

Encouraging private investment in real estate through crowdfunding and blockchain

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SUMMARY

The UNECE policy framework for sustainable real estate markets in 2010 agreed upon to develop a framework for promoting sustainable real estate markets as well as improving financing in the sector. One of the key observations as causes of economic crisis in 2008 by the Round table discussion at UN was - real estate bubble were allowed to inflate, mortgage lending was inadequately supervised and the financial markets were allowed to develop complex financial instruments. Unclear regulatory framework in the financial and real estate sector could become a potential cause for economic crisis.

This research work deals with the rationale for sustainable financing in real estate markets. The policy framework of UNECE identifies that credit policies directly influence real estate market dynamics in the sense that real estate assets form the collateral on which mortgages and loans are allocated. Competitive and affordable mortgage rates with easier repayment installments are increasingly an essential for young couples and first-home family buyers. It provides access to private ownership or partial ownership for a growing number of citizens, would contribute to solving housing problems in the long run.

While approximately 95% of the world's businesses are Small to Medium-sized Enterprises (SMEs), as many as half of them cannot get the financing they need – a credit gap estimated at over \$2 trillion across over 200 million businesses. Many facets of today's markets and marketplaces are likely to be impacted by large-scale adoption of blockchain technology, creating many new avenues for value creation. Focusing on a few key applications areas for institutional players and SMEs, impact from blockchain technology can range from increasing global access to finance, creating new transaction types and reimagining existing exchange and structural models. It is in this context this research work presents the importance of crowdfunding in bridging the credit gap. Alternative forms of funding based on crowdfunding and micro credit will be analysed and should be promoted, first and foremost in economies in transition.

According to the World Economic Forum's survey on technology tipping points, 58% of respondents expect that by the year 2025, 10% of global GDP will be stored blockchain variations, up from about 0.008% in March 2016. So it is in this context this paper draws an

overview of the relevance of financial technology like blockchain and crowdfunding in filling the credit gaps for a sustainable financing in real estate projects.

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1. INTRODUCTION

The global real estate market is over \$237 trillion and has been dominated by wealthy investors that are familiar with concept of buying, owning and letting property. Retail investors are most of the times discouraged to invest due to high transaction costs, restrictive regulatory regime, ongoing operating costs and in most of the times lack of adequate alternative financing models.

Alternative Finance includes various new on-line platforms that act as intermediaries between retail investors and borrowers/fundraisers. Alternative Finance activities include peer-to-peer lending, peer-to-business lending, invoice trading and financing, community shares, crowdfunding, debt based securities etc. In UK it is observed that the fastest growing markets with in alternative financing are the secure lending of the real estate mortgages and developments. “The average business loan amount for real estate markets is considerable higher at £662, 425 with an average loan term of 10 months.” (Zhang, Bryan et al, 2014)

2. SCOPE OF THIS RESEARCH

The research question - Can alternative financing models lead to sustainable financing in real estate markets has gained significance since economic crisis. Our research methodology is weaved around the UNECE policy framework that can lead to sustainable real estate markets. Post economic crisis in 2008, UNECE policy framework for sustainable real estate markets was published in 2010 as necessary principles to be followed to avoid another crisis in real estate markets. This research is built on the UNECE policy framework principles that are relevant to sustainable financing in current real estate market conditions.

The real estate markets in 2016 has changed over the past 8 years in many ways as compared to the market situation during the economic crisis in 2008. So there may be a need to review the principles of UNECE policy framework for a more sustainable real estate markets. In the scope of this research work only few principles of UNECE policy framework are analysed within the perspective of understanding the importance of alternative financing to encourage private investment in the real estate. The significance to uphold principles 4,6,7 of UNECE policy framework is the basis for this research work.

UNECE policy framework’s Principle 4 is the first and foremost principle of framework that identified the relevance of sustainable real estate market for socio economic development.

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The emphasis is about development of the real estate sector (and related jobs), real estate financing (mortgages), management and land administration for contribution to a country's socio economic development.

UNECE policy framework's Principle 6 is about sustainable financing which mentions that access to credit and mortgages as well as microfinance for low income earners are essential elements of a healthy real estate markets. It is in this context this research work explores role of fin-tech like crowdfunding as one of the means of sustainable financing for small and medium enterprises in real estate markets and or smart cities. Crowdfunding provides for objective and reliable periodical monitoring of real estate price trends (i.e. of sales and rental/leasing).

UNECE policy framework's Principle 7 advocates the transparency and appropriate valuation of real estate assets used as collateral for advanced financial products can produce social and economic benefits and reduce the probability of future crisis. The lack of transparency in the assessment of the value and the risk of investments in real estate assets, especially when it has been used to back financial products, appears to be one of the causes for a financial crisis. There should be adequate transparency, research, publicity and monitoring of the criteria for financing real estate transactions, especially when real estate assets are used to back securitizations and/or advanced financial products.

It is in this context this research work explores role of fin-tech like blockchain technology along with crowdfunding to power alternative financing models in-order to increase the funding in real estate in a sustainable way.

Transparency of registrations and information on data of all different real estate transactions (sales and rental/leasing) will be ensured. The more a market is open and transparent (and also accessible to foreign buyers), the more numerous the opportunities exist to have a functioning real estate market and realistic selling prices. Banks and other financial institutions, real estate appraisers and risk evaluations can be conducted by independent experts and be transparent and public to the investors.

With regards to innovation and integration, the UN is supporting other development organizations to build new skills and service lines. For example UNDP staff working on innovative initiatives has developed a new generation of skills to support provision of high-demand and new development solutions to its clients: from behavioral insights, big and open data, design thinking, and crowdfunding to real-time monitoring, crowdsourcing, open innovation challenge prizes, innovation labs and impact investment. In the Maldives, the Make My Island the citizen crowdsourcing initiative has attracted pro-bono technical expertise from the UK-based Fix My Street platform, helping improve response from local councils to municipal service delivery issues. The ability to obtain financing is much more likely in a real estate transaction compared with many other startup industries (crowd mason, 2013).

3. FLOW OF FUNDS FOR SUSTAINABLE DEVELOPMENT

The Report of the UN’s Intergovernmental Committee of Experts on Sustainable Development Financing “The additional financing for infrastructure (including energy) is more broadly estimated at between 5 and 7 trillion dollars annually. From Figure 1, While global savings—at around US\$22 trillion a year—would be sufficient to meet these needs, resources are currently not allocated adequately. The policy framework in the Figure 2 illustrates that national public and private, international public and private sources for financing the needs of sustainable development.

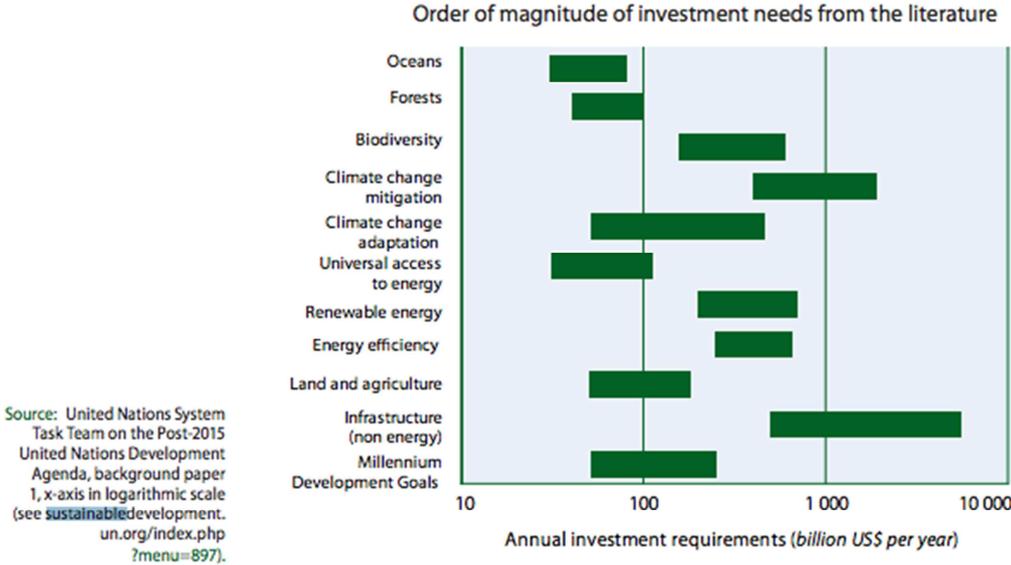


Figure 1: Requirement of investments for various agenda sectors in the future (Source: UN report, 2014)

The challenge for policymakers lies in facilitating greater investment of disperse financing flows into areas of global need, and in improving the quality of present policies, approaches and instruments, addressing inefficient and harmful subsidies, corruption, tax evasion, illicit financial outflows, and inaction particularly in the environmental sector, where its costs often exceed the costs of corrective measures. “Achieving this will not be easy: it will take a transformative change to the way financing is done, in both public and private spheres” (UN report, 2014). In this context alternative financing models in real estate are relevant.



Figure

2: International and National financing sources for sustainable financing. (Source: UN report, 2014)

4. CROWDFUNDING FOR REDUCING CREDIT GAP OF SMALL AND MEDIUM BUSINESS.

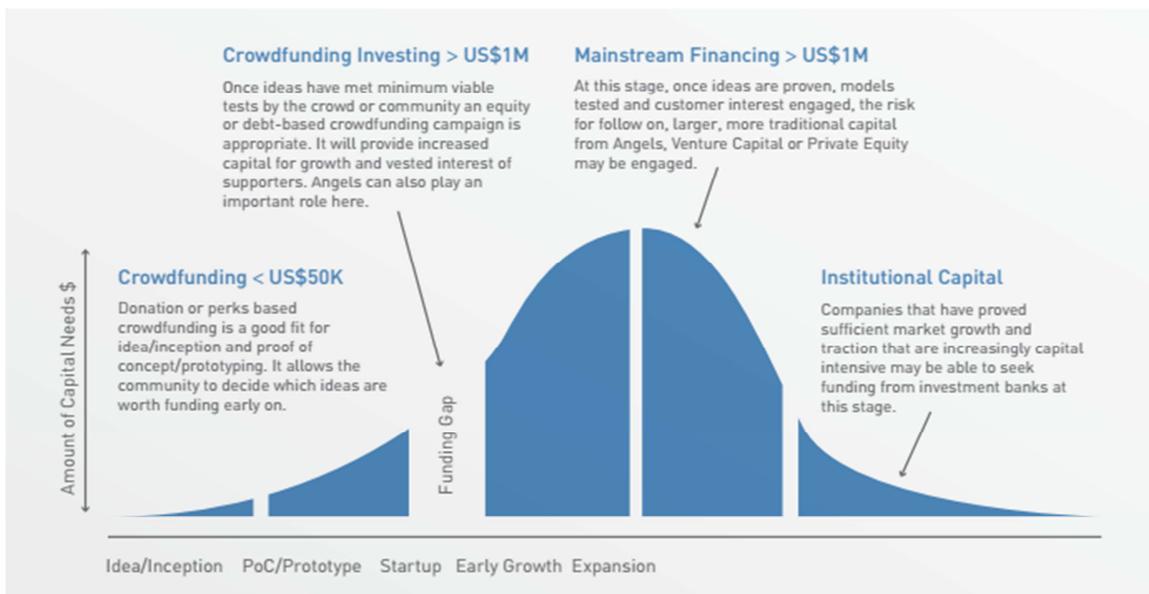


Figure 3: “Funding Gap” Source (Capital Crowd fund advisors, 2013)

Based on the world bank report titled “crowdfunding potential for the developing world”, the range of the capital requirement is also known as the funding gap as shown in figure 3 and is the requirement for debt crowdfunding.

“crowdfunding is an internet-enabled way for businesses or other organizations to raise money in the form of either donations or investments from multiple individuals. This new form of capital formation emerged in the wake of the 2008 financial crisis largely because of the difficulties faced by artisans, entrepreneurs and early-stage enterprises in raising funds. crowdfunding takes advantage of crowd-based decision-making and innovation, and applies it to the funding of projects or businesses. Using social networks, social profiles and web-based communication, individuals and companies have raised billions of dollars in debt, equity and donations for projects” (Best et al, 2013)

The total crowdfunding market is composed of various subtypes, including lending (debt), equity, and royalty-based models, as well as non-securitized types, such as charitable donations and rewards crowdfunding. Over the past few years, lending crowdfunding has been the fastest growing type in the \$35 billion market of crowdfunding in 2015.

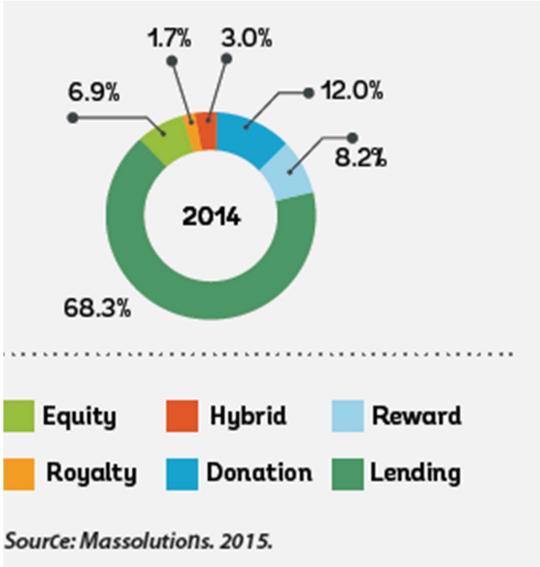


Figure 4: Share of crowdfunding subtypes.

5. CROWDFUNDING TRENDS

5.1 Crowdfunding in East vs West

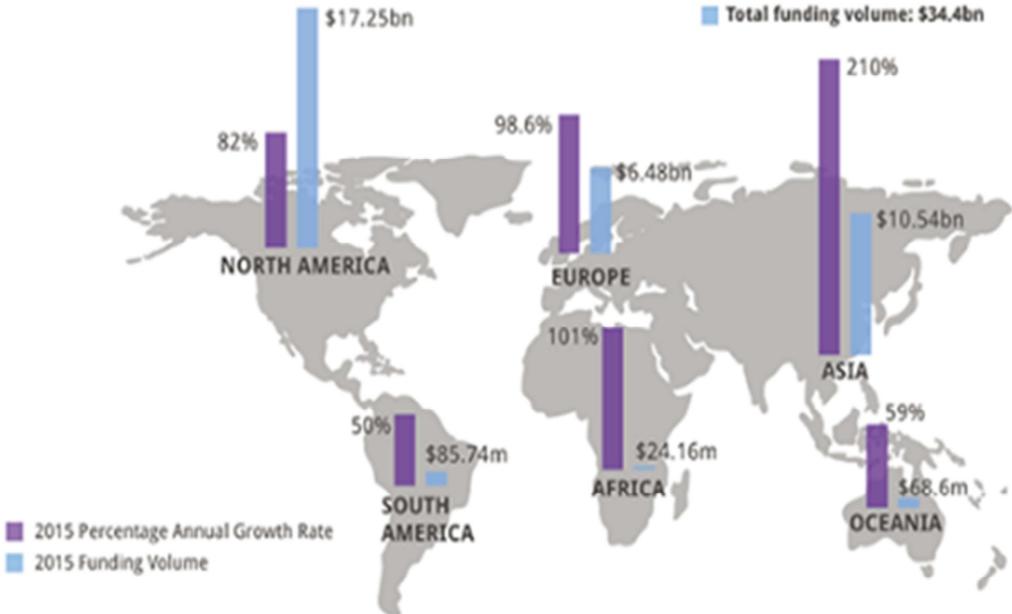
In comparison, crowdfunding in places like the United States has been around for a longer time. While the United States relaxed regulations on investment-based crowdfunding in 2012 (via the JOBS Act), rewards- based sites like Kickstarter and Indiegogo have been around since the late 2000s. (Goh, 2014). Getty Goh, CEO of Coassets summarized the comparison of different crowdfunding platforms in Asia. Table 1: Platforms from the different countries, focus sector and selected crowdfunding types are presented in Appendix 1, Table 1.

Unlike the U.S. and Europe where crowdfunding has grown into a massive industry that provides funding for a variety of “SPPICE” (Service, Product, Project, Investment, Cause and Experience), it is yet to gain a ton of traction in Asia (Drake, 2015). It’s observed that there is an increased need for regulations in equity crowdfunding arena in Asia. In May 2015, Japan

passed a regulation to legalize the crowdfunding in the country. Sites typically collect a fee of around 5% of total funding of projects, both in the west and Asia. The percentage of the website users that actually fund the project also referred to as conversion rate is 2% and it is considered as slightly less in Asia.

Some observations about crowdfunding in real estate in US are

- Real estate crowdfunding: with over 125 real estate crowdfunding sites in US, \$ 484M investments pledged in 2015 via these crowdfunding sites.
- Increase in each user’s utility with the increase in the number of other users of this online platform or of projects is also called as network effect. Double network effect exists in crowdfunding as both investor side and real estate project side gets improved funding as number of users increase in both sides. Only 1 in 5 of these sites pass the basic criteria of transparency, low fees, active project listings, venture capital backing, etc. and so survival is tough according to Ippolito.
- Despite the consolidation, < 1 billion USD investments via these crowdfunding sites which < 0.1% of total real estate market in US and also less than largest general crowdfunding platform like Kickstarter with domination in each top real estate local markets for example, Prodigy Network will continue to dominate Manhattan real estate market.



Growth by crowdfunding region prediction for 2015 in millions of USD (research based estimate)

Figure 5: Growth by crowdfunding region (Source: Massolution, 2015)

5.2 Crowdfunding in Asia

Crowdfunding 2016 could easily top \$60 billion and surpass traditional form of finance. The World Bank estimates that crowdfunding will reach \$90 billion by 2020, a level that could be seen by 2017 if annual growth continues. (Joseph, 2015)

Crowdfunding has developed more slowly in China where the China Securities Regulatory Commission started regulating equity financing platforms. Regulations are relatively tight for equity crowdfunding because investors required to hold net assets of RMB 10 million (\$1.55 million) or income over RMB 500,000 a year. Despite strict regulations, the World Bank estimates that crowdfunding in China could reach \$50 billion by 2025.

Because of tighter investing requirements, crowdfunding has taken off more as a means of product innovation and development than for investment. China's version of Amazon, Alibaba, launched by Yu Le Bao in 2014 as an online platform is offering access to investment in TV and movie projects. This year saw the first regional Asian platform with CrowdPlus.Asia, based in Malaysia and operating in Thailand, Vietnam, Hong Kong and China. The platform is a partnership of Netrove Ventures Group, a regional tech VC firm, and Propellar Corporation, an equity crowdfunding operator. All national platforms are expected to be running by early 2016 (Liang, 2015)

5.3 Total Funding volume

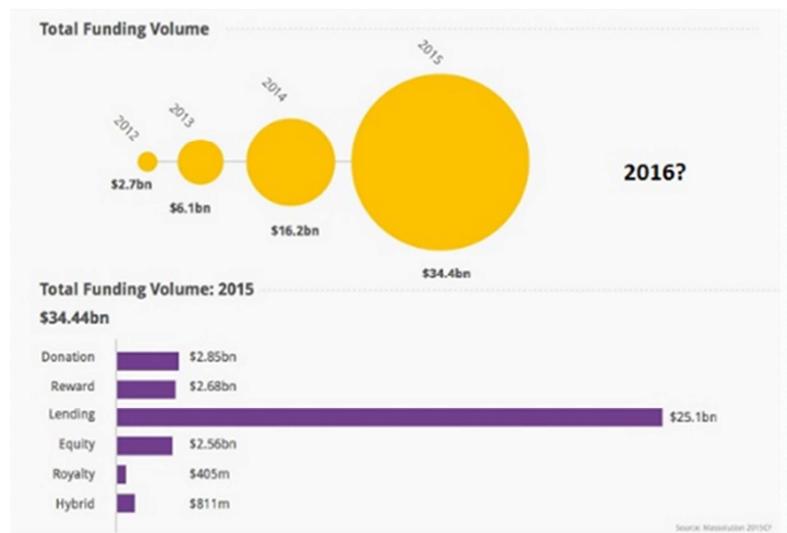


Figure 6: Total funding volumes since 2012 (Source: Houghe, 2015).

Figure 6 illustrates the trends of the total funding volumes in different subtypes of crowdfunding. Users of crowdfunding expressed confidence on crowdfunding as demonstrated by increase in the total funding volume over time. The users of the crowdfunding platforms are users that are individuals and also Small and medium businesses.

It can be claimed that the users even though first time in investing through web platforms using “Power of crowd” has shown considerable promise and trust during the use of this funding vehicles.

As a test case shown in the Figure 7, many crowdfunding companies like company - Coassets in Asia had an increasing user base which is seen as sustainable user base like for Kick starter and Indie gogo even in real estate. The use of Fintech products like crowdfunding to bridge the credit gap in addition to acting as a tool for sustainable financing in real estate can be linked to World Bank estimates.

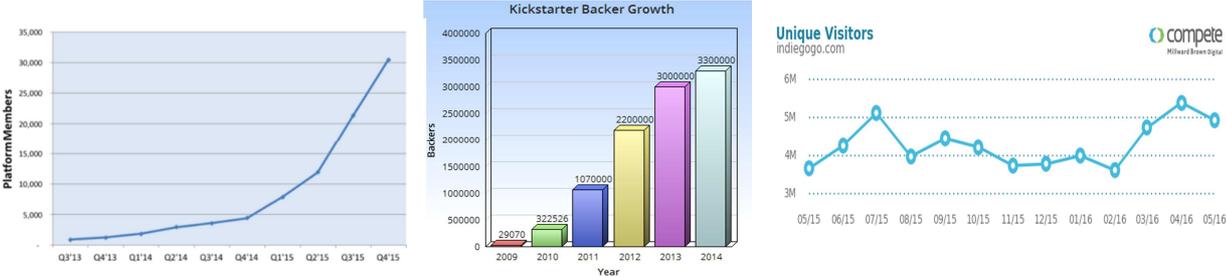


Figure 7: User growth in crowdfunding companies like Coassets, Indegogo, Kickstarter.

6. CROWDFUNDING IN REAL ESTATE

6.1 Has crowdfunding taken off?

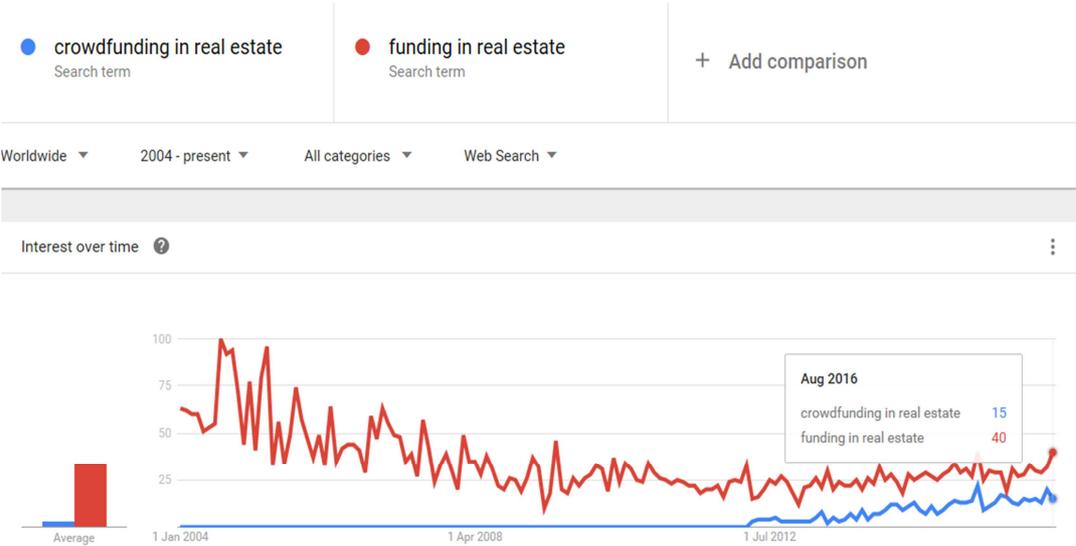


Figure 8: Comparison of interest trends for “Crowdfunding vs funding in real estate” (google trends) As shown in Figure 8, the comparison to traditional funding and crowdfunding in real estate across the globe shows evidence that the trend of crowdfunding in real estate has been increasing. A decreasing trend of investments in Real estate was seen during the financial crisis and it can be understood as extremely relevant in 2016 to understand the augmented support crowdfunding has created to improve investments in real estate.

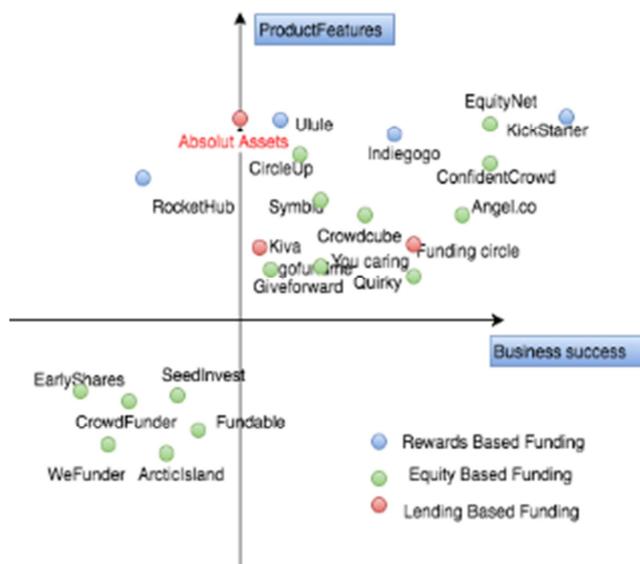


Figure 9: Growth in Real estate Crowdfunding International platforms

Figure 9 shows the market analysis of crowdfunding platforms in real estate, it can be understood that crowdfunding did act as a supplementary source of funding to real estate even during times of economic austerity and technology suspicion expressed by many experts. There are so many players in the crowdfunding arena as indicated above and their product features and business success can already been seen in by many companies – Kickstarter, Indiegogo being the prominent players. The market analysis of over 100 players has been presented in the Appendix II.

6.2 Crowdfunding vs Traditional investments in Real estate

Table 1. crowdfunding vs traditional investments in real estate

	Low minimum investment	Low transaction costs	Ability to easily diversify	Transparent investment	Control of investment	Direct Project Exposure	Known return on investment	Market volatility
Directly held real estate				✓	✓	✓		
REIT	✓	✓	✓	✓				✓
Real estate Crowdfunding	✓	✓	✓	✓	✓	✓	✓	

The comparison of the characteristics of the crowdfunding as against the directly held real estate and REIT are as shown in above Table.

Property crowdfunding is one of the fastest growing segments. Even before the idea of came up crowdfunding, individuals were already pooling their funds together and co-investing in properties. Hence, to many people, especially Asians who are avid property investors, real estate crowdfunding and real estate co-investing are essentially the same thing. However, one of the main contrasts between the two is the distribution channel. Real estate co-investing typically involves people within one’s immediate network, while real estate crowdfunding leverages on the Internet to aggregate like-minded individuals from different parts of the

world to provide financial support for projects they believe in (Goh et al 2014). The development of AKA United Nations, an east side building repositioned as an extended stay condominium, is being financed through crowd funding by Partners Prodigy Network and Korman Communities (Ostrowski, 2015).

6.3 Risks for crowdfunding in Real estate

Not all markets provide favorable conditions for real estate crowdfunding using blockchain. The feasibility of these platforms depends a lot on the transparency and regulations. So the crowdfunding sometimes may not be able to fill credit gaps and hence requires friendly regulations to make them consider to be causing sustainable financing in real estate markets. According to a circular from the Hong Kong Securities Commission, some of the potential risks of crowdfunding include (1) risks of default of the investment project or business, (2) risks of illiquidity, (3) risks of platform failure from temporary or permanent shutdown, (4) risks of fraud arising from the anonymity created by online aspect of crowdfunding, (5) risks arising from platform that operates in different jurisdiction.

6.4 SWOT for crowdfunding in Real estate

Table 2 : SWOT for crowdfunding in real estate

<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> ● Capital availability ● Increased investor engagement ● Usually cheaper transaction costs ● Possible strong investment returns ● Possible to monitor investments online ● Ancillary revenues 	<p style="text-align: center;"><u>Weakness</u></p> <ul style="list-style-type: none"> ● Lack of secondary market ● Risks are high ● Possibility for bubbles in the market
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> ● New investment locations ● Possibility of secondary market ● Possible applications and currencies are high and additional businesses 	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> ● Regulatory scrutiny ● Incumbents like banks always can dominate the new startups ● New lending institutions may monopolize the sector

As an example of threats for crowdfunding due to fintech regulation, we looked at the singapore’s regulatory view of crowdfunding. In terms of monetary regulation, even though real estate investment is not under the Monetary Authority of Singapore’s (MAS) ambit, the collection of public funds is under strict guidelines that have to be followed. As a result of these regulations, a possible way for some of these crowdfunding businesses to operate in Singapore, without having to change their business model, is to start as a real estate private equity fund. Starting up a real estate private equity funds in place of crowdfunding business would lead to higher risk and hence making it a not so popular choice of alternative financing.

The UNECE policy framework - Principle 2 has identified that the prerequisite for granting of real estate as guarantee and key element for access to mortgage loans and finances is the identification and protection of property rights by efficient land register and cadaster. As SWOT of crowdfunding identified the weakness of crowdfunding as lack of secondary market. In this context the relevance of blockchain in crowdfunding is relevant. Fintech like blockchain when used in real estate has the potential to counter the risks posed by traditional crowdfunding sites during funding to real estate. Crowdfunding over the blockchain enables ordinary people to access investment opportunities that they would have been illiquid and not feasible to acquire. The exciting feature of crowdfunding with cryptocurrency (powered through blockchain) is that allows the investor to trade their investment immediately on the trading platform thereby creating the secondary market.

7. **EVOLUTION OF DISRUPTIVE TECHNOLOGIES LIKE BLOCKCHAIN**

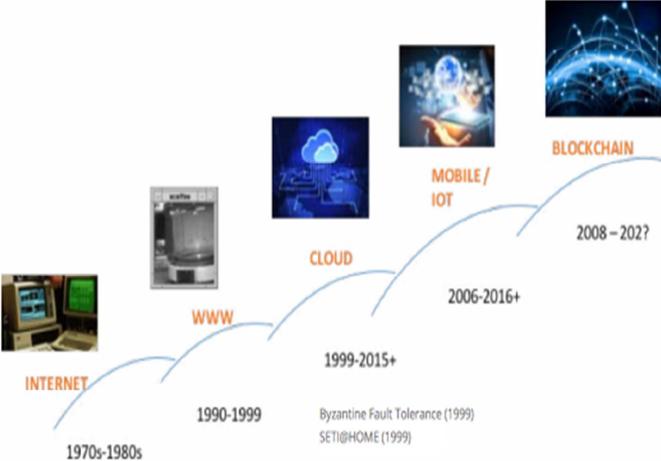


Figure 10:

Blockchain since 2008 - fifth horizon in the evolution of networked innovation

As shown in Figure 10, the evolution of networked innovation, the 1970s and 1980s saw the development of the Internet, the “first horizon” in our paradigm. Beginning in 1990, Sir Tim Berners-Lee and others promoted the creation of intuitive navigation and cross connection of information, making possible the “second horizon” of the World Wide Web. While “cloud computing” had its origins in other technologies, we argue that the formation of Salesforce.com in 1999 marked a key milestone in its evolution into the “third horizon” of networked innovation.

A notable publication around Byzantine Fault Tolerance (critical to the theoretical underpinnings of blockchain), and the launch of projects like SETI@Home (which anticipates the distributed nodes of blockchain), also were produced in 1999. With decreasing bandwidth costs and increasing ubiquity of smartphones and smart devices, we trace the “fourth horizon” to the launch of mobile broadband services in 2006. This brings us to the blockchain, with Satoshi’s October 2008 paper launching the “fifth horizon” (Schrier et al, 2016).

Blockchain is a distributed database with an open ledger. Broadly, this means data isn't stored on a single computer but rather on many different computers (known as "nodes") in a peer-to-peer network. This represents a radical paradigm shift in financial services. The reason blockchain is called a "chain" is that there is an initial block, called a genesis block, to start the chain and later to crypto coins. The cryptocurrency is based on collaborative open source principles and peer-to-peer networks that suggest a commitment to social solidarity and mutual aid. When you want to perform a transaction such as to sell a cryptocurrency to another person :

- The blockchain software puts out a call for the nodes in the distributed network to perform a calculation to create a "hash" which is a complex calculation.
- The act of choosing a random number, whose hash results in the desired value with respect to a target chain value, is referred to as "mining".
- The new block links back to the previous block, in this case the genesis block, creating a "chain". As each new block is mined, the chain lengthens.
- The calculation conducted presents what is known as "proof of work". This serves to validate adding blocks to the chain, and allows for defense against bad actors by having the entire network create the system of trust, versus needing to trust each party (or node) on the network.

About every ten minutes or so mining computers collect a few hundred pending crypto coin transactions (a "block") and turn them into a mathematical puzzle. The first miner to find the solution announces it to others on the network. The other miners then check whether the sender of the funds has the right to spend the money, and whether the solution to the puzzle is correct. If enough of them grant their approval, the block is cryptographically added to the ledger and the miners move on to the next set of transactions (hence the term "blockchain").

The issues of block chain are as much about technology and business model development as it is about regulation and industry dynamics. 2015 was about gaining attention for the technology. 2016 will be about rapid and widespread experimentation with this new technology.

8. BLOCKCHAIN IN REAL ESTATE

8.1 Has blockchain in real estate taken off?

Figure 11 shows the evolution of the members registered in the international blockchain real estate association. It shows a significant hockey-stick growth trajectory. A transaction, such as a typical non-cash payment, can be distilled into elements: Originator, Funding, Instrument, Usage, Processing, Receiver, Confirmation and Settlement. There are several possible paths for adoption of blockchain, which are not mutually exclusive but might potentially become mutually reinforcing over time. New ventures explore both foundational components (other kinds of smart assets) and experimentation into challenge areas (e.g property rights in countries with weak rule of law; remittance of funds across borders or currencies).



Figure 11: Growth of registration of International blockchain real estate association

8.1 Framework for blockchain in real estate using crypto coins

The Framework for implementation of the blockchain in real estate is as shown in Figure 12 has been developed in this research work. This framework was derived by collation of several traditional steps involved in real estate management by property agencies in Asia and US. Assets would be issued directly into the blockchain ledger. When transactions take place to buy or sell it would simply involve entries being matched in a peer to peer method, with clear ownership based on identifying or in the case of a broker someone with clear permission acting on someone else’s behalf. This collapses many layers of intermediaries and the complexity required under the current system.

The Swedish Land Registry, ChromaWay, Kairos Future and Telia Company investigate Smart Contracts and Blockchain for the process of selling a house. Framework presented in this research work as shown in Figure 12 is similar to the model developed by Chromaway. In the case of real estate agreements, contracts could be verified and enforced automatically without the need for human interaction, reducing the need for agents, lenders, inspectors and title insurance providers. In the current trend of real estate crowdfunding using blockchain, a series of smart contracts could be deployed to maintain records of the amount, time and conditions of investments, and source of funds. The currency of the transaction is cryptocurrency.

The crypto coin system—like the normal bank payments system—is intended to move monetary tokens between people through the changing of account entries on databases, but it has two immediate differences.

- The database that is used to record payments between people is public, rather than the privately held account databases of the normal banking system.
- The intermediaries that change the database are a decentralized network of people (“miners”) running special crypto coin software, rather than banks running their own private software systems.

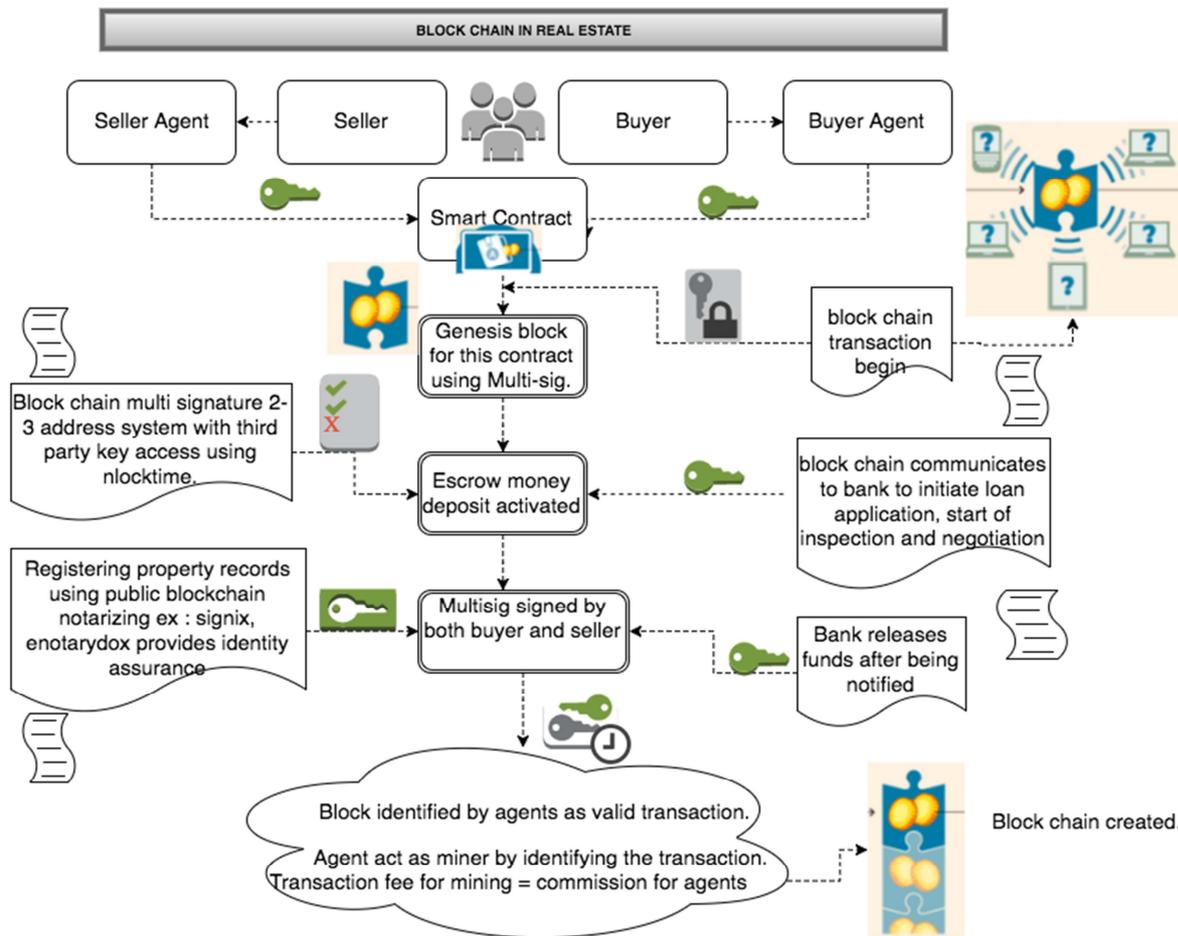


Figure 12: Blockchain in Real estate (during sale)

So according to UN research institute of Social development - the crypto coin system is “ at its most simple, consists of a widely distributed, and highly visible, public ledger (or database)—colloquially referred to as the blockchain—that people can use to record transactions of digital tokens between themselves. The database thus keeps score of their tokens on the system in a highly public and transparent way”

In order to implement the smart contract to enable distributed consensus, get the nodes to create a distributed consensus to through transaction fee or mining fee. If the number of transactions increases, the problem for the blockchain would be keep up with the transaction so that it can accommodate all the transactions efficiently.

Smart contracts can also be used to aggregate inputs from various “oracles” and serve as a progress monitor for a real estate transaction. An oracle is a third party that is trusted by the participants in the blockchain. It can be something like a known API or another blockchain. An oracle could track the progress of the assembling of the various executed documents necessary to create a legally enforceable real estate transaction (Barrington, 2015)

Notaries using deployed blockchain technology have digital identities and signatures issued by and used with third party assurance; they will retain both the user experience and evidence that maps a particular person to a title. “The SIGNiX SaaS delivery model for digital signatures and identities, which is based on central management of each consumer’s private keys, meets the minimum criteria for third party issuance, validation and assurance of secure on-demand remote identity verification and authentication” (Reiniger, 2016). It meets the requirement of “appears in person” or “appears before” is legally met for the context of signing a document through the use of third party assurance by means of an online notarization using live two-way audio/video conferencing. The notary’s electronic journal has ability for state-sanctioned audit trail to prove a signer’s identity and intent, to provide document’s authenticity, to denote each usage of the notary’s official electronic seal that is electronic document tamper-evident. Technology like blockchain in connection with the notary’s seal and trust marks in general would supplement proof of document integrity by enabling proof of document originality.

Blockchain enables use of multisignature address feature to create a 2-of-3 address, with signing parties being tenant or buyer, landlord and trusted third party that has the keys with access globally. Once the address is created, the tenant funds the address. All parties can verify on the public blockchain, within 10 minutes, that the funding has occurred and within about an hour the landlord can be confident that the funds will be there at the end of the term. During the contractual duration, the landlord cannot misappropriate funds, as it takes two signers to move funds out of the account. At the end of the lease, the tenant creates a transaction transferring the entire deposit to another tenant-owned address. The tenant sends the transaction to the landlord for signing. If the property is damaged the landlord can send a counter transaction and ask the tenant to sign. The landlord and tenant can then negotiate among themselves. If they cannot reach agreement, they can get the third party signer involved (Morgan, 2015).

9. NEW TECHNOLOGICAL OPPORTUNITIES AND REVENUE

Crowdfunding businesses with blockchain creates revenue by 4 separate revenue streams:

- Charging opportunity providers with administration fees
- Through conferences, tradeshows, talk’s consultancy and courses.
- With advertising and marketing through the various channels
- Leveraging private blockchain technology and cryptocurrency

Other revenue streams exclusively through private blockchain and cryptocurrency -

- Mining and Node Security services
- Content based fee structure
- Utility value of cryptocurrencies and exchange services
- Consultancy services
- Setting up your own cryptocurrency website to generate a passive income
- Mini earnings by doing tasks
- Writing literacy blogs about crypto coins

- Selling products and services that accept crypto coin as payment
- Mining
- Investing on cryptocurrency (ex: Current market cap of Bitcoin is \$10,328,792,561 and is increasing)
- Lending- Loan some crypto coins, earn some interest

10. ISO STANDARDS FOR DATA PROTECTION:

Machine-mediated digital identities may pose challenges during use of blockchain technology: A digital identity credential can be used to access a system without any action or knowledge of the attributed individual. There is a lack of direct evidence establishing click or use of a digital identity credential. In addition relying party/recipient cannot determine the authorized the use of the digital identity by the sending party.

In a global survey conducted by ISACA in 129 countries, only 38 % of respondents felt they were prepared for a cyber-attack – even though 83 % believed they are among the top three threats facing organizations today. With so much personal and sensitive information being handled electronically, there is a lot at stake if it were to be compromised. In today's complex business environment there is the challenge of protecting company secret and critical information. Hacker's attacks and threat of losing information is becoming a challenge to entrepreneurs and corporates. Users of big data and blockchain are more likely concerned about saving and protecting their information since big data contain more structure and links and meaning than simple data or simple information sources.

The ISO 27000 family of standards helps organizations keep information assets secure. Using this family of standards will help your organization manage the security of assets such as financial information, intellectual property, employee details or information entrusted to you by third parties.

- Information Operations (IO) are actions taken to affect adversary information and information systems while defending one's own information and information systems in blockchain. ISO/IEC 27001/2 is the best-known standard in the family providing requirements for an information security management system (ISMS).
- The seventh data protection principle within the 1998 Data Protection Act calls organizations to use "appropriate" technical measures to safeguard personal information and to have regard for "the state of technological development". The seventh data protection principle within the 1998 Data Protection Act identifies the security obligation for controllers of personal data.
- Protecting information in the cloud (ISO/IEC 27017)

It is evidently witnessed through various researches and conducting reviews that data protect is most critical and essential subject to any organization involved in data management or data practicing either SME or corporate enterprises. ISO 27001 is the right tool to put your process

in place to protect your data and provide a level of security while dealing vigorously in such a critical industry.

11. ARE BLOCKCHAIN AND CROWDFUNDING CAUSING SUSTAINABLE FINANCING IN REAL ESTATE?

As elucidated in the working paper 2016 of UNRISD - crypto coins can be applied within the **context of international development, financial inclusion and bottom-of-the-pyramid business efforts**. A number of narratives about why it may be empowering for people in less developed countries has emerged. This includes (Scott, 2016):

- Bitcoin as a means to facilitate low-cost remittances for those seeking to transfer small amounts of money internationally
- Bitcoin as a means for an otherwise excluded individual to have a decentralized global bank account, accessible simply by downloading an open source wallet from the internet, rather than having to set up with a formal financial institution
- Bitcoin—or the technology that underpins it—subsequently providing the basis for a richer set of financial services.

This research work only moots crowdfunding backed by crypto currency as an alternative financing in supplement to traditional financing. It may be taken note of the additional finances which have been raised to real estate due to crowdfunding and also cryptocurrency. So it is understood that the traditional financing alongside to alternate financing with the possibility to have financial inclusion could lead to sustainable financing in real estate.

“The hardest sum to raise is between the S\$500,000 and S\$2 million mark, because it is too big for friends and families to chip in, but too small to get banks interested in” (Goh, 2015). Incidentally this is the credit gap that lot of SME’s face too. Hence it is observed in Asia that the crowdfunding platforms - for example Coassets the south Asia’s only listed crowdfunding platform in Australian stock exchange - have provided sustainable finances to private real estate. Crowdfunding with blockchain technology has been used as a website for developers to raise bridge loan or short-term working capital at a maximum amount of S\$5 million per deal.

Although this research doesn’t claim that cryptocurrencies are the panacea to financial inclusion and thereby to sustainable financing: vision of projects like “Faircoin, on the other hand, is to build large-scale networks of solidarity-based collaboration using technology. It is in potentially enabling such “collaboration at scale” that cryptocurrency technology begins to look like a force for radical economic alternatives” (Scott, 2016)

12. CONCLUSIONS AND FURTHER RESEARCH

An empirical relation between use of technology and filling the credit gaps for a sustainable financing in real estate projects is dependent on the regulations across the globe. The ability to

get investors, project operators, and social media links at one place. The property industry is now fully au fait with syndication and REITs and the concept of collectively investing in large and diversified portfolios of commercial real estate across different geographies and jurisdictions. However, the likelihood is that technology will alter current models and streamline investment processes over the next few years with accredited investors increasingly evaluating the merits of investing in particular funds or schemes via highly supportive data rooms and websites in the first instance and making their actual investment via transparent crowdfunding type platforms.

Over the last few years, technology has eliminated middlemen and increased efficiencies in a plethora of different industries and it has the potential to do likewise in the real estate industry. Real estate crowdfunding has seen exponential growth over the last few years and is likely to continue to grow over the course of the next few years, particularly as the regulatory framework becomes more developed in many jurisdictions (Hunt, 2015). It is the scale and reach that makes real estate crowdfunding different and, if correctly executed, a potent force that could significantly disrupt the status quo. Despite regulatory uncertainties real estate crowdfunding is booming in Asia (Chaing, 2015).

This paper has drawn an overview of the relevance of financial technology in filling the credit gaps for a sustainable financing in real estate projects by augmenting the traditional financing modes for real estate. The key dynamics within crypto currency and technology that may be of interest to sustainable financing in real estate is still prone towards the elitist, tech-centric outlook of disruptive technology start-up culture. It is reckoned that one blockchain does not fit all.

So further research in this would be to explore the extent to which crypto currency as a currency system could interact in the future with blockchain 2.0 smart-contract technology to create sustainable financial schemes independent of normal financial institutional funding method for better real estate management. Will added risk management mechanisms like crowdfunding insurance to safeguard the investor's interest lead to sustainable financing in real estate?

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APPENDIX 1:

Table 3: platforms from the different countries focus sector and selected crowdfunding types

Country	Hong Kong	Singapore	Singapore	Singapore	Sweden	United States	United States	United States
Companies	Crowdfunder	CoAssets	Crowdfunder	Crowdfunder	Funderby	Kickstarter	Indiegogo	Realty Mogul
Founded	Mar 2013	May 2013	May 2014	Jan 2013	Apr 2011	Apr 2009	Jan 2007	Mar 2013
Approximate age as at Sep 2014	1 year 6 months	1 year 4 months	4 months	1 year 8 months	3 years 5 months	5 years 5 months	7 years 8 months	1 year 6 months
Focus sector	Real Estate	Real Estate	Creative projects - Arts, books, films and technology	Asian small- and medium-sized enterprises seeking funding	European start-ups seeking funding	Creative projects	Idea, Start-up or Charity	Real Estate
Types of Crowdfunding	Equity	Debt and equity	Reward	Reward	Debt, Equity and reward	Reward	Reward	Equity
Funds collected via the site	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Fees as shown on the site	5% (4% set up fee + addition 1% fee per project year to cover incidentals)	3% to 5% (Derived from advertising and listing fees)	4% (Derived from funds raised)	6.5% to 9.5% (derived from funders raised and amount depends on whether the project meets funding target)	12% (6% admin fees + 6% commission from funds raised)	5% (Derived from funds raised)	4% to 9% (derived from funders raised and amount depends on whether the project meets funding target)	Data not available
Alexa ranking (as at 15 Sep 2014)	792,002	88,394	283,810	1,191,538	158,917	542	1,485	115,086
Amount pledged on an annual basis	US\$3million ¹	S\$10mil ² (Based on equity)	Data not available	S\$29.412 ³	€6,313,976 ⁴	US\$99.3mil ⁵	Data not available	US\$14.6mil ⁶ (Based on equity)
Number of members	Data not available	3,400	Data not available	Data not available	39,985	30.6million visitors	Data not available	6,000 ⁶
Number of projects listed	Data not available	46 ⁷	13 ⁷	49 ⁷	750 ⁸	27,086 ⁵ (For 2011)	Data not available	51 ⁷
Percentage of successful projects	Data not available	35%	Data not available	12% ⁵	Data not available	44% ⁸	34% ⁸	Data not available
Average investment per funder	Data not available	More than S\$50,000	Data not available	S\$115 ⁹	€1,500 ⁴	US\$160 ¹⁰	US\$90 ¹¹	Data not available
User conversion % (from viewer)	Data not available	2.47%	Data not available	Data not available	Data not available	2.39% ¹²	2.17% ¹²	Data not available

Source: (Goh, 2014)

Appendix II: Table 4. Market analysis of real estate crowdfunding platforms.

Rank	Name	Venture capital funding	Minimum investment	Bankruptcy Protection	New investment emails*	Legal entity created per investment or single for all	Sample Date	Open Investments	Nonspecific properties/funds	Specific properties/properties	Equity	Debt	Commercial	Residential	Cooling off period	Notes	
2	RealCrowd.com	\$1.6M	\$25K-\$50K	n/a	n/a	n/a	28-07-2015	8	5	3	8	0	8	0	No	According to this, it seems to imply that they have direct collateral: http://www.ccm.com/circle-magazine/articles/323787/2015/03/commercial-real-estate-crowdfunding	
2	RealtyMogul.com	\$80M	\$5K-\$50K	No, not set	13 Per investment.	Per investment.	28-07-2015	1	0	1	0	1	0	1	Yes		
2	RealtyShares.com	\$10M	\$1K, \$3K, \$5	Yes and in/d	19 Per investment.	Per investment.	14-06-2015	6	2	4	3	2	4	4	Yes		
5	AcquireRealEstate.com	\$6M	\$2.5K	No	1 Per investment.	Per investment.	03-08-2015	4	0	4	0	0	0	4	Yes		
6	LendingHome.com	\$110M	\$5K, but \$3K	Yes	Delaware trust is single for all	Single for all	17-06-2016	18	0	18	0	18	0	18	No	High loan-to-value ratios: all of them over 65%	
6	Roofstock.com	\$13.25M	\$5K	N/A	because investor owns the property themselves	Per investment	13-06-2016	40	0	40	0	0	0	40	No	Buy the entire property	
8	ParchoLand.com	\$23.6M	\$5K	Yes	There n/a. Email	Single for all.	For various	28-07-2015	2	0	2	0	1	1	No		
Contenders: no venture funding for does, but has an offsetting (negative). Has some other strong point.																	
9	FundThatFlip.com	\$2M	\$5K	?	Single for all.	Single for all.	10/10/2015	12-10-2015	3	0	3	0	3	0	3	No	
10	1031CrowdFunding.com	Not disclosed	\$25K	n/a	n/a	Per investment.		4	0	4	4	0	4	0	No	May be able to resell investments. "Yes. In the PPM the beneficial interest can be transferred to a qualified investor with the approval of the issuer."	
11	CrowdStreet.com	\$4.85 M	\$10k	n/a	2 n/a	n/a	07-08-2016	11	6	5	10	1	11	0	No		
12	CityFund.com	No.	\$10K	?	1	Single for all.	16-06-2015	2	0	2	1	1	2	0			
13	EquiShares.com	No	\$5K-\$250K	?	2?	?	30-07-2015	5	3	2	5	0	3	2	No		
Up-and-coming: no venture funding for does, but has an offsetting (negative), meets all minimum requirements																	
14	EquityMultiple.com	No.			Yes	Each of our deals Per investment	25-03-2016	3	0	3	1	2	3	0	No	Will eventually be traded on their secondary market: CFX in the fall.	
15	PeerRealty.com	No	\$5K	Yes	There	Per investment.	14-06-2015	2	0	2	2	0	2	0	No		
16	DiversifyFund.com	No	\$10K	Yes	Investors vote to off	more than 10 investors.	30-07-2015	5	0	5	5	0	5	0	No		
17	CrowdFunder.com	No	\$5K	n/a	1 n/a	n/a	28-07-2015	2	1	1	2	0	2	0	No		
18	GroundBreaker.co	No	\$5K	?	2?	?	30-07-2015	3	0	3	1	2	2	1	No		
19	ProdigyNetwork.co	No	\$20K	?	?	?	18-06-2015	1	0	1	1	0	1	0	No		
20	FullCapitalStack.com	No	\$25K	Yes	after a	Per investment.	28-07-2015	1	0	1	1	0	0	1			
21	CartonCrowdfund.com	No	\$250,000	"We don't have those	per investment	Per investment	13-06-2016	7	0	7	6	1	7	0			
22	SharesStates.com	No	1k	"- Yes. In the event that	Per investment: series LLC	Per investment: series LLC	13-06-2016	5	0	5	0	5	2	3			
23	TripleNetZeroDebt.com	No	1k	Kind of yes. If market	Per investment.	"We have	21-06-2016	3	0	3	2	1	3	0	No		
24	Money860.com	No	Follow-up	Follow-up	Per investment.	Per investment.	04-08-2015	1	0	1	0	1	1	0			
The Challenged																	
25	Fundrise.com	\$35M	\$5K	?	6	Per investment.	28-07-2015	6	0	6	4	2	6	0	Yes	Change business model late 2015. No individual investments. Just effects with mammoth fees, investor dilution, and in our opinion, questionable marketing.	
25	Funding.co	\$4m	\$10K	Yes	Compa	1	Per investment.	30-07-2015	1	0	1	1	0	1	Yes		

KEY
 ? = Waiting for response from company.
 Green = Positive feature
 Red = Negative feature
 *: Tally of emails received in month
 Disclaimer: All non-data, including rankings, summaries of investor interviews, and site impressions are based on consultation and so may have subjective bias.

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Disclaimer: This paper is the result of the analysis carried out by the four authors and in anyway doesn't represent the works of the corporate companies that they are currently working for.