A Survey on Blockchain and Online Land Registration

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Abstract— Blockchain is a database of gatherings exchanges that are connected to the past gathering of exchanges and is recreated and dispersed in the system so all copies of the blocks are distributed to everybody who takes an interest in database and are indistinguishable. Some blockchains, (for example, open blockchains) work as decentralized frameworks. Members in the system oversee and concur by agreement on the updates to the records. A problem was identified in this survey that classical land registration method is outdated and complicated. It takes a lot of time and efforts if you want to change any information on papers or to transfer registry to another owner. This problem can be overcome with the idea represented in this paper about online land registration using blockchain technology. We identified in our survey that how well people are aware and interested in blockchain and its process for online land registration. We analysed the collected data of 54 students and professionals from various fields and domains and concluded that the people are more comfortable in using online platforms for buying as the online trend has risen in the past years and people tend to keep all of their data online as it provides security as well as prevents the hassle of losing important documents. This survey mainly focuses on how to other countries are trying to use blockchain in different aspects as well as land registration we have shed some light on that and also mentioned advantages of using blockchain in land registration and future of this technology.

Index Terms— Blockchain, Decentralized Blockchain, Centralized Blockchain, Land Registration, Cryptocurrency, Real Estate, Distributed Ledger

1 Introduction

The 31st of October 2008, the white paper "Bitcoin – A Peer-to-Peer Electronic Cash System" by Satoshi Nakamoto (2008) was flowed among an email rundown of cryptographers [1]. The depicted framework Bitcoin was propelled as a sophisticated assistance on the third of January 2009. Bitcoin was the primary framework to incorporate the Blockchain information stockpiling structure and has filled in as the reason for all Blockchain executions to follow in spaces as wide going as the vitality segment, supply chains and coordination's, the music business, and the human services part.

2 What Is Blockchain?

Blockchain is a decentralized dispersed record innovation. It permits creation, approval and scrambled exchange of computerized resources for occur and get recorded in a morally sound manner. At its heart, it is a database of gatherings of exchanges that are connected to the past gathering of exchanges (the chain) and is recreated and dispersed in the system so all copies of the blocks to everybody who takes an interest in database are indistinguishable. Blockchain records each exchange that ever occurs, and no records are ever erased.

A Comprehensive Introduction, each chain begins with a unique, or beginning, block, trailed by a period requested group of blocks. Blocks are chained together cryptographically utilizing hashes, which are 256-piece arbitrary numbers computationally produced from input data. This structure a long, consistent chain of hashes – thus the name blockchain. As shown in Figure 1 the owner has a public and private key. A digital token is generated along with digital signature and requires owner private key to verify the authenticity of transaction.

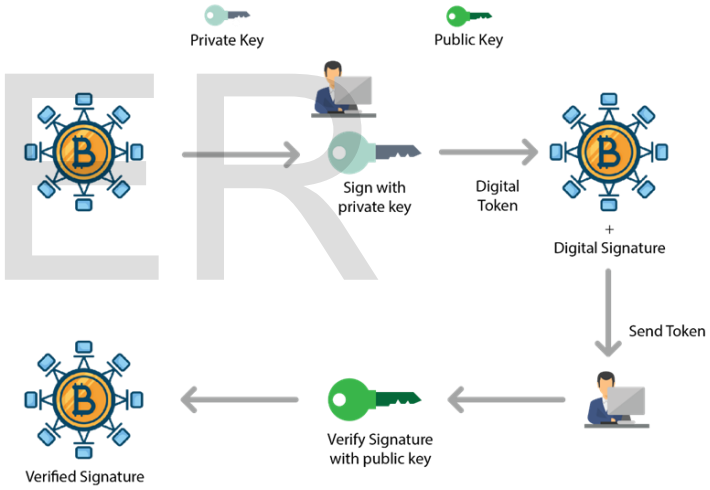

Figure 1. How blockchain works

2.1 Decentralized Blockchain

In addition to being appropriated, some blockchains, (for example, public blockchains) work as decentralized frameworks – that seems to be, their hubs don't work heavily influenced by an incorporated server or centralized server, however in a completely free, yet organized, way.

These blockchains may likewise to be portrayed by decentralized administration; as it were, they may not work under the proper authority of a solitary individual or association, despite the fact that gatherings of people or associations may use casual command over their activity, as noted in "The Bitcoin blockchain as Financial Market Infrastructure: A Consideration of Operational Risk [2]. Instances of these kinds of blockchains incorporate Bitcoin and Ethereum.

Open blockchains are those that any member may utilize and get to as in figure 2. They are frequently consent less; members

do not require extraordinary approval or verification to read, compose, and take an interest in exchanges.

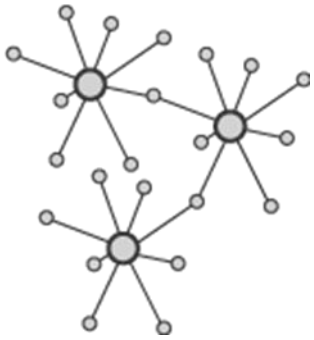

Figure 2. Decentralized Blockchain

2.2 Centralized Blockchain

Permissioned blockchains, then again, are ones in which hubs must have a part personality, and members must have authority and verification to get them. In Figure 3 we can see that these are frequently private blockchains, implied distinctly for the utilization of individuals from a common record – a solitary record that various members may access and use. Permissioned blockchains have enrolment benefits that deal with the character, security, classification, and auditability inside the framework.

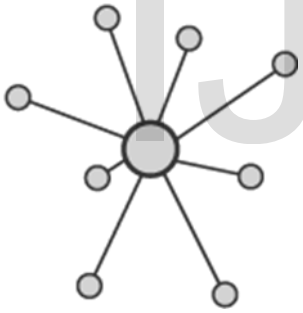

Figure 3. Centralized Blockchain

2.3 Distributed Ledger

A distributed record is a sort of database that is shared, reproduced, and synchronized among the individuals from a system. The conveyed record records the exchanges for example, the trading of benefits or information, among the members in the system shown in Figure 4.

Members in the system, administer and concur by agreement on the updates to the records in the ledger. [3] No focal, outsider middle person, for example, a money related organization or clearinghouse, is included.

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Each record in the circulated record has a timestamp and remarkable cryptographic mark, consequently making the record an auditable history of all exchanges in the system.

To put it plainly, blockchain can be portrayed as a system of PCs, each having an indistinguishable duplicate of the database (conveyed) and changing its state (records) by regular understanding based on pure mathematics, with no requirement for any focal server or operator to endow. As shown in Figure 4.

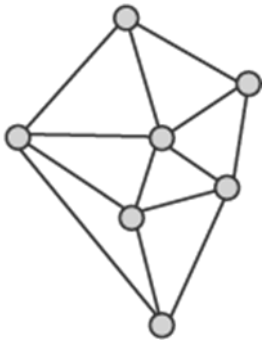

Figure 4. Distributed Blockchain

2.4 Blockchain Transaction

The essential thought behind the Blockchain Technology is that it permits on-screen characters in a framework (called hubs) to execute computerized resources utilizing a Peer to Peer arrangement that stores these exchanges in an appropriate manner over the system. The holder of property and the exchange the possession and are enrolled on the record utilizing open key cryptography and advanced marks. Figure 5 explains a complete transaction of blockchain where each block is processed and approved by the network nodes in the system by validating the transactions. Then node receives a reward for the proof of validation and then block is added to existing chain and a transaction is completed.

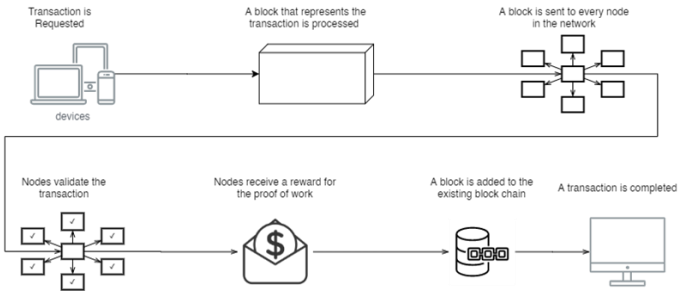

Figure 5. Blockchain Transactions Process

Every node in this decentralized system has a copy of the blockchain which is continuously synchronized with the other copies. In this way there may be no centralized point of vulnerability that computer hackers can exploit. Bringing one node down will not prompt a breakdown of the chain of blocks. This regular Peer to Peer structure contributes to the security in addition to the immutability of the transactions which might be recorded with in the blockchain. In addition,

the disbursed consensus protocol (which can have several forms together with majority vote casting, priority balloting or having a minimal variety of votes) ensures the facts integrity of the transactions.

However, this doesn't suggest that the blockchain is unalterable. The controlling events that installation the blockchain (ranging from residents to public or private organizations) can determine to adjust the records of a blockchain important hack.

The dispersed idea of blockchain guarantees that controlling and changing information without having agreement gets more diligently, which brings better data trustworthiness, complete uprightness can never be ensured.

2.5 Blockchain Transaction

Bitcoin and different cryptocurrencies counting on blockchain technology may be disruptive however blockchain is of far broader application. While Bitcoin is a cryptocurrency making sure transparency and duty of economic transactions, blockchain technology may be implemented to many different kinds of transactions to clear up the issues inherent in any transaction.

Generally, blockchain innovation can be utilized in a distributed system of gatherings, who all take an interest in a given exchange. The innovation utilizes a conveyed record that is obvious to all gatherings associated with the exchange. Through an agreement system, the record is destined to be steady. Since the record is circulated, everybody included can see the "world state" anytime and can screen the advancement of the exchange.

By its very nature, blockchain can handle the accompanying business issues:

• Trust – Using blockchain, all the gatherings associated with an exchange just need to trust the blockchain without a requirement for a focal middle person.

• Transparency – Since the record is conveyed, all peers associated with the exchange system can see it subject to security rights (see "permissioned" blockchain underneath).

• Accountability – Since all gatherings in the exchange can see the dispersed record, everybody can concur on how the exchange is advancing while it is continuous, and how it went once it is finished.

The first Bitcoin blockchain suggested completely open and consent less access to the system by any agreeable partaker. Right now, primary advantage of decentralization is acknowledged to the most elevated degree [4]. Completely open and straightforward blockchain-based databases may not be perfect with the prerequisites and information security confinements of the open division. All things considered, a permissioned/private or consortium/half and half kind of blockchain may offer an increasingly reasonable arrangement. On account of limited access to the blockchain, it is imperative to accomplish the minimum amount of the hubs or clients on the system not to bargain the fundamental advantage of the innovation, decentralization and to forestall plot and wipe out the danger of altering.

2.6 Real-Life Applications of Blockchain-Based Solutions

Sweden:

Swedish land vault, Landmateriet, is testing private blockchain to enrol land and properties [4]. The authority accepts that innovation empowers unwavering quality of computerized firsts of testaments, decreases exchange costs and has predominant assurance against hacking. On 8 October 2017, Dubai Land Department has declared that it is presently the world's first official government office to receive the blockchain innovation to its operations. This is the principal genuine usage of the innovation inside the structure of the Dubai Blockchain Strategy that plans to do every open assistance exchange on blockchain arrange by 2020.

China:

The world's economic leader China has recently announced its plans to 'utilize technology for social taxation and electronic issuance matters [4].

China is likewise the principal nation on the planet to test a national bank supported national digital money, which is as of now being tried with regards to intra-bank transactions. The Monetary Authority of Singapore (MAS) is creating blockchain-supported repayment framework that expects to streamline cross-outskirt repayment exchanges between the banks. Different advancements in monetary circle incorporate the Santiago Stock Exchange in Chile 'fuse a blockchain-based protections loaning solution.

Transportation goliath Maersk in a joint effort with IBM are building up the blockchain-based answer for production network the board and documentation trade between shippers, cargo forwarders, sea bearers, ports and customs specialists. Comparative activities are being directed by Korean Customs Service.

Estonia:

In 2007 has encountered an across the country cyber-attack, has now changed into the worldwide pioneer in the field of cyber security, which assumed a basic job in headway of the nation's eGovernment achievement however giving a safe non-corruptible blockchain-based electronic individual personality key. [4]

Finland:

Finland is the home of the Futurize, a blockchain application that permits representatives to record and get paid for their additional time [4]. Despite the fact that the application doesn't associate with the income administration by denying and sending assessment of the pay, the potential outcomes of utilizing blockchain as expense specialist are genuinely considered, for instance to record data legitimately from the QR codes imprinted in the receipts.

2.7 Areas Where Blockchain Can Make A Difference

Digital Voting:

Blockchain innovation can offer an increasingly bottom-top and participatory social structure by giving a financially savvy and secure e-casting a ballot framework.

Supply Chain Management:
The report additionally noticed that blockchains are particularly useful for circumstances where it is imperative to know possession narratives, for example, overseeing supply chains. Blockchain innovation can improve supply chains by offering foundation for confirming, enlisting and following merchandise and enterprises as they move along the inventory network. Tokens can exceptionally recognize merchandise on the blockchain, with every exchange time stepped in a straightforward way.

Public Administration:
The potential "eGovernment" administrations and applications incorporate character the executives, charge assortment, land vault, dispersion of advantages, computerized monetary standards and any sort of government record. [5] Blockchain innovation could permit records to be checked and made with more noteworthy speed, straightforwardness and security.

Remodel Finance:
The report uncovered that blockchain can possibly "drive straightforwardness and productivity by setting up new budgetary administrations framework and forms" and is probably going to "structure the establishment of cutting-edge money related administrations foundation related to other existing and rising advances." Although the adjustments in framework won't most likely be sufficiently apparent to be seen by buyers, less expensive and quicker monetary administrations may turn out to be a piece of the arrangement if blockchain keeps on developing and in the long run turns into "the pulsating heart" of the account business, the report appears. It additionally gauges that around 80% of banks worldwide could begin appropriated record extends by one year from now and uncovers that huge national banks are examining how this innovation will change the way cash moves far and wide.

2.8 Future of Blockchain For Real Estate

Government:
The potential advantages make Blockchain Technology appealing for use by governments and different associations. However, its appropriated nature and the requirement for settling on structure decisions requires changes by government to receive these rewards. [4] While customary frameworks have a moderately clear control, the circulated idea of Blockchain Technology requires changes in obligations and new administration draws near. Actualizing blockchain without broad changes probably will not bring about totally determined advantages. [6] Presently, a large portion of the undertakings are innovation headed to investigate the potential and discover the confinements, however Blockchain Technology is probably going to develop which will bring about putting the cultural difficulties focal rather than the innovation. In the accompanying sections we investigate issues raised by blockchain execution for e-government that should be tended to.

Digital Property Rights:
In the territory of computerized property rights, blockchain innovation can help with distinguishing copyrighted works and settling debates. [7] It could prompt multi-regional authorizing arrangements and improved legitimate conviction for both makers and buyers of substance.
In the domain of securing licenses, blockchain innovation could adjust assurance of trailblazers against that of contenders. Blockchain "hashing" and "confirmation of presence" make the innovation accommodating in improving the patent framework, especially where there is no brought together patent frameworks across nations. Blockchain innovation could make patent frameworks increasingly effective and give progressively efficient confirmation of presence administrations.

Digital Asset Registries / Situating Smart Contracts:
The report noticed that savvy contracts give one of blockchain innovation's most encouraging advantages. Savvy agreements can improve efficiencies in contract authorization. To show the way Blockchain Technology works, we utilize the case of a supposed brilliant agreement. Blockchain Technology can be utilized for creating keen agreements in which the concurrence on conditions by members can be put away and once the conditions are met the progressions delineated in the agreement will be made. Brilliant agreement characterizes the principles and punishments around an understanding and naturally executes and implements the commitment in the agreement. [8] A savvy agreement can be characterized as "a component including advanced resources and at least two gatherings, where a few or the entirety of the gatherings put resources in and resources are naturally redistributed among those gatherings as indicated by a recipe dependent on specific information that isn't known at the time the agreement is started.
A straightforward guide to represent the working of a shrewd agreement is the exchange of responsibility for property, for example a house. The buyer of the house enters the total of cash that should be paid for the property into a block. Only if the buyer gives his key to the seller within a certain time frame, the payment will be processed, and the property registry is updated in the blockchain. If the key is not moved, at that point the cash is offered back to the purchaser. The keen agreement contains decides for the exchange that cannot be changed during the procedure nor meddled with by one of the gatherings without the other one knowing. The savvy agreement may diagram that others (confided in parties) need to affirm the exchange before the agreement is executed to maintain a strategic distance from debate and guarantee trust.
On account of move of possession, the conditions can be put away in the keen agreement and once satisfied, the exchange can be executed bringing about the enlistment of the new proprietor in the record. In this way defilement about resources can be dodged.

Securing Property Rights:

The nature of a nation's arrangement of property rights mirrors its capacity and readiness to make and keep up dependable records. This dependability thus mirrors the apparent unwavering quality and genuineness of those archives: a record is solid on the off chance that it precisely speaks to the realities to which it bears witness to, and valid on the off chance that has not been messed with or undermined.

Storing land titles on a blockchain has clear intrigue. Above all, sharing a land vault over an appropriated organize significantly upgrades its security by disposing of "single purpose of disappointment" hazard and making it increasingly hard to alter records. It could likewise build straightforwardness by permitting affirmed entertainers (counting, conceivably, examiners or non-benefit associations) to screen changes made to the library on a close to constant premise, and upgrade productivity by decreasing the time and cash related with enrolling property. [6]

A blockchain cannot, be that as it may, address issues identified with the unwavering quality of records. This is an undeniable point yet one that is regularly neglected. As noted, before, the blockchain is a "trash in, trash out" framework: if an administration transfers a bogus deed to a blockchain (either out of lack of regard or misdirection), it will stay bogus.

This proposes utilizing the innovation to store land records works best in places where the current framework for recording land titles is as of now solid. This was surely the situation in Georgia, which started an undertaking with The Bit fury Group and the Blockchain Trust Accelerator in 2016 to enlist land titles on a blockchain. [9] Indeed, even before the task started, the nation's territory vault was positioned the third best on the planet by the World Bank.

The methodology taken by Bit fury in Georgia includes the utilization of two blockchains, one private and one open. In the main stage, Georgia's National Agency of Public Registry (NAPR) transfers digitized land titles onto a private, permissioned blockchain that lone a little arrangement of realized PCs can get to. In the second, NAPR makes a special cryptographic code (known as a "hash" and examined in more detail in the addendum) for each report and afterward grapples this code on the Bitcoin blockchain. The open blockchain successfully works as a legal official, time stamping both the underlying transfer and any consequent changes to the hash activated by adjustments of the fundamental land title.

There the test has been modernizing the nation's laws to make an administrative structure that can bolster the utilization of advanced records and blockchain (Graglia 2017) [10]. One of the principle wellsprings of deferral has been planning a law that would give legitimate remaining to advanced marks.

Ever ledger, an organization, makes it simpler to check a precious stone's provenance by permitting industry entertainers to start and store advanced jewel declarations on a blockchain in a methodology that includes three stages. To start with, the framework produces an extraordinarily recognizing "thumbprint" for a jewel by referencing 40 distinct qualities for every diamond, including subtleties of its cut, carat, and shading, just as superior quality photos of a laser-engraved sequential number on its support. Next, this data is transferred to a private blockchain that runs off of hyper ledger fabric.

2.9 The Economic Benefits of Blockchain

Blockchain innovations can possibly change existing plans of action and in this way, transformation affect enterprises, governments, and social orders. By 2025 at least 10% of GDP is stored on different platforms of blockchain globally. [11].

Through blockchain advancements, esteem makers, for example, specialists, arrangers, and creators could move an incentive to their customers or shoppers straight forwardly. Blockchain innovations make it conceivable to track and follow scholarly exchanges of property in this manner securing similarly makers and shoppers of items and administrations. Blockchain permits the incorporation of automatic and self-controlling components that offers a chance to the clients to oversee and administer the stages themselves. Using blockchain-based stages, clients can't just utilize the administrations, yet in addition acquire extra advantages from taking part in the administration and control of the system. Furthermore, blockchain can likewise incorporate smaller scale instalment components already not financially down to earth, expanding the degree of security and protection for clients making the stages progressively effective and autonomous.

Obviously, there are also challenges that still exist when it comes to blockchain technologies. For example, in decentralized applications, nodes may be located in different countries and thus different jurisdictional spheres, which makes it challenging to determine which compliance rules, policies or laws have to be applied.

Security and privacy are focal issues in a blockchain arrangement and not having the option to manage them may hinder the sending of uses. Numerous blockchain applications certainly require connecting exchanges to realized personalities raising the necessities for information security. As blockchain applications present new types of decentralise esteem age, usually acknowledged decentralized administration rules, hazard the board practices, and consistence systems are fundamental.

From a technical point of view, the scalability of blockchain-based systems is one of the main challenges. It remains unclear how to guarantee security at scale, governance at scale, or risk management at scale in decentralized environments. The ability to connect an increasing number of users, to handle and increasing number of transactions and doing this is a robust and resilient way that meets the requirements to mature blockchain as technology. [14]

Blockchain to Help in Making Trusted Organizations:

A significant number of families in creating nations cannot confide in any foundation to keep a decent record of

their territory possession rights or property rights. This is on the grounds that these nations frequently come up on the legitimate and political security and development that other western nations may profit by. Rather, these nations' record frameworks are frequently divided, and the residents tend not to confide in the legislators and authorities behind them as a result of political shakiness or debasement concerns.

Blockchain in this manner an intriguing option to these untrusted organizations, proposing a safe, straightforward and changeless condition that evacuates the requirement for an official establishment or centre man. Rather than bringing arrangement together of property rights, which offers a simple breathing space for control and disruption to degenerate authorities, blockchain has the advantage of being a decentralized biological system where exchanges are handled by various hubs (or excavators) in a system. The changelessness blockchain is particularly fascinating with regards to property rights. For Instance, blockchain frameworks guarantee the unchanging nature of a square in the chain of approved exchanges by including square headers that reference the past square in the chain of exchanges. In that manner, if somebody messes with a square (or set of property rights right now), to grow by rapid production of blocks all through the entire chain and everybody sees that a malignant entertainer attempted to alter this square.

Blockchain as an Alternative Source of Capital:

Access to bank credits, for both humble people and little firms, is frequently troublesome in creating nations, as most banks request huge guarantees and protections that these specialists do not have. The issue of subsidizing is significant in the creating scene.

Blockchain could give a fascinating option in contrast to these casual loaning procedures and assist specialists with discovering progressively secure financing. A couple of new businesses have developed proposing customized money related administrations utilizing blockchain to address the issues related with casual loaning. For instance, the start-up OmiseGo proposes decentralized wallets and resource agonistic worth trade for the unbanked people, and Wetrust offers protection and loaning hovers inside existing notoriety-based trust systems and networks as an option in contrast to the proper protection and loaning foundations. Humaniq (a cryptocurrency) addresses another aspect of the subsidizing issue and tries to encourage money related incorporation by utilizing biometric validation for personality. In these utilization cases, blockchain offers an interest among formal and casual loaning and empowers procedures to be progressively neighbourhood while guaranteeing more extensive implementation components.

Blockchain to Escape Oscillating Cash:

Expansion and hyperinflation for lot of developing countries regularly cause monetary standards to downgrade at fast rates, making ordinary things very costly and imports unquestionably increasingly exorbitant. For instance, Venezuela has confronted tremendous expansion in the previous 6 years. Before the finish of 2018, Venezuela recorded arriving at high galactic of 80,000% swelling. Cryptographic forms of money can possibly annihilate this issue as an enhancement to a nation's fiat cash, giving an advanced decentralize type of instalments.

Stable coins, for instance, are frequently pegged to an alternate resource like the US dollar or gold, yet don't have a national bank behind their soundness. Stable coins would thus be able to be utilized as an elective mechanism of trade (the capacity to exchange without dealing), a store of significant worth (the capacity to keep an incentive over years), and unit of record (the capacity to quantify a unit to characterize and look at the estimations of business sectors). This enables cryptographic forms of money to basically utilize for more everyday exchanges and as an elective store of significant worth in instances of high prominence.

Foreign Aid:

Blockchain can long last assistance in significant progressively direct manners, for instance with regards to outside guide. Issues with outside guide to created nations today are numerous; gifts are regularly dependent upon significant overhead expenses to make up for each on-screen character and outsiders all the while, which frequently disincentives' potential benefactors; gifts frequently need accurate information, both as far as how the cash finds a good pace and as far as how it is utilized for the reason; at far as concern, gifts for an immature nation are frequently having the opposite of the desired effect., keeping it in a condition of reliance with the donators.

Blockchain is an intriguing answer for these issues since it considerably diminishes the quantity of agents associated with the gift, in this manner diminishing overhead costs that get "lost" in the gift. Rather than paying the various entertainers engaged with the preparing and changing over procedures, blockchain considers focused on gifts that legitimately land in wanted hands without the requirement for any outsider gratitude to robotized systems empowered by keen agreements. Blockchain can make gifts significantly more productive, accurate and dependable for the donator. Moreover, blockchain offers constant and detectable information on the gift, without the need to confide in an association.

2.10 Vulnerabilities of The Blockchain

Strengths	Weaknesses
Blockchain guarantee the honesty of records through the way exchanges are recorded and approved.	The Blockchain records are difficult to edit as one chain is abandoned, and a new one is taken up.
Privacy protection enabled for users and governments and	Clients need their private key to get to their assets and if a

they can identify who is accessing their data and for how long.	client loses their private key, the cash is viably lost, and there is no way around it.
No intermediary required between two parties as the distributed network of nodes verify the transactions through a process known as mining.	Blockchain records can develop enormous after some time.

Table 1. Strengths and weaknesses of Blockchain [12]

3 Methodology

The purpose of our research is to study blockchain for land registration and to mention the strengths and weaknesses of this process. The methodological approach we used is quantitative as we conducted a survey to collect data on how many people are comfortable in using online sites for purchasing various materials, products and other goods and what is the response of people this idea of online land registration using blockchain. Using quantitative method, we analysed how much users are familiar with online market and its purchasing process and how much they prefer to buy online, and to take their opinion in making online transactions, do they hesitate or they are much familiar with online market trend.
We identified a problem that classical land registration method is outdated and complicated. It takes a lot of time and efforts if you want change any information on papers or to transfer registry to another owner. This problem can be overcome with the idea represented in this paper about online land registration using blockchain technology for added security. Manual or tradition land registration process can be converted into online registration process. People can do their transactions online at any time with ease of without thinking about timing of banks and real estate dealers. Some countries like Sweden, France and China are already in process to apply blockchain for various industries and trying to get rid of from manually registration paper work.

4 Results And Analysis

We conducted a survey for our concerns including students and professionals about online registration process and other hurdles in online transaction. Total 54 people gave their valuable responses. All questions are based on 5-point likert scale because it describes a result clearer that how much people agree or disagree with moving the traditional land registration with online registration. Both male and female of different age groups ranging from 20 to 45 years old that take part in this survey and as of all responses 38.9% are females and 61.1% are males.

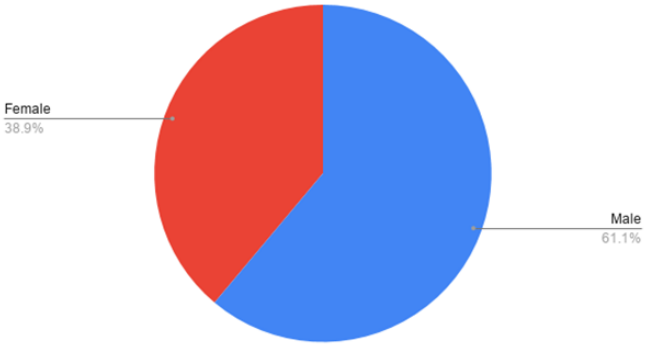

Figure 6: Count of Gender

Here the Table 2 shows the responses count according to age groups that the youth, students and young professional are more eager to adapt new technologies and among them males are more interested as compare to females.

Age	Responses	
Range	Male (61.1%)	Range
20-25	17 (31.48%)	20-25
26-30	13 (24.07%)	26-30
31-35	2 (3.7%)	31-35
36-40	0 (0%)	36-40
41-45	1 (1.85%)	41-45

Table 2: Response recorded based on age groups

A complete survey is attached below in Table 3 that how much people agree or disagree with online land registration and blockchain. The scale below has following wieghtage.
Strongly Disagree (1), Disagree (2), Unsure (3), Agree (4), Strongly Agree (5),

S. No.	Questions	1	2	3	4	5
Land Registration						
1	You are familiar with current land registration process.	12	15	15	9	3
2	Currently, it is hassle to store land registration papers.	3	3	20	14	14
3	It is difficult to register land manually by paper work.	2	6	18	10	18
Online Land Registration						
4	Online purchasing is becoming very common since last few years.	0	4	4	17	29
5	People trust online sites which they buy from.	4	7	15	19	9
6	It will be more convenient to register a land or property online.	2	7	14	16	15
7	Online land registration can easily be preferred for commercial sector.	1	4	13	19	17
8	Online land registration can easily be preferred for residential sector.	1	3	14	23	13
9	It is easy to maintain the property papers online.	1	3	15	19	16
10	People prefer to keep their property papers online.	6	7	23	11	7
Security						
11	People usually hesitate in making	6	3	11	22	12

	any online transactions.					
12	Documents are more secure online.	6	11	16	14	7
13	The online land registries will be easier to transfer as compare to current paper procedure.	1	2	13	16	22
Blockchain Land Registration						
14	Real estate dealers and people are familiar with Cryptocurrency / Bitcoin.	9	16	21	8	0
15	People are familiar with Blockchain technology.	15	17	19	1	2
16	Bitcoin can be useful in transferring money for real estate industry.	0	9	21	12	12

Table 3: How much people agree or disagree with online land registration and blockchain

Our survey is based into three main sections which gives a brief description about how people judge online purchasing process, security and purchasing property using blockchain technology.

4.1Current Land Registration v/s Online Land Registration

Out of 54 people only few people are familiar with current land registration process which is too complicated. People have shown their interest in online purchasing. Trust in online shopping as nowadays it is becoming very common for purchasing stuff online and people find it easy because it's saves time.

Mostly people believe in online purchasing as it is more convenient. They have also shown their interest in purchasing online property. People can buy and sell their property remotely. And their physical presence is not necessary for registration process. Traditional purchasing method is way more difficult. Owners have to sign dozens of legal papers but if we move towards an online solution then it will be easier and acceptabl

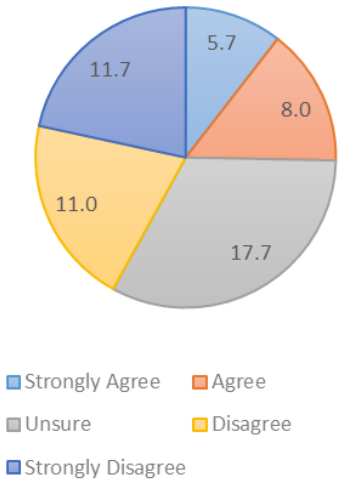

Figure 7: Current Land registration Process

They also believe that it is easy for them to maintain property papers online but they do not hesitate if we ask them to keep their papers online.

People who are unsure about online registration may not have understand the problem or possibility that online registration can be helpful. People disagree with the current land registration as well as with online land registration. In beginning when ecommerce solutions arouse people have lack of knowledge about the process and do not trust ecommerce solutions. If we see people agree more in Figure 8 as compare to Figure 7 which mean online land registration is preferable than current manual land registration process.

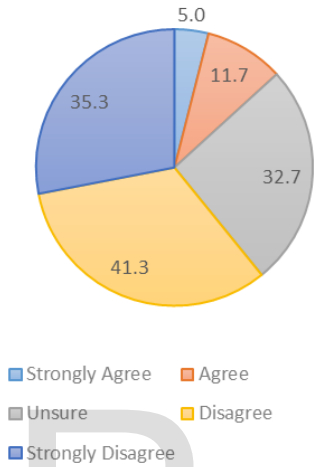

Figure 8: Online land registration Process

4.2. Security:

As discussed before in above section about keeping the documents online which has satisfactory results. Shown in Figure 9, mostly people have an issue with online transaction and it is because of they don't trust online transaction due to security.

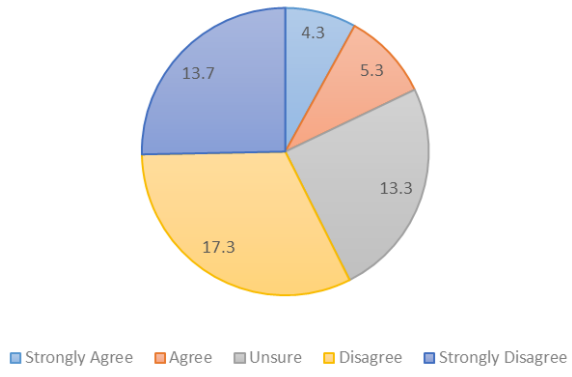

Figure 9: Security Statistics

And they think that document will be less secure online. But one good sign is they believe that land registry transfer process will be easier through online as compare to current process. As far as concern with security of blockchain technology, it is far secure from other technologies as data is stored in blocks and each block is linked to the existing chain. Bringing

one node down will break the whole chain of blocks and if someone want to breach a single node in chain, they have to breach all existing block of chains to add a new block. As soon the hacker adds a new block all other linked block become invalid. This regular Peer to Peer structure contributes to the security in addition to the immutability of the transactions which might be recorded with in the blockchain.

4.3. Land Registration Using Blockchain:

As block chain is rapidly improving technology and most of the people are not familiar with its applications and security. But they may have heard about cryptocurrencies bitcoin which work on public ledger of transactions stored in database and is also known as blockchain. We asked people about familiarity with blockchain technology but above the average people are not familiar with the term blockchain however they heard about cryptocurrencies like bitcoin as shown in Figure 10 blockchain can be useful for land registration and will be helpful for online transactions. The ones who are familiar with crypto currencies which brings a sense of security to their mind, and this security depend on blockchain. As we know crypto currency is becoming familiar and it is based on online transaction thus online purchasing is already a trend now. Blockchain also allow people to have the ownership of documents in form of digital assets which they can access from anywhere in case of transfer or papers lost. [13]

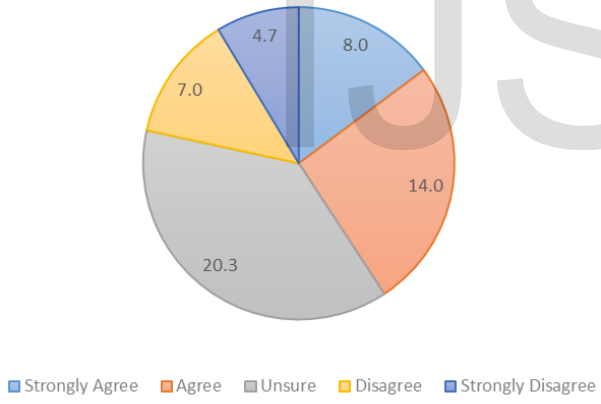

Figure 10: Land registration using blockchain

5 Conclusion

Online Land Registration is far from being implemented as the technology itself is maturing as time goes by. The aim of this paper was to highlight the strengths and weaknesses of the blockchain technology to make a clear vision of how it can be improved. We analyzed the collected data of 54 students and professionals from various fields and domains and concluded that the people are more comfortable in using online platforms for buying as the online trend has risen in the past years and people tend to keep all of their data online as it provides security as well as prevents the hassle of losing important documents. Although there is some short coming of this technology, but the short comings are overweighed by the potential of the technology and the improvements that can be made to blockchain to actualize it for recordkeeping. Maybe the most serious hazard will be if data experts neglect to respond to the call of understanding the capacities of blockchain-based recordkeeping, permitting its execution to walk ahead without their astuteness and direction. Although the technology itself has improved a lot in a short span of time and we are just on the first step of discovering its potential in all other aspects but this technology has brought us some great methods and ideas which we can work with and one of the is using it on land registration.

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