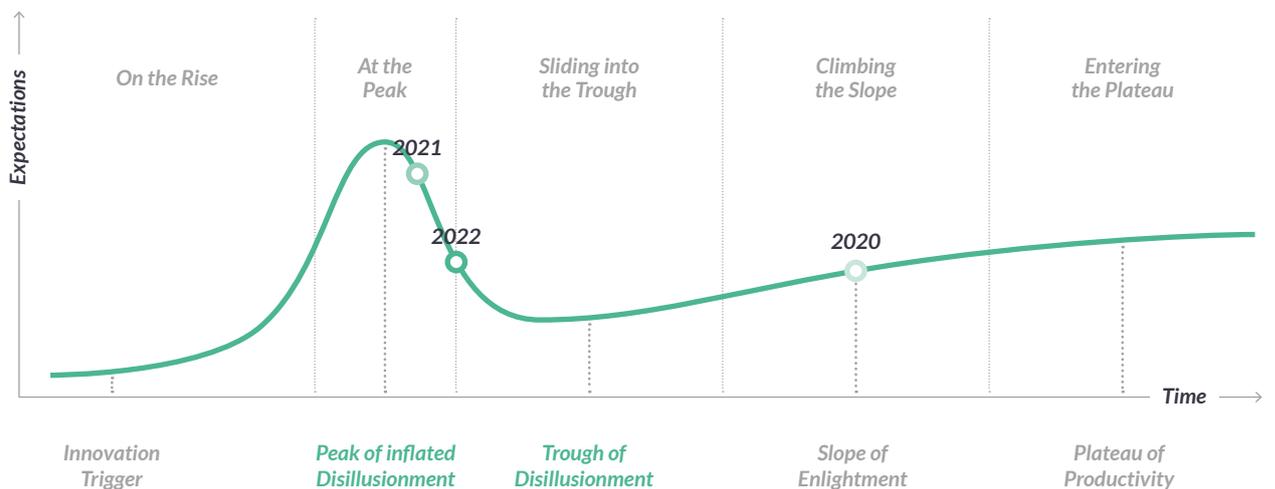
	2019	2020	2021	2022
Number of products	4	1	4	8
Global ranking	#16	#36	#17	#17

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Warsaw**
Adrian Karczewicz adrian.karczewicz@fibree.org
Alexander Morari alexander.morari@fibree.org

Country Facts

Source: Wikipedia

 Warsaw Capital	 38,179,800 Population
 Polish Złoty Currency	 Polish Language
 \$699.5 billion GDP	

FIBREE Facts

January 2019 First chapter	2 Regional chairs
--------------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

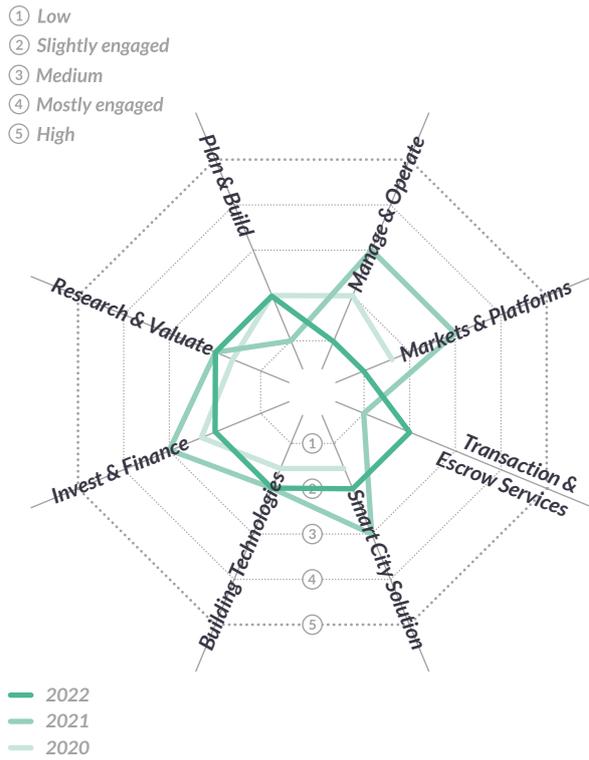
» **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

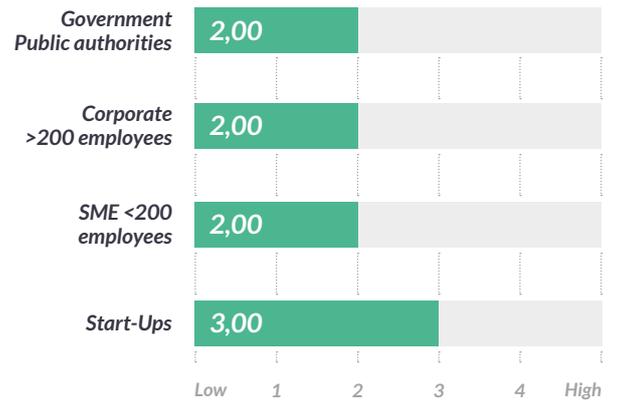
Warsaw School of Economics

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

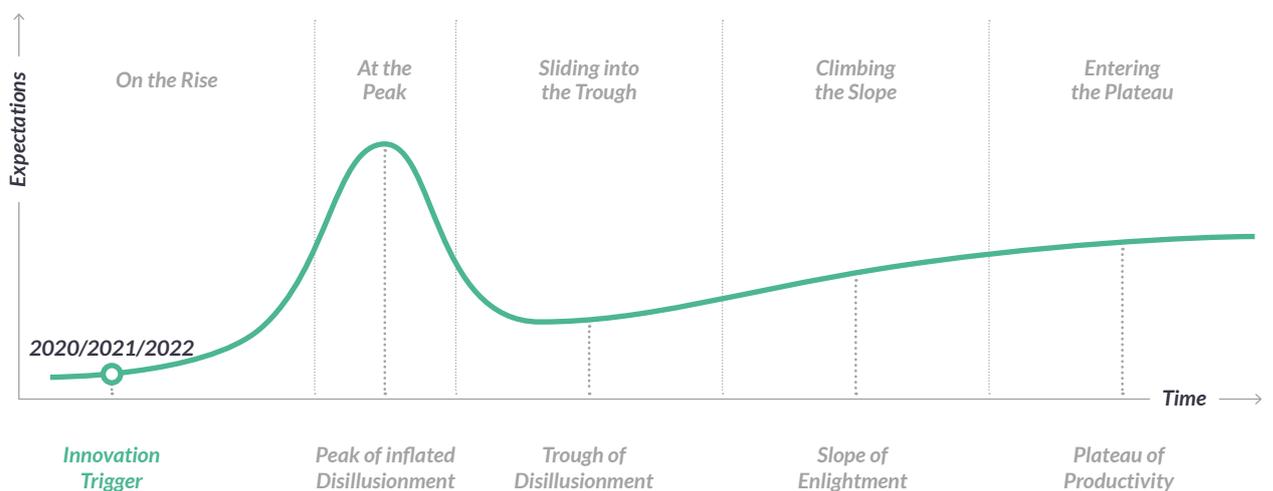
	2019	2020	2021	2022
Number of products	3	3	5	6
Global ranking	#25	#17	#17	#19

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Lisbon**
Cristina Campian cristina.campian@fbree.org
José Reis Santos jose.reis.santos@fbree.org

Country Facts

Source: Wikipedia

 Lisbon Capital	 10,352,042 Population
 Euro Currency	 Portuguese Language
 \$251.9 billion GDP	

FIBREE Facts

October 2019 First chapter	2 Regional chairs
--------------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

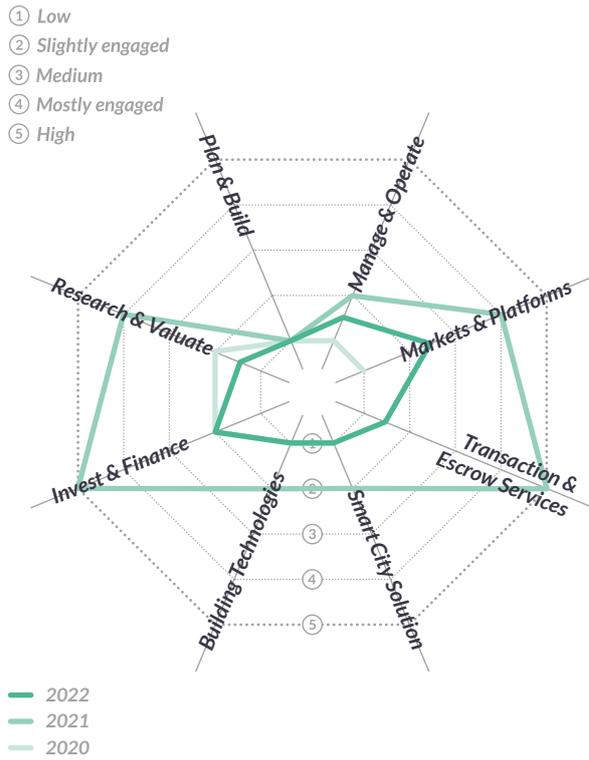
» **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

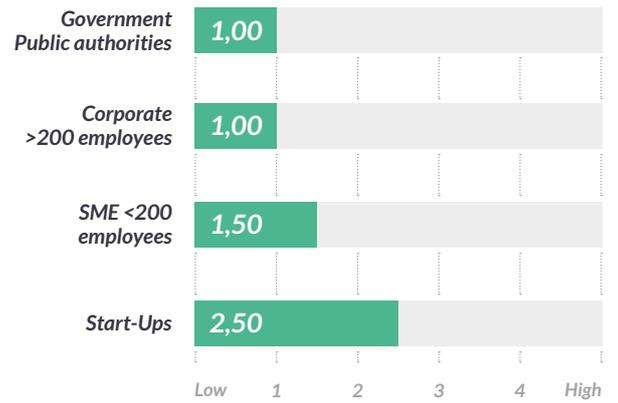
Nova de Lisboa, Técnico Lisboa, Associação de Blockchain e cripto moedas

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



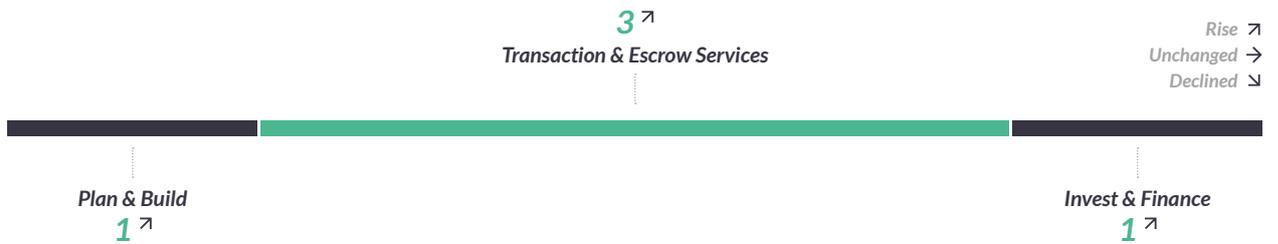
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

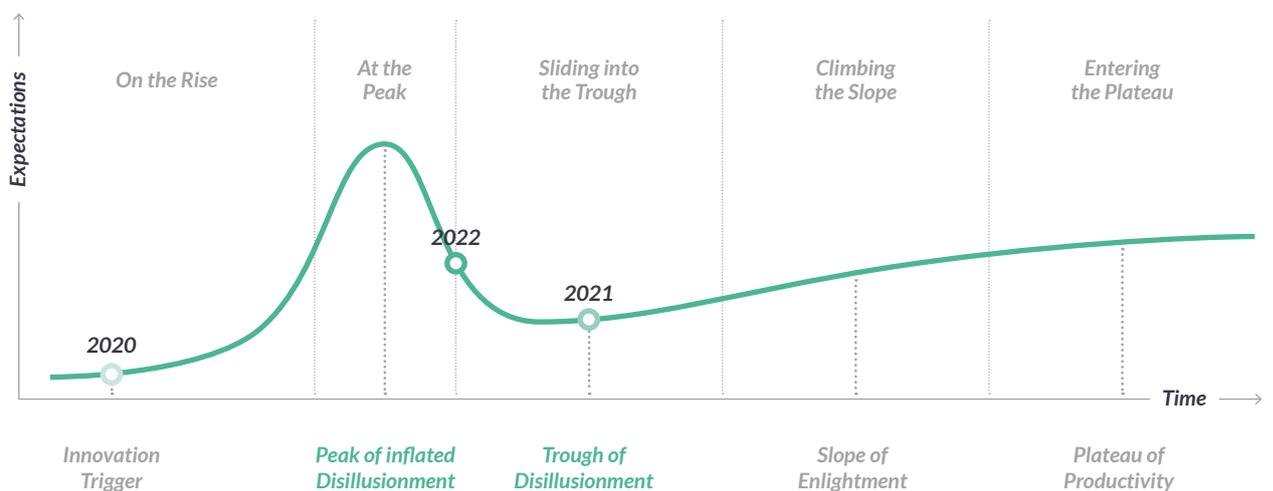
	2019	2020	2021	2022
Number of products	-	-	2	5
Global ranking	-	-	#30	#20

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Riyadh**
Faraj Alhouty faraj.alhouty@fibree.org

Country Facts

Source: Wikipedia

 Riyadh Capital	 34,218,000 Population
 Saudi Riyal Currency	 Arabic Language
 \$876.15 billion GDP	

FIBREE Facts

February 2020 First chapter	1 Regional chairs
---------------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Bitcoin**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **No**

Awareness of ESG topics in the real estate sector?

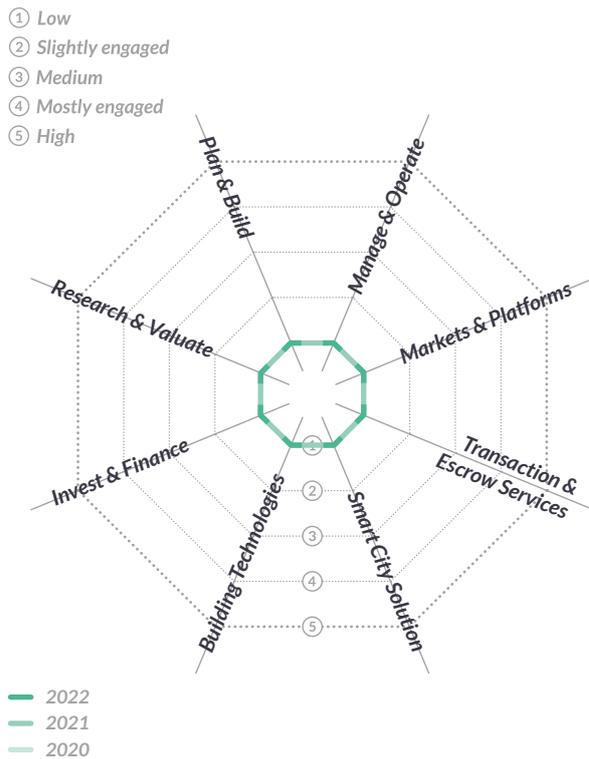
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

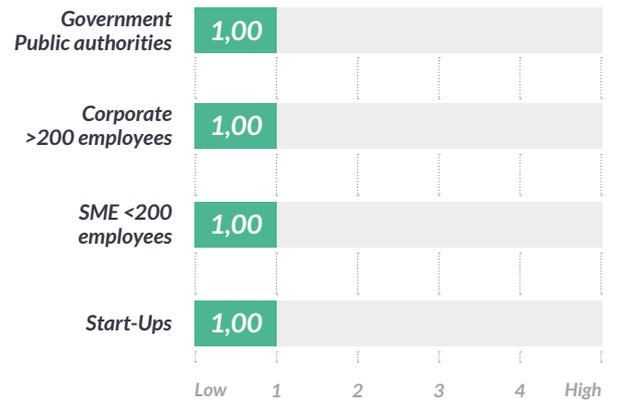
Taibah University, King Abdulaziz City For Science and Technology

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

	2019	2020	2021	2022
Number of products	-	-	2	3
Global ranking	-	-	#13	#28

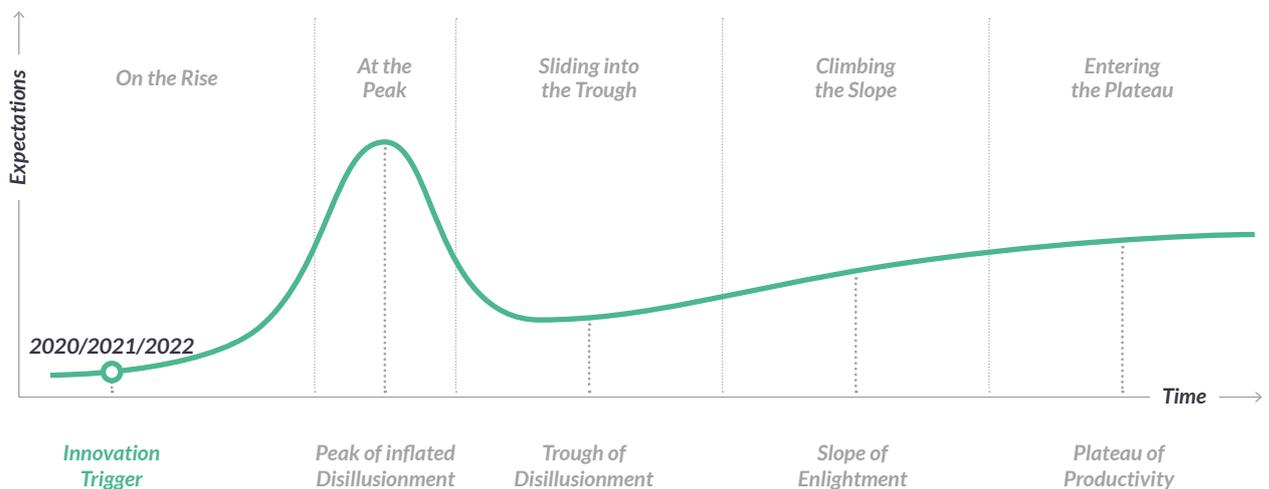
Product Database by Segment

Active products 2022 and change directions since 2021.

3[↗]
Invest & Finance

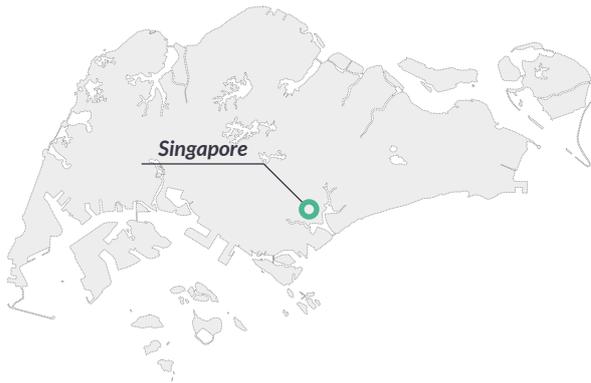
Rise ↗
Unchanged →
Declined ↘

Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Singapore**
Oliver Siah oliver.siah@fbree.org

Country Facts

Source: Wikipedia

 Singapore Capital	 5,453,600 Population
 Singapore Dollar Currency	 English, Malay, Mandarin, Tamil Language
 \$424.431 billion GDP	

FIBREE Facts

September 2019 First chapter	1 Regional chairs
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Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Yes**

Will Metaverse play an important role in the near future?

- » **No**

Awareness of ESG topics in the real estate sector?

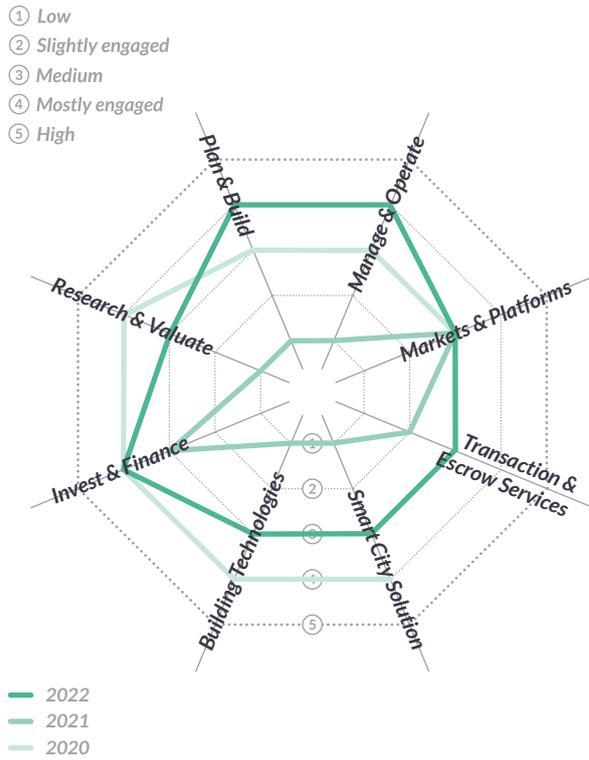
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

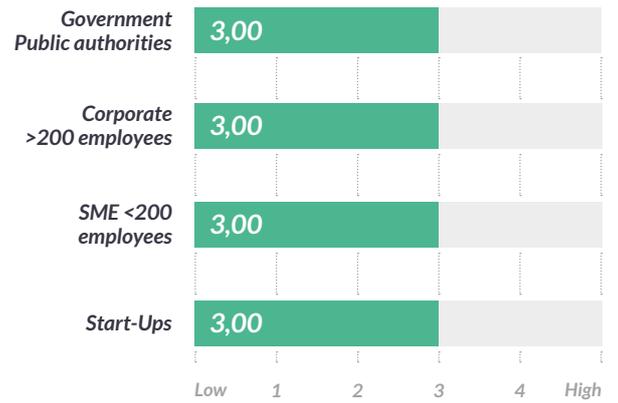
- SUSS, NUS**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



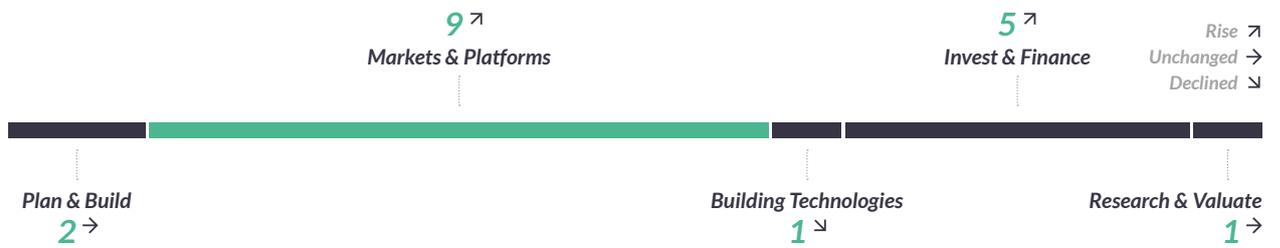
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

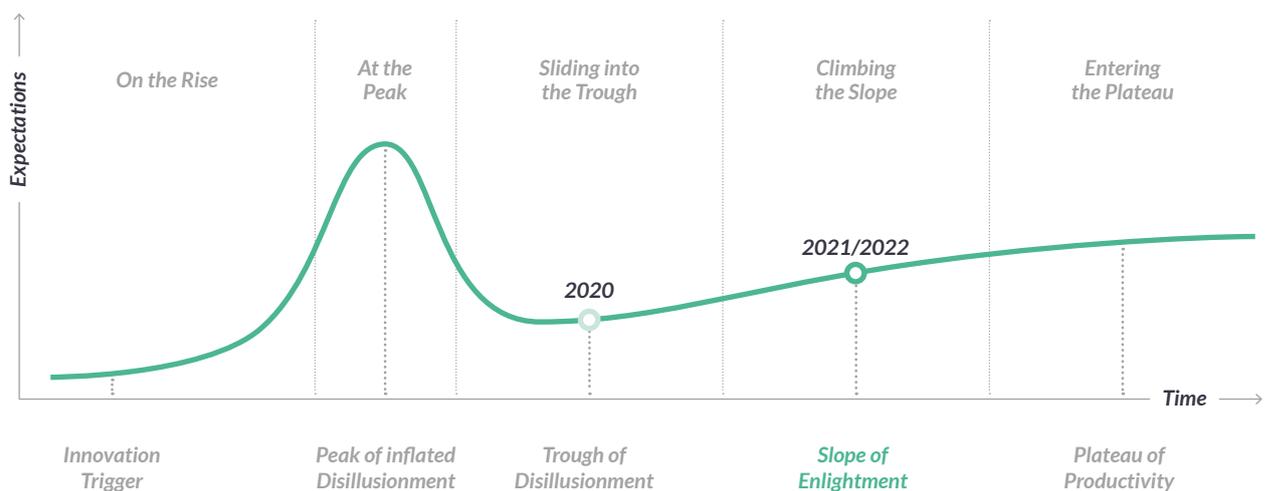
	2019	2020	2021	2022
Number of products	28	9	16	18
Global ranking	#3	#10	#5	#6

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

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

Country Facts

Source: Wikipedia

 Ljubljana Capital	 2,108,708 Population
 Euro Currency	 Slovene Language
 \$63.6 billion GDP	

FIBREE Facts

July 2018 First chapter	2 Regional chairs
-----------------------------------	-----------------------------

Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

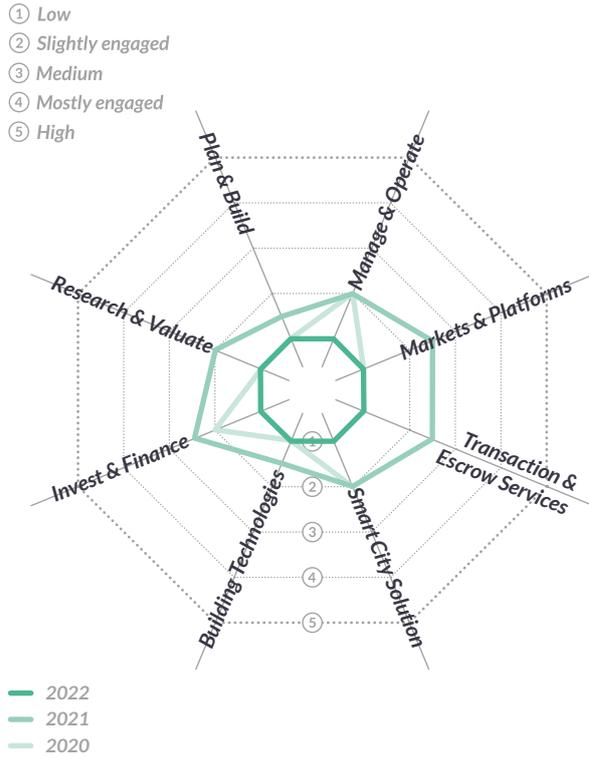
» **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

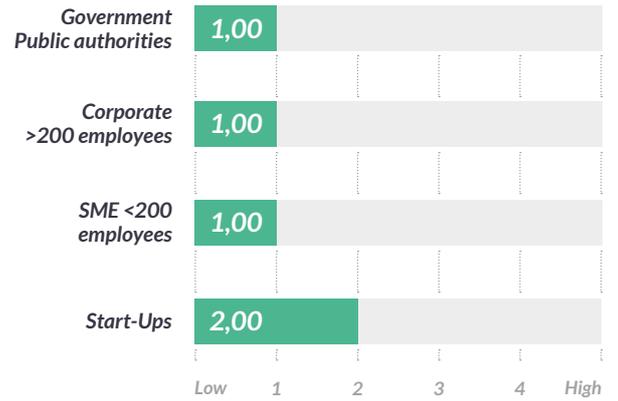
Univerza v Ljubljani

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

	2019	2020	2021	2022
Number of products	3	3	2	1
Global ranking	#25	#17	#30	#56

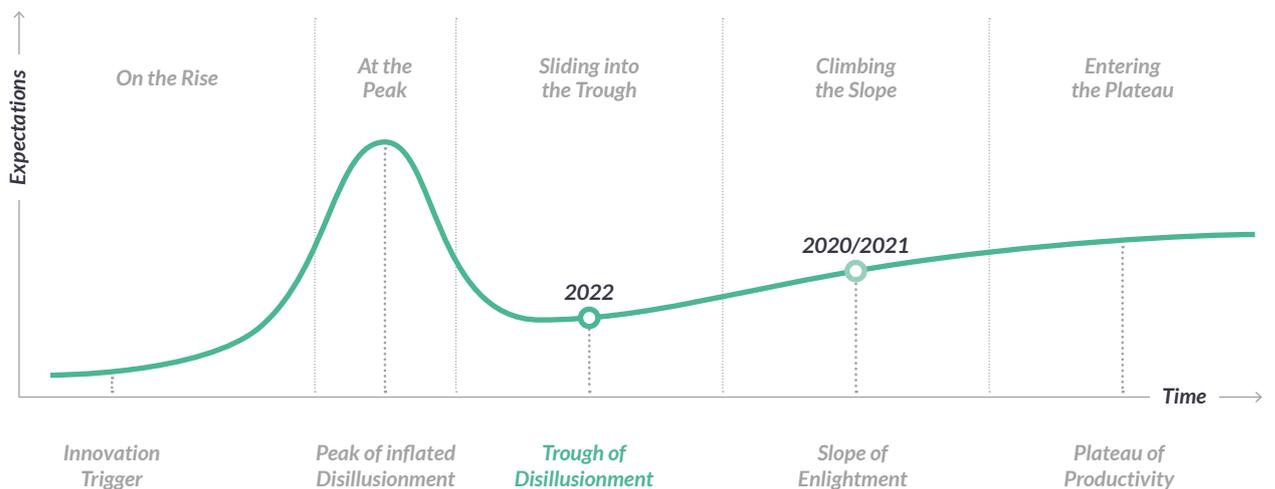
Product Database by Segment

Active products 2022 and change directions since 2021.

1 ↓
Building Technologies

Rise ↗
Unchanged →
Declined ↘

Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Barcelona**
Daniel Codina Guerra daniel.codina@fibree.org
Lorenzo Moreno lorenzo.moreno.munoz@fibree.org
- Levante (Region)**
José García Caballero jose.garcia.caballero@fibree.org
- Madrid**
Miguel Linera Alperi miguel.linera@fibree.org
- Valencia**
Irina Karagyaur irina.karagyaur@fibree.org

Country Facts

Source: Wikipedia

-  **Madrid**
Capital
-  **47,450,795**
Population
-  **Euro**
Currency
-  **Spanish**
Language
-  **\$1.435 trillion**
GDP

FIBREE Facts

- January 2019**
First chapter
- 5**
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

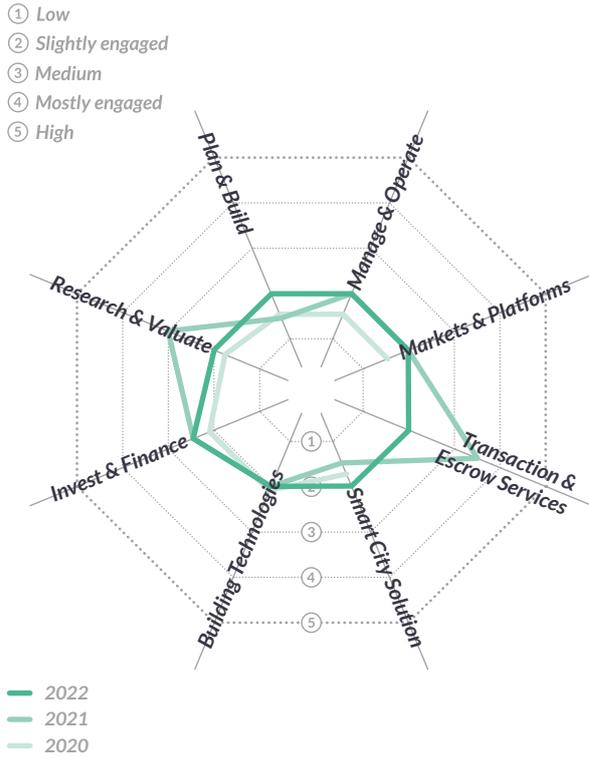
- » **There is more discussion, than actual action**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

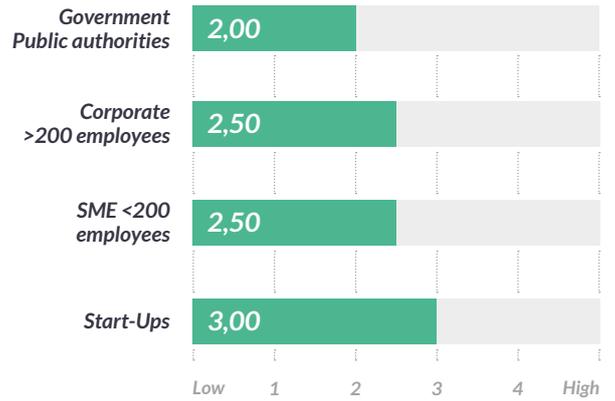
- Alicante**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



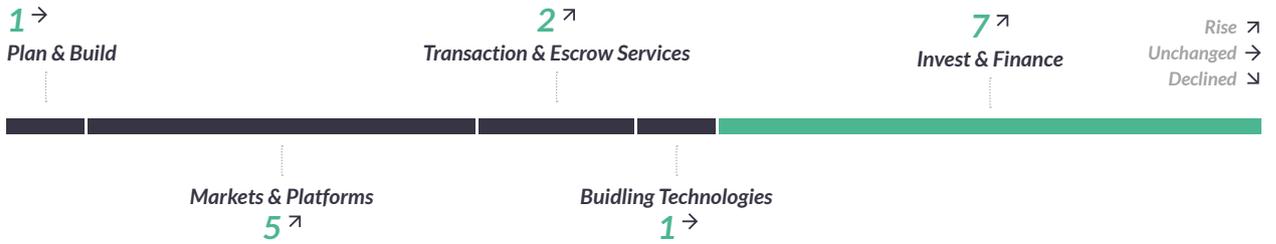
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

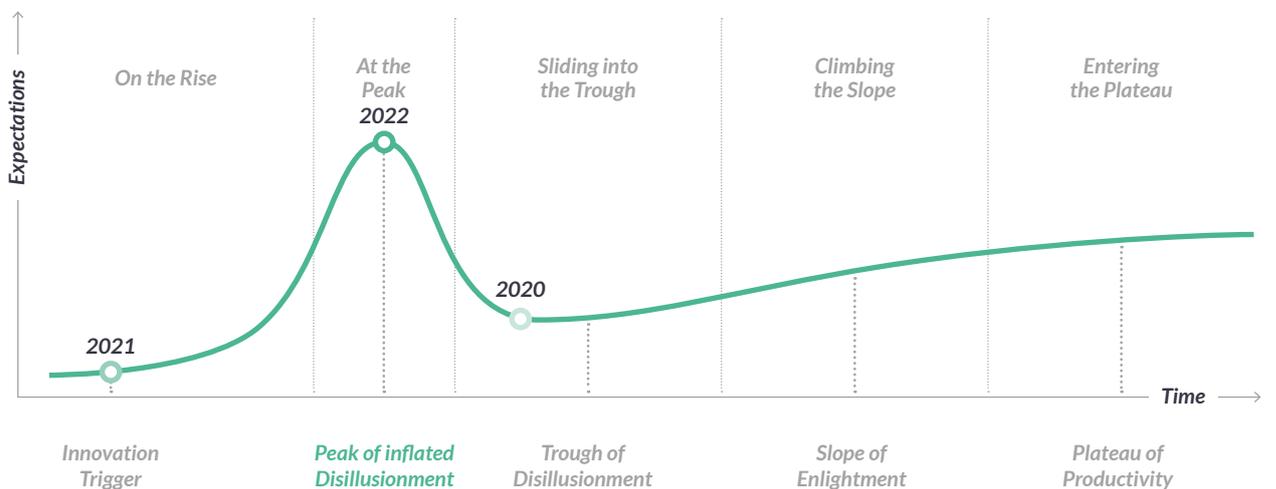
	2019	2020	2021	2022
Number of products	15	12	11	16
Global ranking	#10	#8	#9	#7

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Zug
Walter Strametz walter.strametz@fbree.org

Country Facts

Source: Wikipedia

 Bern Capital	 8,570,146 Population
 Swiss Franc Currency	 German, French, Italian, Romansh Language
 \$749 billion GDP	

FIBREE Facts

- | | |
|-----------------------------------|-----------------------------|
| July 2018
First chapter | 1
Regional chairs |
|-----------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » Ethereum

Readiness by Financial Authorities to Accept Blockchain Applications

- » Yes

Will Metaverse play an important role in the near future?

- » Yes

Awareness of ESG topics in the real estate sector?

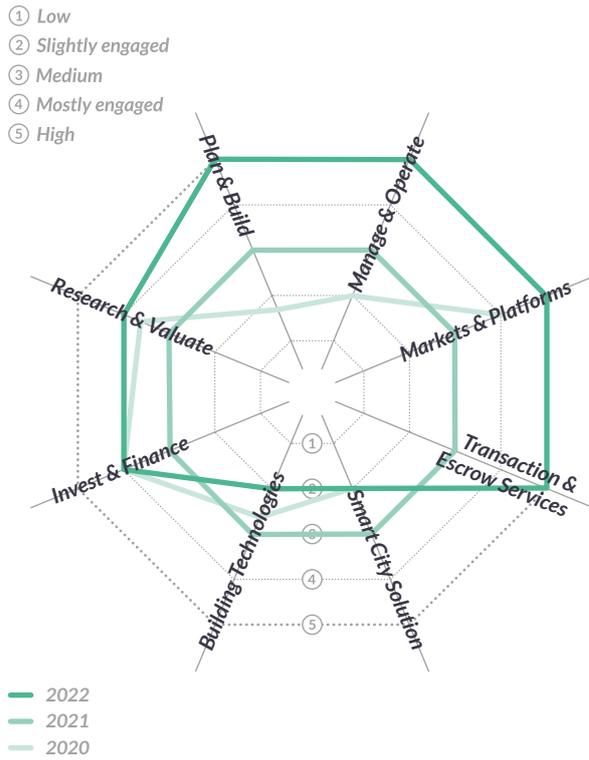
- » There is more discussion, than actual action

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

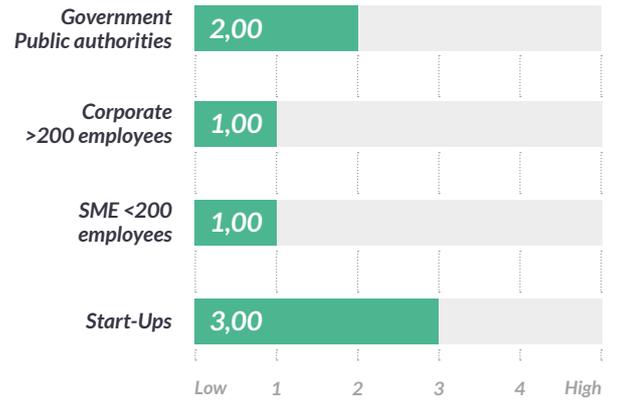
- » Lucerne University of Applied Sciences and Arts

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



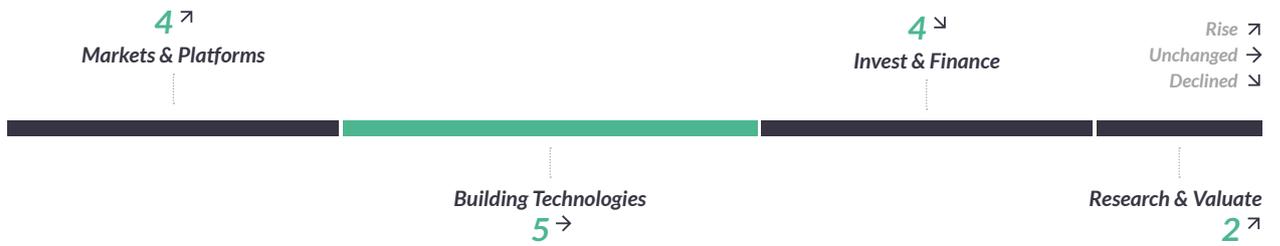
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

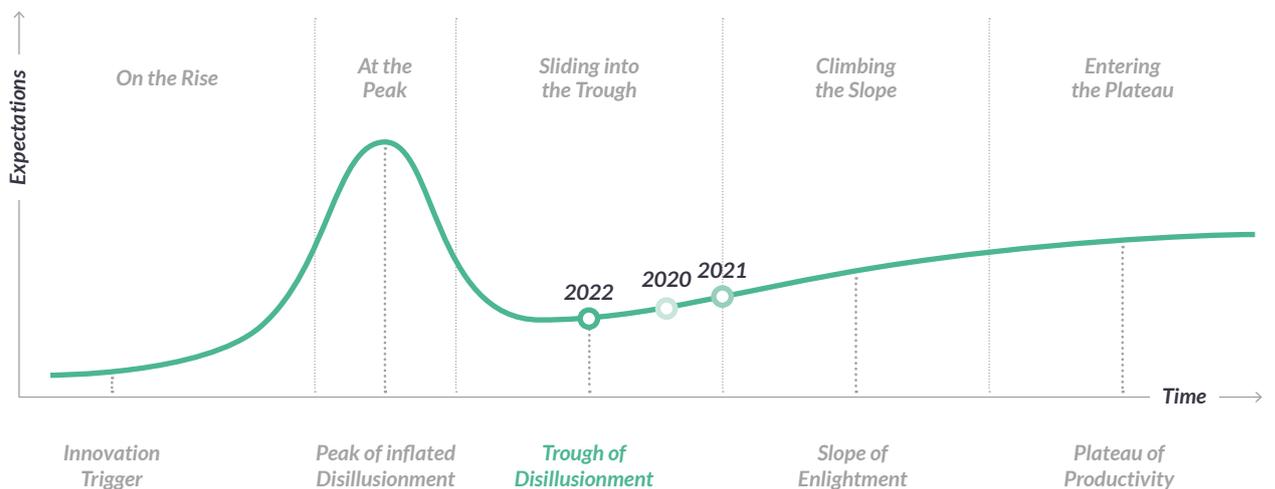
	2019	2020	2021	2022
Number of products	27	20	13	15
Global ranking	#4	#3	#6	#8

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Dubai**
Makram Hani makram.hani@fbree.org

Country Facts

Source: Wikipedia

 Abu Dhabi Capital	 9,282,410 Population
 UAE Dirham Currency	 Arabic Language
 \$501.354 billion GDP	

FIBREE Facts

- March 2021**
First chapter
- 1**
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **Ethereum**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

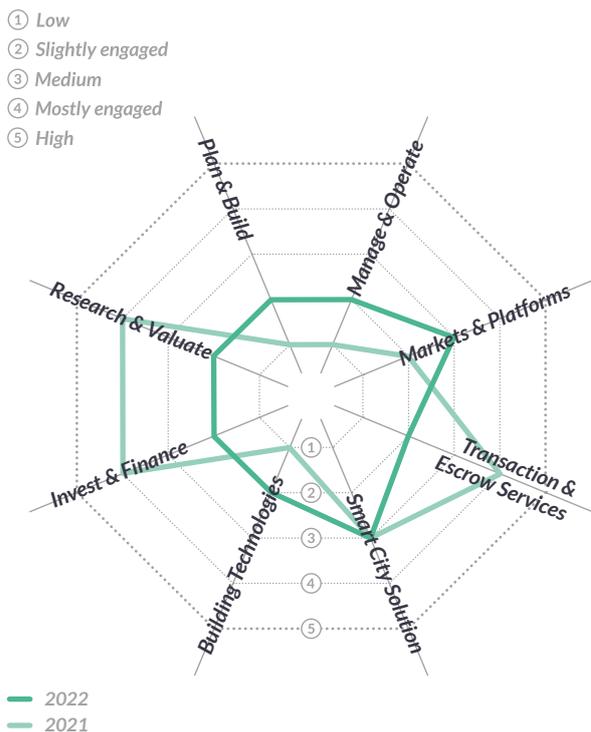
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

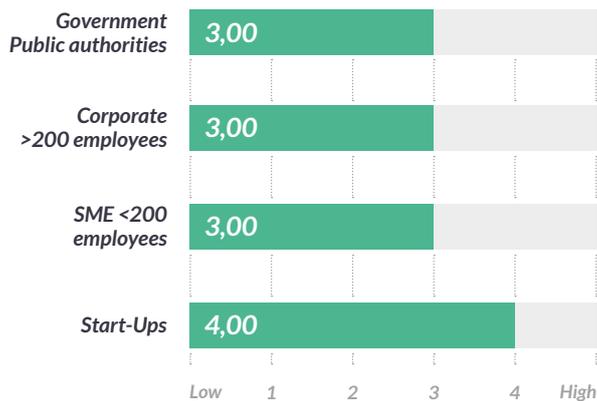
- Amity University**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

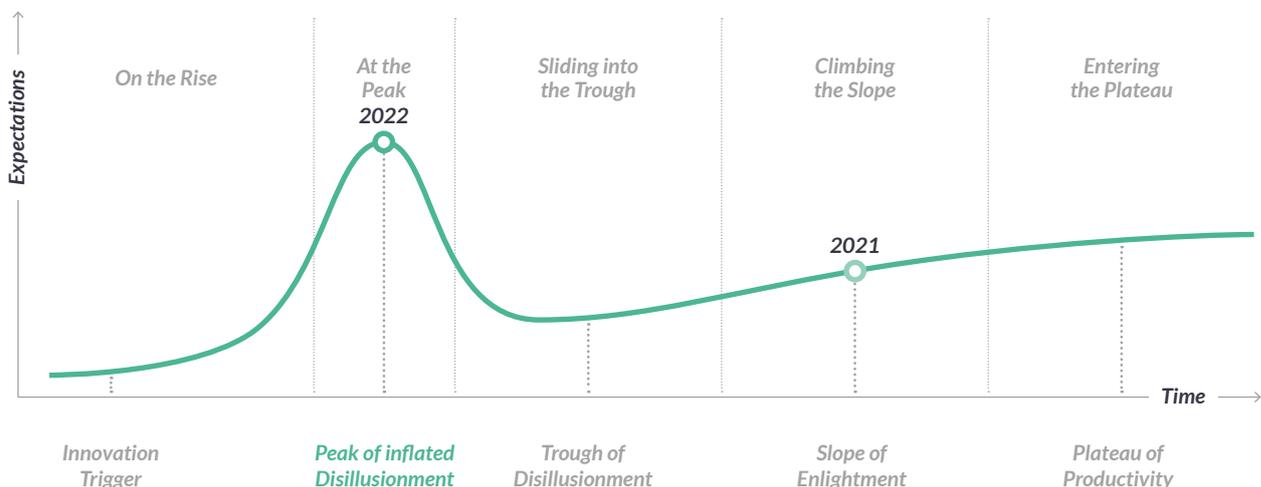
	2019	2020	2021	2022
Number of products	17	3	3	5
Global ranking	#8	#17	#23	#21

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

○ London

Alexander Appelmans alexander.appelmans@fibree.org

Jeremy Barnett jeremy.barnett@fibree.org

Kevin O'Grady kevin.ograde@fibree.org

Country Facts

Source: Wikipedia



FIBREE Facts

May 2019
First chapter

3
Regional chairs

Analog to Digital

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



Most Used Technology for Blockchain Applications

» Hyperledger

Readiness by Financial Authorities to Accept Blockchain Applications

» Open, but not there yet

Will Metaverse play an important role in the near future?

» Yes

Awareness of ESG topics in the real estate sector?

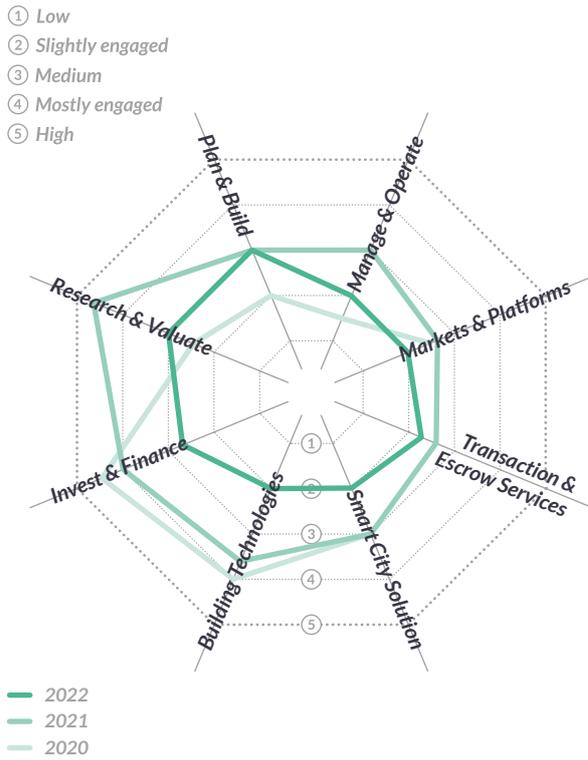
» There is more discussion, than actual action

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

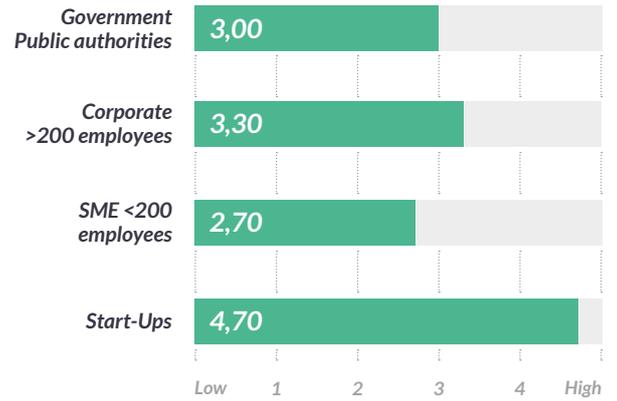
Edinburgh University, Cardiff University, Cambridge University, Imperial College, UCL

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



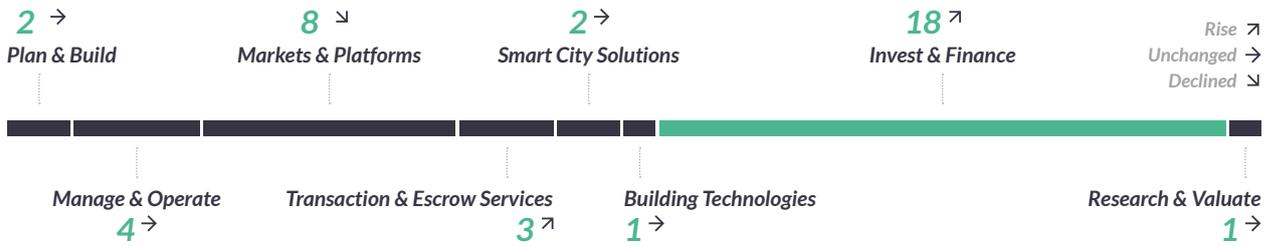
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

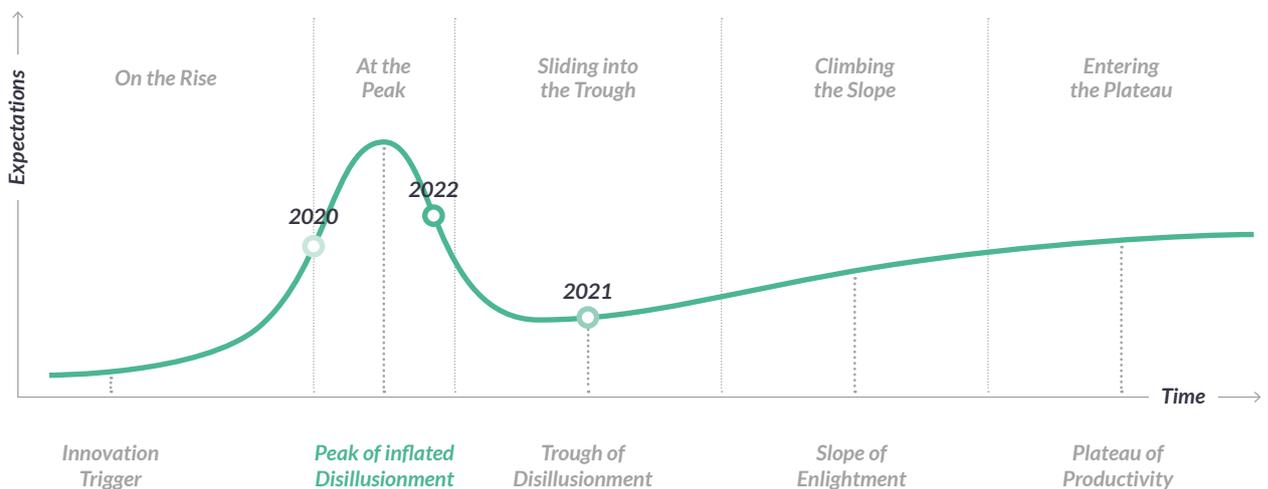
	2019	2020	2021	2022
Number of products	53	23	34	39
Global ranking	#2	#2	#2	#2

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- Baltimore**
Shari Lineberg shari.lineberg@fibree.org
- Chicago**
Geoffrey Kasselmann geoffrey.kasselmann@fibree.org
- Dallas**
Chris Deans chris.deans@fibree.org
- Denver**
Garratt Hasenstab garratt.hasenstab@fibree.org
- Florida**
John Dean Markunas john.dean.markunas@fibree.org
- Houston**
Mark Kingston mark.kingston@fibree.org
- Las Vegas**
Robert Hahn rob.hahn@fibree.org
- Los Angeles**
Eric Bryant eric.bryant@fibree.org
- New Jersey**
Theresa Kennedy theresa.kennedy@fibree.org
- Pasadena**
Ken Rhinehart ken.rhinehart@fibree.org
- Philadelphia**
Gary Brandeis gary.brandeis@fibree.org
- Phoenix**
Ian Staley ian.staley@fibree.org
- San Francisco**
Ranga Krishnan ranganathan.krishnan@fibree.org
- Seattle**
Brock Freeman brock.freeman@fibree.org
- Tampa / Saint Petersburg**
Lori Souza lori.souza@fibree.org
- Washington D.C.**
Todd Miller todd.miller@fibree.org

Country Facts

Source: Wikipedia

 Washington Capital	 331,893,745 Population
 United States Dollar Currency	 English Language
 \$25.35 trillion GDP	

FIBREE Facts

October 2018 First chapter	17 Regional chairs
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Analog to Digital

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



Most Used Technology for Blockchain Applications

» **Ethereum, Hyperledger, Internet Computer**

Readiness by Financial Authorities to Accept Blockchain Applications

» **Open, but not there yet**

Will Metaverse play an important role in the near future?

» **Yes**

Awareness of ESG topics in the real estate sector?

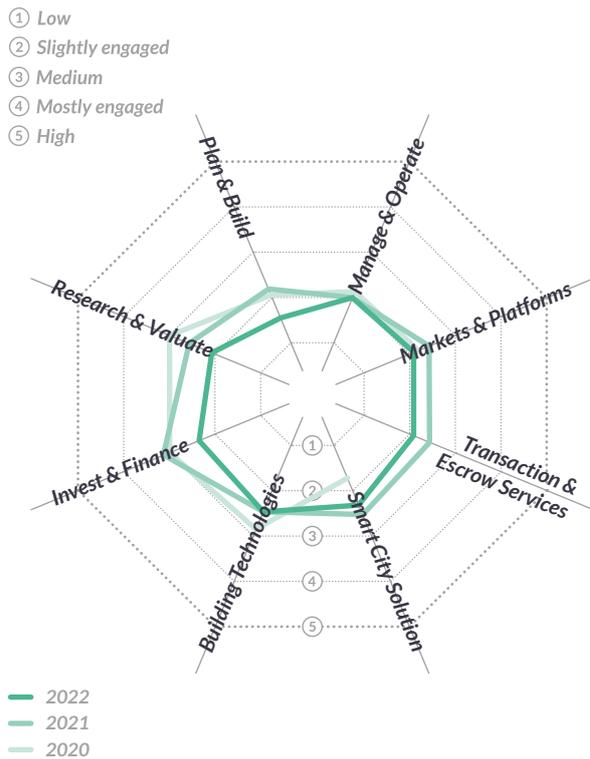
» **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

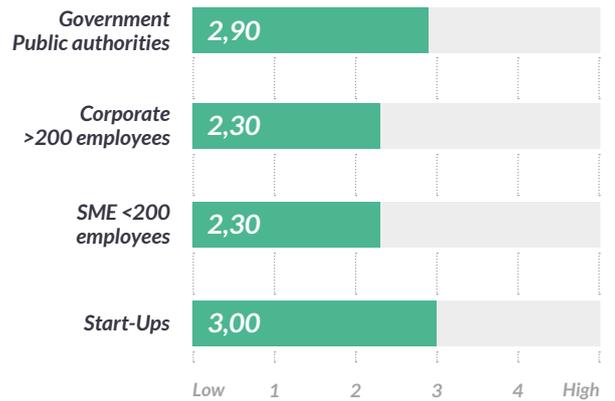
University of Colorado at Boulder; University of California, Berkeley, Arizona State University

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



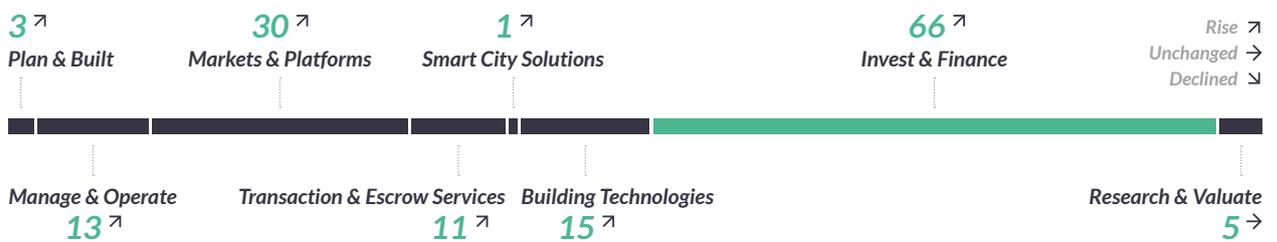
Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

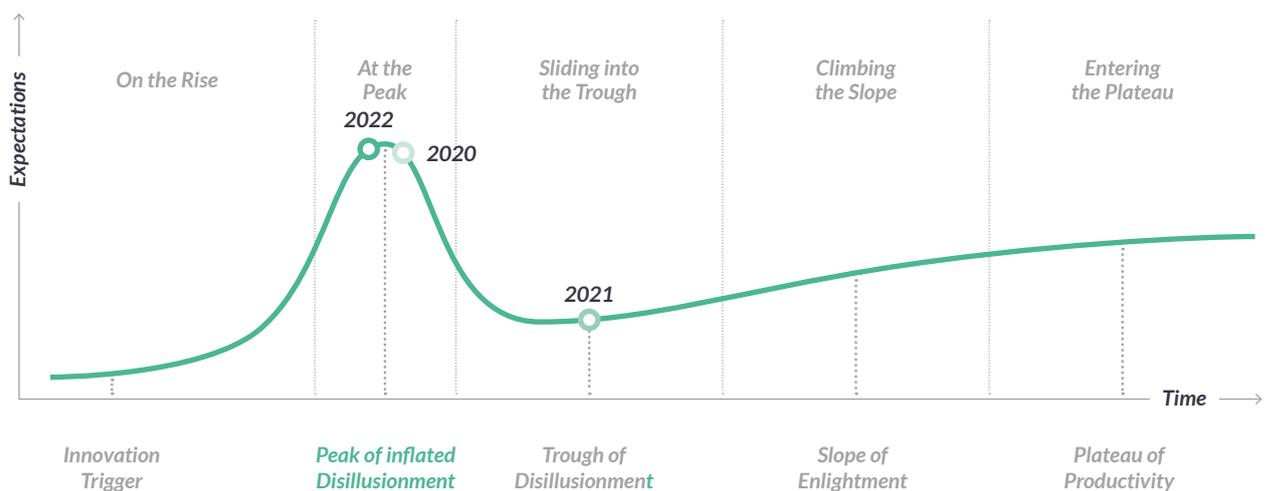
	2019	2020	2021	2022
Number of products	125	69	108	144
Global ranking	#1	#1	#1	#1

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Country Map

Find your local chapter



Regional Chairs

- **Hanoi**
Alex Pham alex.pham@fibree.org

Country Facts

Source: Wikipedia

 Hanoi Capital	 96,208,984 Population
 đồng Currency	 Vietnamese Language
 \$340.602 billion GDP	

FIBREE Facts

- | | |
|------------------------------------|-----------------------------|
| March 2022
First chapter | 1
Regional chairs |
|------------------------------------|-----------------------------|

Analog to Digital

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



Most Used Technology for Blockchain Applications

- » **BSC (Binance Smart Chain)**

Readiness by Financial Authorities to Accept Blockchain Applications

- » **Open, but not there yet**

Will Metaverse play an important role in the near future?

- » **Yes**

Awareness of ESG topics in the real estate sector?

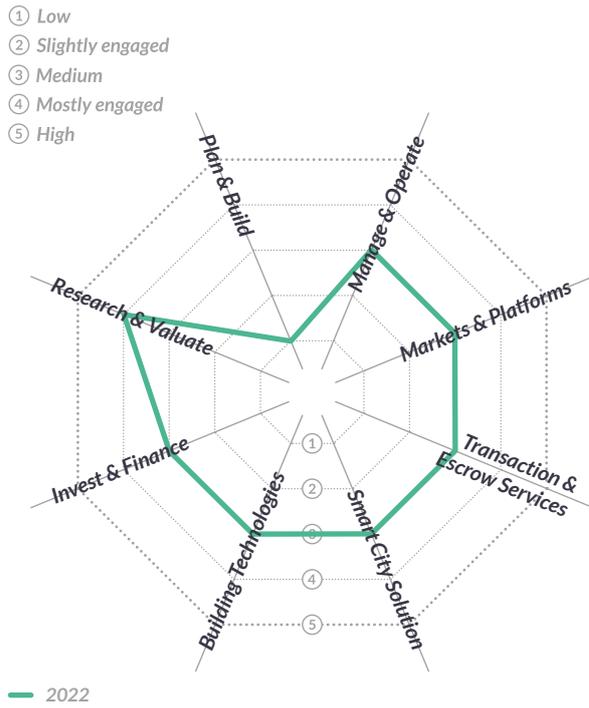
- » **The market shows initiatives and action is being taken**

Research on Blockchain and Real Estate

Universities and education programs in the field of blockchain and real estate.

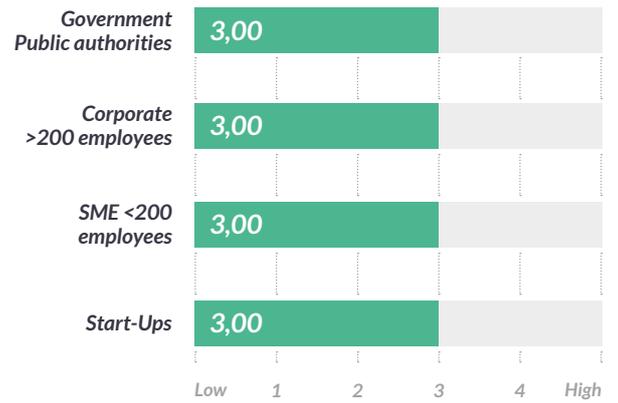
- RMIT**

Level of Engagement with Blockchain in Defined Segments



Sector Activity

Overall Activity in Blockchain & Real Estate



Product Database Keyfigures

Active products due to desktop research and input by regional chairs and FIBREE representatives in this country. Ranking according to globally available products.

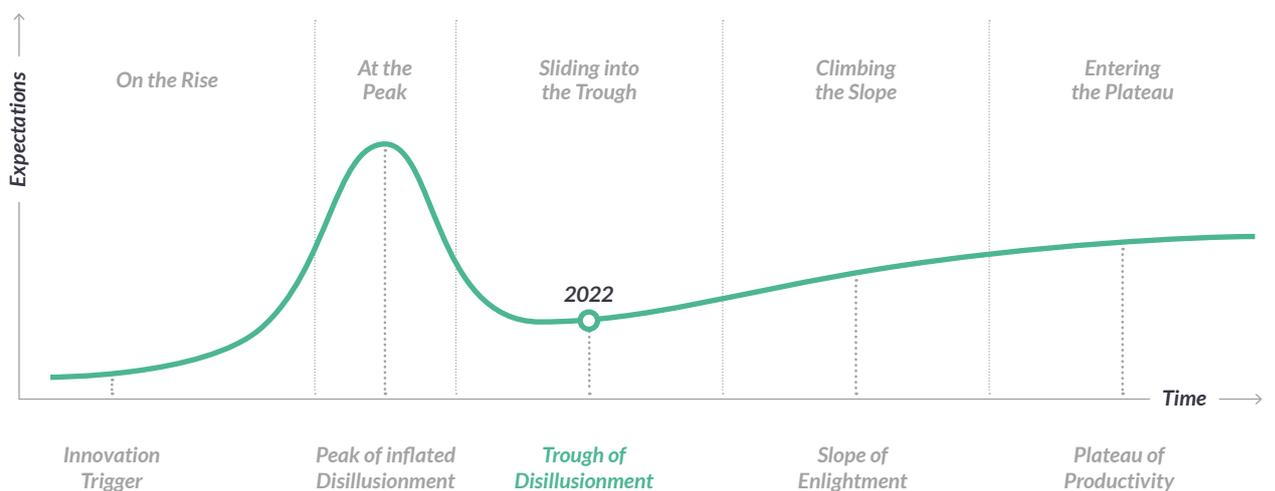
	2019	2020	2021	2022
Number of products	-	-	-	-
Global ranking	-	-	-	-

Product Database by Segment

Active products 2022 and change directions since 2021.



Gartner Hype Cycle



Product Database

This product database was created by a FIBREE working group mainly based on desktop research (see page 52). Products that were public available by 15 June 2022 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 community-platform 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.

The list below is in alphabetic order by country. The explanations for the three key-criteria can be found on the pages as in brackets. Product category and focus (page 56), entry point and growth stage (page 57).

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

Brand	Focus	City	Country	Entry point	Growth Stages	Website
Briken	Invest & Finance	Buenos Aires	Argentina	BC > RE	2	briken.com.ar
Crowdium	Invest & Finance	Buenos Aires	Argentina	BC > RE	3	crowdium.com.ar
DNL PropTech	Invest & Finance	Buenos Aires	Argentina	50/50	1	dnlproptech.io
Avestix	Invest & Finance	Brisbane	Australia	RE > BC	3	avestix.com
Darqtec	Transaction & Escrow Services	Brisbane	Australia	BC > RE	1	darqtec.com
Hutly	Markets & Platforms	Brisbane	Australia	50/50	3	hutly.com
Piptle	Invest & Finance	Brisbane	Australia	BC > RE	1	piptle.com
Proprt	Invest & Finance	Brisbane	Australia	BC > RE	2	proprt.io
EnergyStorageRights	Manage & Operate	Canberra	Australia	50/50	1	energystoragerights.com
Tokenized	Invest & Finance	Canberra	Australia	BC > RE	9	tokenized.com
Bricklet	Invest & Finance	Manly	Australia	BC > RE	9	bricklet.com.au
Benext	Transaction & Escrow Services	Melbourne	Australia	BC > RE	1	benext.io
Deedcoin	Invest & Finance	Melbourne	Australia	BC > RE	9	deedcoinlaunch.com
Deedcoin	Transaction & Escrow Services	Melbourne	Australia	BC > RE	9	deedcoin.com
Helio	Invest & Finance	Melbourne	Australia	50/50	2	heliolending.com
Liquid Token	Invest & Finance	Melbourne	Australia	BC > RE	9	liquidtoken.net
Propoty	Invest & Finance	Melbourne	Australia	BC > RE	2	propoty.com
Serenity Source	Building Technologies	Narrabeen	Australia	BC > RE	1	serenitysource.com.au
BuildSort	Plan & Build	Perth	Australia	RE > BC	2	buildsort.com
Powerledger	Building Technologies	Perth	Australia	BC > RE	3	powerledger.io
DepositMate	Invest & Finance	Pymont	Australia	RE > BC	2	depositmate.com.au
Contracoin	Markets & Platforms	Southport	Australia	BC > RE	9	contracoin.network
Fractonium	Invest & Finance	Sydney	Australia	BC > RE	9	fractonium.com
GiFang	Invest & Finance	Sydney	Australia	RE > BC	3	gifang.com
iContract Technologies	Plan & Build	Sydney	Australia	RE > BC	1	icontract.ai
Lygon	Invest & Finance	Sydney	Australia	BC > RE	3	lygon.io
Mercury Ventures	Transaction & Escrow Services	Sydney	Australia	BC > RE	2	mercury-ventures.com
Weavs	Building Technologies	Dornbirn	Austria	BC > RE	3	weavs.io
Blockchain Consultig	Building Technologies	Graz	Austria	BC > RE	9	blockchain-consulting.io
Brickwise	Invest & Finance	Graz	Austria	RE > BC	2	brickwise.at
Chris Miess	Invest & Finance	Schwaz	Austria	BC > RE	9	chrismiess.com
Black Manta Capital Partners	Invest & Finance	Vienna	Austria	BC > RE	3	blackmanta.capital
Hot City (Picapipe GmbH)	Smart City Solutions	Vienna	Austria	BC > RE	1	picapipe.com
Innou	Building Technologies	Vienna	Austria	BC > RE	3	innou.io
Obsnetwork	Building Technologies	Vienna	Austria	BC > RE	3	Obsnetwork.com
Riddle&Code	Building Technologies	Vienna	Austria	BC > RE	9	riddle&code.com
Sto & Co Blockchain GmbH	Invest & Finance	Vienna	Austria	50/50	1	stoco.io
Dexma	Manage & Operate	Antwerpen	Belgium	BC > RE	3	dexma.com
Immotokens	Invest & Finance	Gent	Belgium	50/50	2	immotokens.be
Trase	Building Technologies	Hasselt	Belgium	BC > RE	3	trase.be
Settlemint	Markets & Platforms	Leuven	Belgium	RE > BC	3	settlemint.com
Ribus	Building Technologies	-	Brazil	BC > RE	3	ribus.com.br
Toke Invest	Markets & Platforms	Curitiba	Brazil	BC > RE	3	tokeimoveis.com.br

Netspaces	Markets & Platforms	Porto Alegre	Brazil	BC > RE	3	netspaces.org
Growth Tech	Building Technologies	Rio de Janeiro	Brazil	BC > RE	3	growthtech.com.br
BlockImob	Markets & Platforms	Sao Paulo	Brazil	50/50	3	blockimob.com.br
Foxbit	Markets & Platforms	Sao Paulo	Brazil	BC > RE	3	foxbit.com.br
Insignia	Markets & Platforms	Sao Paulo	Brazil	BC > RE	3	useinsignia.com
MB Digital Assets	Markets & Platforms	Sao Paulo	Brazil	BC > RE	3	mbda.com.br
ReitBz	Invest & Finance	Sao Paulo	Brazil	BC > RE	2	reitbz.io
Tokeniza	Markets & Platforms	Sao Paulo	Brazil	BC > RE	2	tokeniza.ai
Limechain	Building Technologies	Sofia	Bulgaria	BC > RE	3	limechain.tech
RealShare	Invest & Finance	Calgary	Canada	Unknown	9	yourealshare.com
Honestdoor	Markets & Platforms	Edmonton	Canada	RE > BC	3	honestdoor.com
Chelle Coin	Invest & Finance	Mississauga	Canada	Unknown	9	chellecoin.com
GeoClique	Invest & Finance	Montreal	Canada	BC > RE	1	welcome.geoclique.com
GeoClique	Markets & Platforms	Montreal	Canada	50/50	1	welcome.geoclique.com
Bred	Building Technologies	Ontario	Canada	BC > RE	3	bredtoken.com
Bitcoin Real Estate	Markets & Platforms	Port Alberni	Canada	BC > RE	3	bitcoin-realestate.com
Acreage	Invest & Finance	Toronto	Canada	Unknown	9	acreageway.com
Arextech	Markets & Platforms	Toronto	Canada	BC > RE	3	arex.technology
CityZeen	Smart City Solutions	Toronto	Canada	50/50	2	cityzeen.co
Foho	Markets & Platforms	Toronto	Canada	RE > BC	2	letsfoho.com
Infiblocks Technologies Inc	Manage & Operate	Toronto	Canada	RE > BC	1	infiblocks.com
Metavest	Invest & Finance	Toronto	Canada	BC > RE	1	metavest.io
Nobul	Markets & Platforms	Toronto	Canada	Unknown	9	nobul.com
Tokenfunder	Invest & Finance	Toronto	Canada	BC > RE	3	tokenfunder.com
XR Web	Markets & Platforms	Toronto	Canada	BC > RE	3	xrweb.network
Atlas One	Invest & Finance	Vancouver	Canada	BC > RE	1	atlasone.ca
Coinvestion Technologies Inc.	Invest & Finance	Vancouver	Canada	BC > RE	2	coinvestion.com
International Deal Gate-way	Markets & Platforms	Vancouver	Canada	50/50	9	dealgateway.com
ProximaX	Markets & Platforms	Vancouver	Canada	Unknown	9	proximax.io
Reitium	Markets & Platforms	Vancouver	Canada	BC > RE	3	reitium.com
Zooky	Markets & Platforms	Vancouver	Canada	RE > BC	3	zooky.ca
Evareium	Invest & Finance	George Town	Cayman Islands	Unknown	9	evareium.io
Bimtrazer	Plan & Build	Santiago de Chile	Chile	BC > RE	2	bimtrazer.com
Chaintech	Markets & Platforms	Beijing	China	50/50	3	cchaintech.com
Rocktree Capital	Markets & Platforms	Beijing	China	BC > RE	3	rocktreecapital.com
Uprets	Invest & Finance	Beijing	China	Unknown	9	uprets.io
Conflux Network	Building Technologies	Changsha	China	BC > RE	3	confluxnetwork.org
VastChain	Building Technologies	Hang Zhou	China	BC > RE	3	vastchain.cn
Cybereits	Invest & Finance	Hong Kong	China	Unknown	9	cybereits.com
E-House	Transaction & Escrow Services	Shanghai	China	RE > BC	3	eju.com
EBaas	Building Technologies	Shanghai	China	BC > RE	3	ebaas.com
IHT	Markets & Platforms	Shanghai	China	BC > RE	9	ihtcoin.com

iReam	Invest & Finance	Shanghai	China	Unknown	9	iream.club
Wealthe Coin	Invest & Finance	Shanghai	China	BC > RE	3	wealthe.io
AiTerra	Invest & Finance	Bogotá	Colombia	BC > RE	2	aiterra.co
Housty	Manage & Operate	Bogotá	Colombia	RE > BC	3	housty.com.co
Laprop	Invest & Finance	Medellin	Colombia	BC > RE	2	laprop.co
Blocknify	Building Technologies	Prague	Czech Republic	BC > RE	2	blocknify.com
Brikkapp	Markets & Platforms	Prague	Czech Republic	50/50	2	Brikkapp.com
Digishares	Invest & Finance	Aalborg	Denmark	BC > RE	3	digishares.io
Suscribo	Transaction & Escrow Services	Guayas	Ecuador	BC > RE	3	suscribo.com
Rentible	Invest & Finance	-	El Salvador	BC > RE	2	rentible.io
W2B.IO	Invest & Finance	Tallinn	Estonia	Unknown	9	w2b.io
Immiris	Plan & Build	Ajaccio	France	50/50	3	immiris.com
Algae	Invest & Finance	Paris	France	50/50	1	algae-app.com
Equisafe	Markets & Platforms	Paris	France	50/50	3	equisafe.io
Immo Blockchain	Invest & Finance	Paris	France	RE > BC	1	immo-blockchain.com
Magma	Building Technologies	Paris	France	RE > BC	1	thisismagma.com
MyReals	Invest & Finance	Paris	France	BC > RE	1	myreals.io
Olarchy	Markets & Platforms	Paris	France	RE > BC	3	olarchy.com
Swınca	Invest & Finance	Paris	France	BC > RE	1	swincacoin.com
Syment	Transaction & Escrow Services	Paris	France	BC > RE	3	syment.com
The Sandbox	Invest & Finance	Paris	france	BC > RE	3	sandbox.game
Wincity	Invest & Finance	Paris	France	BC > RE	3	wincity.com
Apato	Invest & Finance	Berlin	Germany	Unknown	9	apato.company
Domi	Research & Valuate	Berlin	Germany	50/50	1	domilabs.io; domiapp.io
UBIRCH	Building Technologies	Cologne	Germany	BC > RE	3	ubirch.com
Micobo	Invest & Finance	Frankfurt am Main	Germany	BC > RE	3	micobo.com
Finexity AG	Invest & Finance	Hamburg	Germany	50/50	3	finexity.com
Fundament	Invest & Finance	Hamburg	Germany	Unknown	9	fnd.group
Datarella	Building Technologies	Munich	Germany	BC > RE	3	datarella.com
INFINITE	Manage & Operate	Munich	Germany	BC > RE	1	infinite.de
OLI Systems	Manage & Operate	Stuttgart	Germany	BC > RE	3	my-oli.com
LVE	Building Technologies	-	Greece	Unknown	9	lveblockchain.org
Realchain	Invest & Finance	Athens	Greece	Unknown	9	f6s.com/realchainp.c
LABS Group	Markets & Platforms	Hong Kong	Hong Kong	50/50	1	labsgroup.io
Liquefy	Markets & Platforms	Hong Kong	Hong Kong	50/50	1	liquefy.com
Mai blocks	Markets & Platforms	Hong Kong	Hong Kong	50/50	1	maiblocks.com
Riodefi	Building Technologies	Hong Kong	Hong Kong	BC > RE	2	riodefi.com
eHaz	Manage & Operate	Budapest	Hungary	RE > BC	3	ehaz.hu
SmartDeposit	Invest & Finance	Budapest	Hungary	BC > RE	3	smartdeposit.hu
Minddeft	Building Technologies	Ahmedabad	India	BC > RE	2	minddeft.com
Property Share	Invest & Finance	Bangalore	India	50/50	1	propertyshare.in
Reallyy	Invest & Finance	Bangalore	India	50/50	1	reallyy.app

RentUp	Invest & Finance	Bangalore	India	50/50	2	rubixapplication.com
Definite	Invest & Finance	Delhi	India	50/50	3	definite.re
PropertT	Invest & Finance	Faridabad	India	50/50	2	buypropert.investments
Land Cartels	Invest & Finance	Gurgaon	India	50/50	1	landcartels.com
Snapperfuturetech	Building Technologies	Maharashtra	India	BC > RE	1	snapperfuturetech.com
hBits	Invest & Finance	Mumbai	India	50/50	3	hbits.co
prosaes	Transaction & Escrow Services	Mumbai	India	RE > BC	3	prosaes.com
StarProp	Invest & Finance	Pune	India	50/50	3	strataprop.com
I-Pro Token	Invest & Finance	-	Indonesia	BC > RE	1	i-protoken.com
Triumland	Invest & Finance	Bitung	Indonesia	RE > BC	1	triumland.com
BidX1	Invest & Finance	Dublin	Ireland	RE > BC	3	bidx1.com
CasaCrowd	Invest & Finance	Dublin	Ireland	BC > RE	1	casacrowd.com
Geowox	Invest & Finance	Dublin	Ireland	50/50	1	geowox.com
Spry Finance	Invest & Finance	Dublin	Ireland	50/50	2	spryfinance.ie
Inveniam	Building Technologies	-	Israel	BC > RE	3	inveniam-group.com
Solidblock	Invest & Finance	Jerusalem	Israel	RE > BC	3	solidblock.co
Brikoin	Markets & Platforms	Tel Aviv	Israel	50/50	2	brikoin.com
Everflow	Invest & Finance	Tel Aviv	Israel	RE > BC	3	everflow.global
Affidaty	Building technologies	Firenze	Italy	BC > RE	2	affidaty.io
Scripta Blockchain	Building technologies	Firenze	Italy	BC > RE	3	scripta.foundation
Brickoin	Invest & Finance	Milano	Italy	50/50	1	brickoin.com
CASAVO	Markets & Platforms	Milano	Italy	RE > BC	3	casavo.com/it
HomePanda	Markets & Platforms	Milano	Italy	50/50	3	homepanda.it
Notarify	Transaction & Escrow Services	Milano	Italy	BC > RE	3	notarify.io
Realhouse	Invest & Finance	Milano	Italy	50/50	2	realhouse.io
Rechain	Plan & Build	Milano	Italy	50/50	1	rechain.it
reFrame Digital	Research & Valuate	Milano	Italy	RE > BC	3	reframedigital.it
Trusters	Invest & Finance	Milano	Italy	50/50	3	trusters.it
WIZKEY	Invest & Finance	Milano	Italy	BC > RE	2	wizkey.io
Acca	Transaction & Escrow Services	Napoli	Italy	BC > RE	3	acca.it
Ekobonus	Invest & Finance	Padova	Italy	50/50	3	ekobonus.com
Mybrix	Invest & Finance	Rome	Italy	RE > BC	2	mybrix.it
REDD	Research & Valuate	Rome	Italy	50/50	1	realestatedocumentsdata.com
RElabs	Invest & Finance	Rome	Italy	50/50	1	relabs.it
Reply S.p.A.	Transaction & Escrow Services	Torino	Italy	50/50	3	reply.com
Alyon	Invest & Finance	Verona	Italy	50/50	1	alyon.co
Liquid Realty	Invest & Finance	Tokyo	Japan	50/50	2	liquidrealty.finance
Zwei Space	Markets & Platforms	Tokyo	Japan	50/50	2	zweispace.co.jp
Land Layby	Invest & Finance	Nairobi	Kenya	50/50	1	hrbe.io
UbricoIn	Invest & Finance	Nairobi	Kenya	BC > RE	2	ubricoin.com
CROWDLITOKEN AG	Invest & Finance	Triesen	Liechtenstein	50/50	2	crowdlitoken.com
Stone coin	Invest & Finance	Triesen	Liechtenstein	50/50	2	thestonecoin.com
Eliacin	Invest & Finance	Luxembourg	Luxembourg	BC > RE	3	eliacin.lu
Estate Share	Invest & Finance	Luxembourg	Luxembourg	50/50	1	estateshare.eu
Housetoken	Invest & Finance	Luxembourg	Luxembourg	RE > BC	1	housetoken.io
Niu Group	Building Technologies	Luxembourg	Luxembourg	BC > RE	3	niugroup.lu

STOKR	Markets & Platforms	Luxembourg	Luxembourg	BC > RE	2	stokr.io
Tokeny	Building Technologies	Luxembourg	Luxembourg	BC > RE	2	tokeny.com
Scarlett invest	Invest & Finance	Penang	Malaysia	50/50	1	scarlettinvest.com
Tokenomica	Markets & Platforms	San Gwann	Malta	RE > BC	1	tokenomica.com
Kauri	Markets & Platforms	-	Marshall Islands	50/50	2	kauricrypto.com
100ladrillos	Invest & Finance	Guadalajara	Mexico	50/50	3	100ladrillos.com
Mexanova	Invest & Finance	Mexico City	Mexico	50/50	1	mexanova.com
MountX	Invest & Finance	Mexico City	Mexico	BC > RE	2	mountx.io
Ofertare	Markets & Platforms	Mexico City	Mexico	RE > BC	3	ofertare.com
Propteca	Transaction & Escrow Services	Mexico City	Mexico	BC > RE	1	propteca.com
Orange Invest	Invest & Finance	Monterrey	Mexico	BC > RE	3	orange-inv.com
Bloqen	Invest & Finance	Puebla	Mexico	50/50	1	bloqen.com
Omsmart	Plan & Build	Queretaro	Mexico	RE > BC	2	omsmart.mx
Bloqhouse	Invest & Finance	Amsterdam	Netherlands	50/50	3	bloqhouse.com
Estatex	Invest & Finance	Amsterdam	Netherlands	50/50	2	estatex.eu
LTO Network	Markets & Platforms	Amsterdam	Netherlands	BC > RE	3	ltonetwork.com
Blockmaterials	Plan & Build	Heerlen	Netherlands	RE > BC	2	blockmaterials.com
ReCheck	Markets & Platforms	Heerlen	Netherlands	BC > RE	3	recheck.io
Blandlord	Markets & Platforms	Rotterdam	Netherlands	50/50	2	blandlord.com
Blyver	Invest & Finance	Rotterdam	Netherlands	BC > RE	1	blyver.com
Max Property Group B.V.	Invest & Finance	Rotterdam	Netherlands	RE > BC	3	maxpropertygroup.com
Propchain	Invest & Finance	Rotterdam	Netherlands	RE > BC	2	propchain.com
Empowa	Invest & Finance	The Hague	Netherlands	50/50	1	empowa.io
Loek!	Markets & Platforms	The Hague	Netherlands	RE > BC	3	loekonline.nl
Fair Squares	Invest & Finance	Utrecht	Netherlands	50/50	2	fair-squares.nl
Kate Innovations	Markets & Platforms	Utrecht	Netherlands	RE > BC	3	kateinnovations.com
House Africa	Transaction & Escrow Services	Abuja	Nigeria	RE > BC	2	houseafrica.io
Justin Okpu & Co. Ltd.	Research & Valuate	Abuja	Nigeria	Unknown	9	justinokpuandco.wordpress.com
PropVat	Markets & Platforms	Abuja	Nigeria	50/50	2	propvat.com
BAM Tecnology	Building Technologies	Lagos	Nigeria	BC > RE	2	blockchainmgt.com
Ellamediate	Markets & Platforms	Lagos	Nigeria	50/50	2	ellamediate.com
Hilton top Solicitor	Transaction & Escrow Services	Lagos	Nigeria	RE > BC	3	hiltontopsolicitors.com
RedswanCRE	Invest & Finance	Lagos	Nigeria	50/50	2	redswancre.ng
Relsify	Markets & Platforms	Lagos	Nigeria	50/50	2	home.relsify.com
Cestates	Markets & Platforms	Manila	Philippines	50/50	2	cestates.io
Quickwire Inc.	Building Technologies	Manila	Philippines	BC > RE	2	qwikwire.com
FCQ Platform	Markets & Platforms	Lublin	Poland	50/50	2	fcqplatform.com
Terra Land	Markets & Platforms	Lublin	Poland	50/50	2	terraland.io
Exea Smart Space	Transaction & Escrow Services	Warsaw	Poland	50/50	3	smartspace.io
Mysa	Invest & Finance	Warsaw	Poland	50/50	2	mysa.finance

SonarHome	Markets & Platforms	Warsaw	Poland	RE > BC	3	sonarhome.pl
Pracownia Finansowa	Markets & Platforms	Warsaw	Poland	RE > BC	3	pracownia-finansowa.pl
Zome	Transaction & Escrow Services	Braga	Portugal	RE > BC	3	zome.io
Next Reality	Plan & Build	Lisbon	Portugal	50/50	3	nextreality.com
Smart Deed	Transaction & Escrow Services	Lisbon	Portugal	RE > BC	1	smartdeed.io
Unlockit	Transaction & Escrow Services	Lisbon	Portugal	BC > RE	1	unlockit.io
Fiducy	Invest & Finance	Villa Real	Portugal	RE > BC	1	fiducy.pt
In Portal	Markets & Platforms	San Juan	Puerto Rico	50/50	2	inportalusa.com
Immo-Block	Invest & Finance	Bucharest	Romania	BC > RE	1	immo-block.com
Universal Blockchain	Smart City Solutions	-	Russia	50/50	2	universablockchain.com
Waves Enterprise	Building Technologies	-	Russia	BC > RE	3	wavesenterprise.com
Avrio BC	Invest & Finance	Jeddah	Saudi Arabia	50/50	2	avrioinvest.com
Arcom KSA	Invest & Finance	Riyadh	Saudi Arabia	Unknown	1	arcom.com.sa
Quara Holding	Invest & Finance	Ryad	Saudi Arabia	50/50	1	quaraholding.com
Koolute	Transaction & Escrow Services	-	Senegal	BC > RE	1	koolute.io
BIMPROQR	Plan & Build	Singapore	Singapore	RE > BC	2	bimproqr.com
BlockCrowd	Markets & Platforms	Singapore	Singapore	50/50	1	blockcrowd.io
Chintai	Invest & Finance	Singapore	Singapore	50/50	1	chintai.io
Comm X	Markets & Platforms	Singapore	Singapore	50/50	2	commx.io
Efektimon	Invest & Finance	Singapore	Singapore	RE > BC	1	prelaunch.efktimon.com
Fraxtor	Invest & Finance	Singapore	Singapore	50/50	2	fraxtor.com
Fundplaces	Markets & Platforms	Singapore	Singapore	BC > RE	2	fundplaces.com
iatokens	Markets & Platforms	Singapore	Singapore	50/50	1	iatokens.com
Investax	Markets & Platforms	Singapore	Singapore	Unknown	9	investax.io
Real estate DOC	Markets & Platforms	Singapore	Singapore	50/50	1	realestatedoc.co
Realbox	Invest & Finance	Singapore	Singapore	50/50	3	realbox.io
SDAX	Markets & Platforms	Singapore	Singapore	RE > BC	2	sdax.co
Shareable assets	Markets & Platforms	Singapore	Singapore	RE > BC	2	shareableasset.com
Spazio NOON	Plan & Build	Singapore	Singapore	RE > BC	2	noon.sg
STIE	Building Technologies	Singapore	Singapore	RE > BC	3	stie.com.sg
TUU	Research & Valuate	Singapore	Singapore	50/50	1	tuu.eco
Twin Capital	Invest & Finance	Singapore	Singapore	BC > RE	1	twincapital.com
Zwei Space	Markets & Platforms	Singapore	Singapore	50/50	1	zweispace.co.jp
SIMMST	Building Technologies	Piestany	Slovakia	50/50	1	simmst.de
Blocksquare	Markets & Platforms	Ljubljana	Slovenia	BC > RE	3	blocksquare.io
Kasa	Markets & Platforms	Seoul	South Korea	50/50	2	kasa.co.kr
Mossland	Invest & Finance	Seoul	South Korea	BC > RE	1	moss.land
Bitprop	Invest & Finance	Cape Town	South-Africa	Unknown	9	bitprop.com

Dyvare	Markets & Platforms	Almeria	Spain	50/50	1	dyvare.com
Tokeniza	Markets & Platforms	Almeria	Spain	BC > RE	2	tokeniza.es
Omni PSI Group	Markets & Platforms	Andalusia	Spain	50/50	1	omni-psi.com
Brickken	Invest & Finance	Barcelona	Spain	50/50	1	brickken.com
Hodefy	Markets & Platforms	Barcelona	Spain	BC > RE	1	hodefy.com
TUTI.FUND	Invest & Finance	Barcelona	Spain	50/50	1	tuti.fund
Transfertrade	Building Technologies	Castellón de la Plana	Spain	BC > RE	1	transfertrade.com
Bionm	Plan & Build	Madrid	Spain	RE > BC	1	bionm.es
Housers	Invest & Finance	Madrid	Spain	RE > BC	3	housers.com
Nash21	Transaction & Escrow Services	Madrid	Spain	BC > RE	2	nash21.io
RealFund	Invest & Finance	Madrid	Spain	BC > RE	2	realfund.tech
RentalT	Transaction & Escrow Services	Madrid	Spain	50/50	9	rentalt.co
Tokeniza	Invest & Finance	Madrid	Spain	50/50	1	tokeniza.es
Deed	Markets & Platforms	Malaga	Spain	RE > BC	9	deedspain.com
Xperind	Invest & Finance	Malaga	Spain	BC > RE	1	xperind.com
Vicente Ortiz&Co	Markets & Platforms	Marbella	Spain	BC > RE	1	vicenteortizabogados.com
Domoblock	Invest & Finance	Valencia	Spain	50/50	1	domoblock.io
Unique Network	Building Technologies	Valencia	Spain	BC > RE	3	uniquenetwork.io
ChromaWay	Building Technologies	Stockholm	Sweden	50/50	2	chromaway.com
Eldorado Group	Markets & Platforms	Geneva	Switzerland	50/50	2	eldoradogroup.ch
Tokenestate	Invest & Finance	Geneva	Switzerland	Unknown	1	tokenestate.io
Swiss-Crowd	Building Technologies	Lugano	Switzerland	Unknown	1	swiss-crowd.com
Immochain	Markets & Platforms	Niederrohrdorf	Switzerland	50/50	2	immochain.net
Blockimmo	Markets & Platforms	Zug	Switzerland	Unknown	1	blockimmo.ch
BlockState	Markets & Platforms	Zug	Switzerland	Unknown	1	blockstate.com
Brickmark AG	Invest & Finance	Zug	Switzerland	Unknown	1	brickmark.net
Calanni Estate Consulting	Research & Valuate	Zug	Switzerland	50/50	3	calanni-estate.com
Consensys	Building Technologies	Zug	Switzerland	Unknown	1	consensys.net
element36	Building Technologies	Zug	Switzerland	BC > RE	3	element36.io
Idoneus	Invest & Finance	Zug	Switzerland	RE > BC	1	idoneus.io
Token Factory	Building Technologies	Zug	Switzerland	Unknown	1	tokenfactory.global
AdNovum	Building Technologies	Zurich	Switzerland	Unknown	1	adnovum.ch
Algotecture	Research & Valuate	Zurich	Switzerland	Unknown	1	algotecture.github.io
Crowdlitoken	Invest & Finance	Zurich	Switzerland	RE > BC	3	crowdlitoken.com
Sharkaroo	Building Technologies	Bangkok	Thailand	RE > BC	2	sharkaroo.io
NOON Property Management	Plan & Build	Phuket	Thailand	RE > BC	1	noon.sg
GABORAS	Markets & Platforms	Istanbul	Turkey	Unknown	9	gaboras.com.tr
Aqar Chain	Markets & Platforms	Dubai	UAE	50/50	2	aqarchain.io
Ecoworld	Markets & Platforms	Dubai	UAE	BC > RE	2	ecoworld.co
GRIP Investments	Invest & Finance	Dubai	UAE	50/50	9	grip.investments
Hitek	Building Technologies	Dubai	UAE	BC > RE	3	hitekservices.com

SmartCrowd	Markets & Platforms	Dubai	UAE	50/50	1	smartcrowd.ae
Crypto Savannah	Building Technologies	Kampala	Uganda	BC > RE	1	cryptosavannah.com
ATLANT	Markets & Platforms	-	UK	50/50	9	atlant.io
Fetch	Smart City Solutions	Cambridge	UK	BC > RE	9	fetch.ai
Bips	Invest & Finance	Cheshire	UK	BC > RE	1	bips.moneybrain.com
Building Innovation Management	Plan & Build	Farnborough	UK	BC > RE	2	buildingim.com
CurveBlock	Invest & Finance	Leeds	UK	BC > RE	2	curveblock.io
Aztec Protocol	Transaction & Escrow Services	London	UK	BC > RE	2	aztec.network
Block Estates	Markets & Platforms	London	UK	BC > RE	2	blockestates.io
Blockdeed	Invest & Finance	London	UK	Unknown	9	blockdeed.com
Brikcoin	Invest & Finance	London	UK	Unknown	9	brikcoin.net
Click to Purchase	Transaction & Escrow Services	London	UK	RE > BC	3	clicktopurchase.com
Clubb	Transaction & Escrow Services	London	UK	RE > BC	2	clubb.com
Coadjute	Manage & Operate	London	UK	BC > RE	3	coadjute.com
Dacx	Markets & Platforms	London	UK	BC > RE	9	dacx.io
ELAND ATLAS	Smart City Solutions	London	UK	BC > RE	9	elandatlas.com
eLocations	Markets & Platforms	London	UK	50/50	3	elocations.com
Helix	Markets & Platforms	London	UK	BC > RE	1	helix.world
Inferium	Invest & Finance	London	UK	BC > RE	1	inferium.co
Intelly Tech	Markets & Platforms	London	UK	50/50	2	intelly.tech
Leaseum Partners	Invest & Finance	London	UK	BC > RE	9	leaseumpartners.com
Midassium	Invest & Finance	London	UK	50/50	2	midassium.herokuapp.com
PIF-Propertyinfofile	Manage & Operate	London	UK	BC > RE	1	propertyinfofile.com
RE5Q	Manage & Operate	London	UK	RE > BC	3	re5q.com
Red Giraffe	Invest & Finance	London	UK	50/50	3	redgiraffe.com/
Resilience Parnters Ltd	Research & Valuate	London	UK	50/50	3	resilience-partners.co.uk
Singer Vielle	Markets & Platforms	London	UK	RE > BC	3	singerviellsales.com
Smartlands	Invest & Finance	London	UK	BC > RE	2	smartlands.io
Space-iz	Invest & Finance	London	UK	BC > RE	9	space-iz.com
Tag World Exchange	Invest & Finance	London	UK	BC > RE	9	twex.info
Tech Alchemy	Building Technologies	London	UK	BC > RE	3	techalchemy.co
Tokenizz	Invest & Finance	London	UK	RE > BC	2	tokenizz.com
TPX TrustMe Property Exchange (UK) Limited	Invest & Finance	London	UK	RE > BC	1	tpx-london.io
TravelBirdz	Invest & Finance	London	UK	BC > RE	1	travelbirdz.co.uk
XRed	Invest & Finance	London	UK	50/50	2	xred.co
YieldCoin / Liqquid	Invest & Finance	London	UK	BC > RE	1	yieldcoin.io
ehab	Plan & Build	Norwich	UK	50/50	9	ehab.co
Zortrex	Manage & Operate	Prestonpans	UK	BC > RE	9	zortrex.com
Filscoin	Invest & Finance	Wakefield	UK	RE > BC	2	filscoin.io
Segrwyd	Invest & Finance	Wales	UK	RE > BC	2	segrwyd.cymru
Illuminates	Building Technologies	-	Ukraine	50:50:00	3	illuminates.org
Stobox	Invest & Finance	Kyiv	Ukraine	BC > RE	9	stobox.io
Citydao	Markets & Platforms	-	USA	BC > RE	1	citydao.io
Desert Blockchain	Markets & Platforms	-	USA	BC > RE	1	desertblockchain.com
Tradesman	Plan & Build	-	USA	BC > RE	1	tradesman.live

Tykes	Invest & Finance	-	USA	BC > RE	2	tykes.io
tZERO	Invest & Finance	-	USA	50/50	2	tzero.com
Elevate Returns	Invest & Finance	Aspen	USA	RE > BC	1	elevatedreturns.com
Askcycle	Building Technologies	Atlanta	USA	BC > RE	3	gettaskcycle.com
Thread Money	Invest & Finance	Atlanta	USA	BC > RE	1	thread.money
Cerescoin	Invest & Finance	Austin	USA	50/50	3	cerescoin.io
Hudlytitle	Transaction & Escrow Services	Austin	USA	50/50	9	hudlytitle.com
OwnProp	Invest & Finance	Austin	USA	50/50	2	ownprop.com
Vertalo	Markets & Platforms	Austin	USA	50/50	3	vertalo.com
Realt	Invest & Finance	Aventura	USA	50/50	3	realt.co
Covenantz	Plan & Build	Bellevue	USA	BC > RE	9	covenantz.com
Landcoin	Invest & Finance	Beverly Hills	USA	BC > RE	2	landcoin.xyz
The Lending Coin	Invest & Finance	Boise	USA	50/50	3	thelendingcoin.com
ChosenHomes	Markets & Platforms	Boston	USA	RE > BC	1	chosenhomes.io
ReToken	Invest & Finance	Casper	USA	50/50	1	docs.ret.team
Avrads	Markets & Platforms	Cheyenne	USA	Unknown	9	avrads.io
Akru	Invest & Finance	Cincinnati	USA	50/50	3	akru.co
Smartsalere	Invest & Finance	Clearlake Park	USA	BC > RE	2	smartsalere.com
Vairt	Invest & Finance	Connecticut	USA	BC > RE	2	vairt.com
Cprop	Manage & Operate	Covington	USA	BC > RE	3	cprop.io
Houseafrica	Smart City Solutions	Daleware	USA	BC > RE	9	houseafrica.io
A Real Blockchain Solution	Invest & Finance	Dallas	USA	BC > RE	3	arealblockchainsolution.com
Casacrowd	Manage & Operate	Delaware	USA	50/50	1	casacrowd.com
Propy	Markets & Platforms	Delaware	USA	RE > BC	3	propy.com
HighTech Grounds	Building Technologies	Dallas	USA	BC > RE	3	hitechgrounds.com
Enledger	Invest & Finance	Denver	USA	BC > RE	1	Enledger.io
Mountainlife Companies	Invest & Finance	Denver	USA	50/50	9	mountainlifecompanies.com
Praator	Building Technologies	Denver	USA	BC > RE	3	praator.com
Resource Blockchain	Building Technologies	Denver	USA	BC > RE	3	resourceblockchain.io
Realto	Invest & Finance	Frisco	USA	RE > BC	3	realto.estate
Blockrails	Transaction & Escrow Services	Ft. Lauderdale	USA	50/50	2	blockrails.com
Ercinvest	Markets & Platforms	Houston	USA	50/50	2	ercinvest.com
Redswan	Invest & Finance	Houston	USA	50/50	3	redswan.io
Ardhio	Invest & Finance	Indianapolis	USA	RE > BC	1	ardhio.com
Bee Mortgage	Invest & Finance	Jacksonville	USA	50/50	9	beemortgageapp.com
Buildblock	Invest & Finance	Lewes	USA	RE > BC	1	innovasishotels.com
Cointinum	Invest & Finance	Lewis Center	USA	BC > RE	3	cointinum.io
Jointer	Invest & Finance	Los Altos	USA	50/50	2	jointer.io
Community Electricity	Smart City Solutions	Los Angeles	USA	50/50	9	communityelectricity.io
Ledgeify	Manage & Operate	Los Angeles	USA	BC > RE	1	ledgeify.com
Mony	Invest & Finance	Los Angeles	USA	50/50	2	mony.network
Socialspaces	Markets & Platforms	Los Angeles	USA	50/50	2	socialspaces.life

Solulab	Building Technologies	Los Angeles	USA	BC > RE	3	solulab.com
Superworldapp	Markets & Platforms	Los Angeles	USA	50/50	3	superworldapp.com
Yinc	Markets & Platforms	Los Angeles	USA	BC > RE	1	yinc.com
Coinhomes	Invest & Finance	Los Angeles	USA	RE > BC	2	coinhomes.com
Immobilium	Invest & Finance	Los Angeles	USA	RE > BC	2	immobilium.io
The Crypto Realty Group	Invest & Finance	Manhattan Beach	USA	50/50	3	thecryptorealtygroup.com
Reinno	Invest & Finance	Massachusetts	USA	50/50	2	reinno.io
Blokhausre	Invest & Finance	Miami	USA	RE > BC	2	blokhausre.com
Crowdcapital	Invest & Finance	Miami	USA	50/50	9	crowdcapital.io
Encrypted Estates	Invest & Finance	Miami	USA	RE > BC	2	encryptedestates.com
Lofty	Markets & Platforms	Miami	USA	50/50	2	lofty.ai
Loqu	Invest & Finance	Miami	USA	BC > RE	2	loqu.io
Piquetrealty	Transaction & Escrow Services	Miami	USA	RE > BC	3	piquetrealty.com
Realdax	Building Technologies	Miami	USA	BC > RE	3	realdax.com
E-States	Markets & Platforms	Milwaukee	USA	50/50	1	e-states.com
Relex	Invest & Finance	New Jersey	USA	50/50	3	relex.io
Blockpark	Manage & Operate	New York	USA	BC > RE	3	theblockpark.com
Certifiedtrue	Manage & Operate	New York	USA	BC > RE	1	certifiedtrue.co
Compound	Invest & Finance	New York	USA	50/50	3	getcompound.com
Compstak	Research & Valuate	New York	USA	RE > BC	3	compstak.com
Consensus	Building Technologies	New York	USA	BC > RE	3	consensus.net
Earn	Markets & Platforms	New York	USA	50/50	2	earn.re
Enbloc	Building Technologies	New York	USA	BC > RE	2	enbloc.io
Everflow	Invest & Finance	New York	USA	50/50	3	everflow.global
Frexa	Markets & Platforms	New York	USA	50/50	2	frexa.io
Homebloc	Building Technologies	New York	USA	BC > RE	3	homebloc.io
Houzlinktechnologies	Markets & Platforms	New York	USA	BC > RE	3	houzlinktechnologies.com
Koreconx	Building Technologies	New York	USA	BC > RE	3	koreconx.com
Nycrec	Invest & Finance	New York	USA	50/50	2	nycrec.io
Nystx	Markets & Platforms	New York	USA	50/50	3	nystx.com
Parcel	Markets & Platforms	New York	USA	BC > RE	2	parcel.so
Parcl	Invest & Finance	New York	USA	50/50	2	parcl.co
Praetoriangroup	Invest & Finance	New York	USA	50/50	3	praetoriangroup.io
Propellr	Manage & Operate	New York	USA	BC > RE	3	propellr.com
Propertyclub	Markets & Platforms	New York	USA	RE > BC	3	propertyclub.nyc
R3	Research & Valuate	New York	USA	BC > RE	3	r3.com
Realblocks	Invest & Finance	New York	USA	BC > RE	3	realblocks.com
Realio	Invest & Finance	New York	USA	50/50	2	realio.fund
Rebloc	Research & Valuate	New York	USA	BC > RE	2	rebloc.io
Reledger	Markets & Platforms	New York	USA	BC > RE	9	reledger.org
Resolute	Invest & Finance	New York	USA	50/50	9	resolute.fund
Risemarkets	Invest & Finance	New York	USA	50/50	9	risemarkets.io
Securitize	Invest & Finance	New York	USA	50/50	3	securitize.io
Shelterzoom	Manage & Operate	New York	USA	BC > RE	3	shelterzoom.com
Streewire	Research & Valuate	New York	USA	50/50	9	streetwire.net
Tokenproperty	Markets & Platforms	New York	USA	50/50	3	tokenproperty.netlify.com

Uprets	Invest & Finance	New York	USA	50/50	3	uprets.io
Vts	Manage & Operate	New York	USA	RE > BC	3	vts.com
Weaver	Invest & Finance	New York	USA	Unknown	9	weaver-iq.com
Quantmre	Invest & Finance	Newport Beach	USA	RE > BC	2	quantmre.com
We Property Owners	Markets & Platforms	Newport Beach	USA	RE > BC	2	wepropertyowners.com
BDS Invest	Invest & Finance	Norcross	USA	50/50	1	bigbds.io
Libertyfund	Invest & Finance	Oak Brook	USA	50/50	3	libertyfund.io
BlocRealtyGroup	Markets & Platforms	Orlando	USA	RE > BC	2	blocrealtygroup.com
FLT Communities	Markets & Platforms	Orlando	USA	50/50	2	fltcommunities.com
Rentivity	Markets & Platforms	Orlando	USA	RE > BC	3	rentivity.com
Blockchain CRE	Building Technologies	Palo Alto	USA	BC > RE	2	blockchaincre.io
Fintechworld	Markets & Platforms	Palo Alto	USA	50/50	3	fintechworld.com
Questcrypto	Invest & Finance	Park City	USA	50/50	2	questcrypto.com
Houserinvestments	Invest & Finance	Philadelphia	USA	50/50	2	housersinvestments.com
Blockcities	Markets & Platforms	Pleasant Grove	USA	BC > RE	1	Blockcities.com
Monopoly On-Chain	Markets & Platforms	Potomac	USA	50/50	1	monopolyonchain.com
Deedlock	Building Technologies	Rochester	USA	BC > RE	3	deedlock.com
Vblock	Transaction & Escrow Services	Rochester	USA	50/50	9	vblock.us
Realium	Invest & Finance	Saltlake City	USA	RE > BC	2	realium.io
Liquid Acre	Invest & Finance	San Angelo	USA	50/50	2	liquidacre.com
Yoonify	Invest & Finance	San Diego	USA	50/50	3	yoonyfy.io
Fabrica	Transaction & Escrow Services	San Francisco	USA	Unknown	2	fabrica.land
Klaviss	Transaction & Escrow Services	San Francisco	USA	BC > RE	1	klaviss.com
Tellustitle	Manage & Operate	San Francisco	USA	BC > RE	2	tellustitle.com
Brightvine	Invest & Finance	San Francisco	USA	50/50	1	brightvine.com
Figure	Invest & Finance	San Francisco	USA	50/50	3	figure.com
Harbor	Invest & Finance	San Francisco	USA	BC > RE	3	harbor.com
Reconsortia	Manage & Operate	San Francisco	USA	BC > RE	9	reconsortia.com
Reposit	Invest & Finance	San Francisco	USA	50/50	2	reposit.com
Zeehaus	Invest & Finance	San Francisco	USA	50/50	3	zeehaus.com
BEI.RE	Research & Valuate	San Jose	USA	BC > RE	3	bei.re
Innovasishotels	Invest & Finance	San Jose	USA	BC > RE	3	buildblock.ioen
Portfolio Token	Invest & Finance	San Jose	USA	50/50	2	portfoliotoken.io
Realto Apps	Markets & Platforms	Santa Clara	USA	RE > BC	3	realtoapps.com
Vestaequity	Invest & Finance	Sarasota	USA	RE > BC	2	vestaequity.com
Trurealty	Transaction & Escrow Services	Scottsdale	USA	RE > BC	3	trurealty.com
Abstract	Invest & Finance	Seattle	USA	50/50	3	abstracttokenization.com
Concreit	Invest & Finance	Seattle	USA	50/50	3	concreit.com
Socratic Consultancy	Manage & Operate	Seattle	USA	Unknown	3	socraticconsultancy.com
Terra-Chain	Manage & Operate	Seattle	USA	BC > RE	1	terra-chain.io
SQF Coin	Invest & Finance	Sheridan	USA	50/50	1	sqfcoin.com
Astonmorley	Transaction & Escrow Services	South-Lake Tahoe (Ca)	USA	RE > BC	3	astonmorley.com
Realnex	Markets & Platforms	Stafford	USA	RE > BC	3	realnex.com
Zweispac	Plan & Build	Sunnyvale	USA	RE > BC	3	en.zweispac.co.jp
Agentscomefirst	Transaction & Escrow Services	Toledo	USA	Unknown	9	agentscomefirst.com
Silicon Title	Transaction & Escrow Services	Vero Beach	USA	50/50	3	silicontitle.com

Realtrade	Markets & Platforms	West Palm Beach (FL)	USA	RE > BC	3	realtrade.io
Fundingtree	Markets & Platforms	Westlake Village	USA	50/50	3	fundingtree.com
Konectcity	Building Technologies	Westlake Village	USA	BC > RE	3	konectcity.com
Colonyhills Capital	Invest & Finance	Wilbraham	USA	RE > BC	3	colonyhillscapital.com
Equitycoin	Invest & Finance	Wilmington	USA	50/50	1	equitycoin.org
Ubitquity	Manage & Operate	Wilmington	USA	BC > RE	3	ubitquity.io

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„The partnership with FIBREE offers us excellent opportunities to engage with the real estate blockchain scene in a global network,” says Dr. Susanne Hugel, Head of Digital Innovation & Business Acceleration CE at CBRE. „It is great to see how well established FIBREE has become since its foundation in 2018 by constantly sharing knowledge and insights on blockchain applications for real estate.” CBRE, a Fortune 500 and S&P 500 company, is the world’s largest commercial real estate services and investment firm (based on 2020 revenue). CBRE has more than 100,000 professionals serving a diverse range of clients with an integrated suite of services in more than 100 countries.

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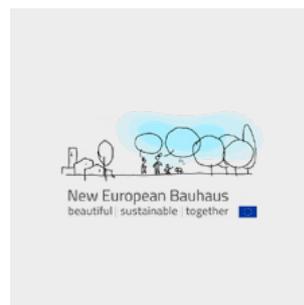
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FIBREE Executive Board

Based on the steady growth of the network we clearly stated that even more we want to connect people and organizations globally who share a common interest in 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

Since founding FIBREE four years ago not only our network is growing, but our day to day challenges. We therefore decided to enlarge the board seats and being more diverse in sense of gender, location and expertise. 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 best data about blockchain and real estate in each local network.

With this year's introduction of the FIBREE community-platform we created a foundation for all stakeholders to find easy access to and to exchange knowledge between experts in the field of blockchain and real estate. We act as facilitator bringing together cooperates with industry players on specific topics and lower the entry barrier for companies or individuals in applying innovative solutions.

Furthermore we have developed the FIBREE consultancy service and for the first time we are initiating the start of ongoing FIBREE research into Real Estate Tokenization Projects, to match the competencies of the international FIBREE network with the many inquiries we receive from the real estate industry.



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