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Relative Importance of Blockchain in Cryptocurrency, Banking & Health Care

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ABSTRACT

This paper looks at the opportunities and challenges of implementing blockchain technology across medical, finance and banking sectors, and provides a clear view which can enable Blockchain for more extents. After going through few articles and papers related to applications of Blockchain, we gained a vivid knowledge on pros and cons on Blockchain applications from each article. Few drawbacks that we encountered are using Power of Work (POW) in medical sector which is destroying the computing ability at a stage when system is getting bigger and eventually which is wasting lots of resources. One study over conceptual proposal on blockchain is the idea of using trade credit as the value of transactions, and this trade credit is in the scope of trade secret which improves trade confidentiality and makes it more secure. Moreover, centralization systems have few risks owing to their dependence on a high scale which could tamper the data or can even block access, change the rules and might even completely shut down the system. Few more drawbacks are designing and building a secure blockchain system is much more difficult on large-scale of banking sector with large database. To address these challenges, recent developments in blockchain technology are enabling novel opportunities in every possible sector by using Trust-worthy cloud, IoT and artificial intelligence, which makes it more powerful and secure. After analyzing Blockchain implementations and identifying their limitations, we conclude with several promising directions for future research.

Keywords: Blockchain, Potential Optimization, POW, Cryptocurrency, Decentralized Networks, Trust-worthy cloud.

INTRODUCTION

Blockchain technology is mostly referred as groundbreaking innovation, kind of indicator to new economic era. Blockchain might come into global market as a new form of economic system [1], it is an essential for record in every digital event and however this data is not just recordings as it contains smart information that are stored in the programs of the blockchains [2]. This stored data

or information that is stored in blockchains is implemented without running into any issues or risks or even fraud [3]. Blockchain is described as many things such as database technology for transactions, decentralized and these data or information is validated and tampered across huge number of network participants. It is also known that blockchain has different classes of technologies (or can also called as distributed ledgers) that provides trust on the user's data which is achieves information that has not be tampered or hacked or manipulated [1]. Blockchain comes with serious issues to the current business process as the transactions and applications will centralized architecture and even trust from third party companies or third-party organizations to verify them [2].

Blockchain ought to be considered as a dispersed affix just timestamped information structure [5]. Blockchains enable us to have a circulated distributed system where non-believing individuals can evidently collaborate with each without the requirement for a trusted authority [6]. To accomplish this one can, consider blockchain as a lot of interconnected instruments which give explicit highlights to the framework, as outlined in fig.1. At the most minimal degree of this framework, we have the marked exchanges between peers. These exchanges indicate an understanding between two members, which may include the exchange of physical or computerized resources, the fulfillment of an undertaking, and so forth [4]. At any rate one member signs this exchange, and it is spread to its neighbors. Regularly, any substance which associates with the blockchain is known as a hub. Notwithstanding, hubs that check all the blockchain rules are called full hubs. These hubs bunch the exchanges into squares, and they are dependable to decide if the exchanges are legitimate, and ought to be kept in the blockchain, and which are most certainly not [6].

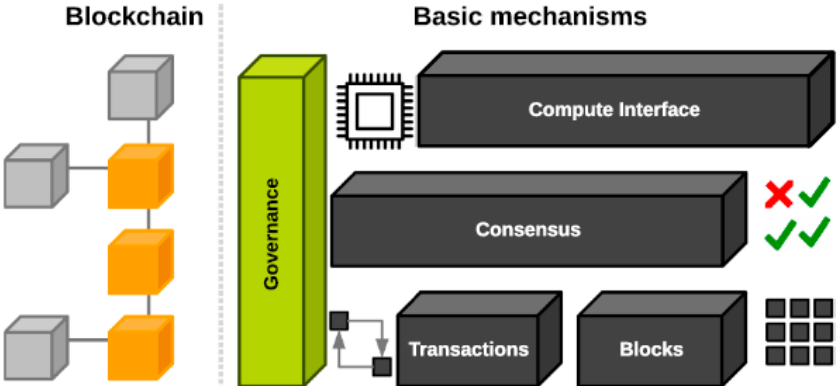


Figure 1: Blockchain architecture [4]

This paper looks at the opportunities and challenges of implementing blockchain technology across medical, finance and banking sectors, and provides a clear view which can enable Blockchain for more extents. After going through few articles and papers related to applications of Blockchain, we gained a vivid knowledge on pros and cons on Blockchain applications from each article. Few drawbacks that we encountered are using Power of Work (POW) in medical sector which is destroying the computing ability at a stage when system is getting bigger and eventually which is wasting lots of resources [3]. One study over conceptual proposal on blockchain is the idea of using trade credit as the value of transactions, and this trade credit is in the scope of trade secret which improves trade confidentiality and makes it more secure. Moreover, centralization systems have few risks owing to their dependence on a high scale which could tamper the data or can even

block access, change the rules and might even completely shut down the system [2] [7]. Few more drawbacks are designing and building a secure blockchain system is much more difficult on large-scale of banking sector with large database. To address these challenges, recent developments in blockchain technology are enabling novel opportunities in every possible sector by using Trust-worthy cloud, IoT and artificial intelligence, which makes it more powerful and secure. After analysis of Blockchain implementations and identifying their limitations, we conclude with several promising directions for future research.

Blockchain can be described as a decentralized, transactional database technology that facilitates validated, tamper-resistant transactions that are consistent across a large number of network participants called nodes [8]. Blockchain can be defined as a category of technologies (sometimes referred to as distributed ledger technologies) that give users trust that stored data (such as a certificate) has not been manipulated [3] [2]. Blockchain is an innovative technology that no individual could have been sufficiently prepared and qualified to face its challenges. The banks regard this new comer technological structure as a threat as the most affected side of the economy, and they have invested in blockchain technology. Nevertheless, the cryptocurrencies and money transfer are the focus of most of their efforts [9].

Neither the banks are supposed to be tomorrow's crypto-miners. They are rather overwhelmed with blockchain's explicit characteristics on money transfer, transaction, and investment issues through cryptocurrencies. Digital currencies indicate a shift away from the financial system infrastructure architecture that has been developed [3]. Information systems and technological solutions such as peer-to-peer networking and cryptographic algorithms allow decentralized coordination, operational security and transparency, while opposing the framework of conventional monetary systems that are centrally organized and less transparent [5]. This new race of currencies is gaining public attention against the backdrop of the recent economic crisis. When public confidence in the financial system's current architecture crumbles, alternative structures become more important and creative ideas for future currency systems are implemented [10] [11]. Recently, both industry and academia have attracted extensive attention from cryptocurrency. Bitcoin, also referred to as the first cryptocurrency, achieved enormous success with the capital market hitting 10 billion dollars in 2016 [12].

The blockchain is the Bitcoin's core mechanism. While Bitcoin is the most common software blockchain, it can be implemented far beyond cryptocurrencies in various applications. Since it allows transactions to be done without any bank or intermediary, it is possible to use blockchain for various financial services such as digital assets, remittance and electronic payment. The Blockchain represents all verified and valid network user transactions. Unlike past digital currencies that are more likely to be seen as social currencies being accessible to a community of users involved in online games, Bitcoin has a wider emphasis and is free of a central organization responsible for money creation [13]. Such a revolutionary process, therefore, not only attracts a steadily increasing level of media interest, but also increases international penetration and rises in market capitalization.

Even though the blockchain innovation can possibly fabricate future web systems, it faces various specialized difficulties, creating an enormous worry over scalability [14]. The square size of Bitcoin is currently restricted to 1 MB and at regular intervals a square is mined. The Bitcoin organize is in

this way constrained to a speed of 7 exchanges for every second, which can't deal with high-recurrence exchanging. Bigger edges, be that as it may, mean more noteworthy extra room and more slow system propagation [2] [9]. This will in the long run add to centralization since clients need to hold such a huge blockchain. Thus, the Bitcoin arrange is constrained to a pace of 7 exchanges for every second, which can't deal with high-recurrence exchanging. In any case, bigger casings require more extra room and more slow transmission of the system. This will conceivably prompt centralization since purchasers need such an enormous blockchain to be put away.

The medical data and its backup records are housed in the traditional medical institution. The data can be maliciously manipulated, and it is difficult to share between different institutions [15]. The exchange of medical data is also facing new criteria with the advancement of medical technology. We use blockchain, database, cryptography knowledge and use their advantages to set up a system for sharing medical information. This system is like a resource search engine that is widely distributed. We're placing different medical institutions on a p2p network, then using a decentralized ledger to store the blockchain-based medical data digests base. Any node on the p2p network will check for public ledge medical information [14].

The system improves medical information search rate. In the meantime, we are building a secondary chain to store requests in order to increase the transparency of medical data query [12]. The applications of block chain on cryptocurrency, banking and health are discussed in detailed in the further sections of the paper.

APPLICATION OF BLOCKCHAIN TECHNOLOGY IN CRYPTOCURRENCY

As we mentioned about the prominence of blockchain above, there are many evolving applications of blockchain in the field of Cryptocurrency. Crypto Currencies paintings on Block Chain Technology that is a web allotted ledger. Crypto Currencies are online, virtual, convertible cash kinds. They are evolved as the use of cryptography techniques and is especially designed to be provided at a predetermined and knowable fee [16]. They aren't sponsored with the aid of gold or they do not derive their strength from governments. Their price is totally depending on their reputation as a means of fee, their anonymity (the transactions are completed anonymously within the community) and the intractability of the events which might be engaged in a crypto foreign money transaction [17]. The most well-known of this money kind is Bitcoin created in 2009 [1].

After that, a lot of other cryptocurrencies appeared on the market, but they were called the altcoins, as they represented the mix of Bitcoin alternatives. Bitcoin does not have a centralized system, no one can control it entirely, like in electronic banking systems. This mechanism presents an answer to cast off a critical relied on authority by way of defining an electronic chain of digital signatures and publicly announcing it to enable verification.

Cryptocurrencies are convertible, pure digital, nameless currencies and they aren't related to any agency. The transactions are powered by way of the collective computational electricity of the bitcoin miners [19] [20]. The first application of block chain is store of fee, i.e. The capability of an asset to hold its price in the future. Some people call this "sound cash". That's due to the fact Bitcoin's forex (BTC) has a constrained supply unlike country wide currencies which has no restrained supply and is predicted to depreciate perpetually [21]. Bitcoin is likewise not situation

to the whims of any governing frame or organization. It is absolutely decentralized: a currency powered via the humans for the humans.

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	Bitcoin	$168,058,713,240	$10059.30	$5,994,810,000	16,706,800 BTC	4.40%	
2	Ethereum	$45,378,658,465	$472.65	$1,255,020,000	96,009,619 ETH	-0.76%	
3	Bitcoin Cash	$26,237,823,946	$1559.26	$1,303,260,000	16,827,100 BCH	-5.17%	
4	Ripple	$10,892,190,176	$0.282014	$566,001,000	38,622,870,411 XRP *	11.89%	
5	Bitcoin Gold	$5,493,125,189	$329.39	$99,534,300	16,676,711 BTG	-9.05%	
6	Litecoin	$5,054,491,011	$93.54	$342,408,000	54,036,708 LTC	4.03%	
7	Dash	$4,815,010,460	$624.04	$142,199,000	7,715,881 DASH	-0.90%	
8	Ethereum Classic	$3,325,399,399	$33.97	$1,652,010,000	97,884,172 ETC	33.06%	

Figure 2: The current value of the cryptocurrency in the market [18]

By reviewing the fig.2, we can clearly say that cryptocurrencies have potential global market value and are very useful for bills as there are not any intermediaries to take a reduce off every transaction. This benefit is even magnified while you do move-border bills or remittances, as conventional wire transfer is a totally slow and high-priced procedure [22]. The blockchain is a public ledger of all transactions in a cryptocurrency community, and the Bitcoin blockchain is mainly a document of all Bitcoin transactions. These different types of cryptocurrencies based on blockchain are holding great market value and even providing easy virtual transactions and virtual asset management.

WORKING OF BLOCKCHAIN IN BITCOIN

Blockchain generation is one of the foundational standards within the bitcoin gadget (and most different cryptocurrency structures) [5]. For someone to make a transaction the usage of bitcoin, the transaction should be submitted to the community. That transaction records consists of public passwords that relate again to non-public ones, so each of the transaction is anonymous and encrypted. Once the transaction records are public, network members can collect and affirm the facts and attempt to crack a completely tough computational puzzle that permits the transaction to be introduced to the public ledger [1].

The first member (or institution of members) of the network to nicely solve the puzzle receives to append that block of transactions onto the cease of the modern block chain. At that factor, all the transactions inside the new block end up an everlasting part of the general public record. When a new block is added to the chain, new cash are created and offered to whoever correctly introduced the block to the chain. The system of including blocks to the chain is called cryptocurrency mining [5]. In different words, the blockchain is wherein all transaction records is stored, what wallets test to verify ownership of bitcoin, and is how new bitcoins are created. The blockchain is at the heart of bitcoin and maximum of other virtual currencies.

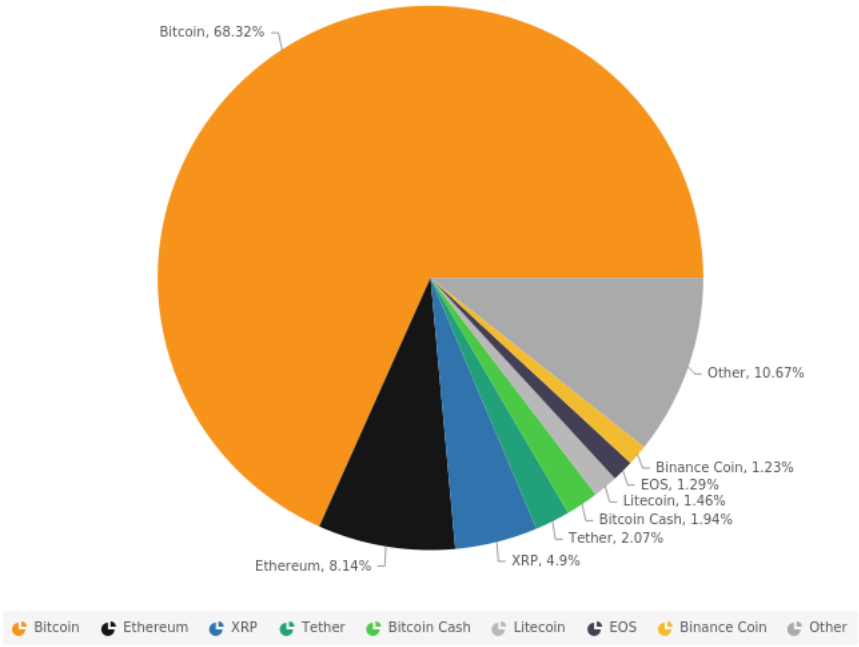


Figure 3: Bitcoin Market Capitalization [23]

This mechanism works on a basic p2p-technology theory. Each peer has a record composed of the entire history of each transaction made. When someone gives another individual a number of Bitcoins, the file is signed by a private key, and after the key is signed, the transaction is released on the network and sent from one peer to all the other peers [8] [24]. There is a certain period of time that needs to be passed for a certain quantity to be validated. Verification of cryptocurrencies is a vital idea because it is all about verification. When pending, a transaction can be forged, but when validated, it is set in a stone and becomes a part of historical transactions in the blockchain. Miners are the only one who can verify, take, label them as legal, and let them spread across the network. Miners were paid for their work in Bitcoins [25] [19]. On the Bitcoin blockchain, this converts into the accompanying model.

Assume that Anna needs to send 100 Bitcoins to Jeff, at that point as a matter of first importance she should carefully sign this exchange utilizing her private key (which is just known to her). She should deliver the exchange to Jeff's open key, which is Jeff's location on the Bitcoin arrange. Next, the exchange, which will be examined into an "exchange square", should be confirmed by the hubs inside the Bitcoin arrange [10] [26]. Here, Anna's open key will be utilized to confirm her mark. If Anna's mark is substantial, the system will process the exchange, add the square to the chain and move 100 Bitcoins from Anna to Jeff. As fig.3, shows that Bitcoin holds maximum amount of market capitalization comparing with the remaining various cryptocurrencies in the present day global market era. Also Pow based systems and silk roads money flow are some of the prominent applications of the blockchain in the field of cryptocurrency and are explained below:

POW BASED SYSTEMS

Decoupling execution (inactivity and throughput) and versatility (with the quantity of hubs and customers in the framework) isn't altogether conceivable, therefore we will gather them for investigation [5]. Those turned into the bottleneck for the most mainstream blockchain usage, for

example, Bitcoin (accord inertness of about 60 minutes) and Ethereum. Also, PoW-based systems utilize a great deal of intensity, proportional to a little nation, for example, Austria. In this manner execution what's more, versatility of periodicals nonexclusive blockchains is constrained by their structure choices, specifically successive execution of exchanges and hard-coded agreement convention. Adaptability, thus, alludes to the capacity to look after execution pointers when serving more clients and exchanges, restricted by: (i) the size of the information on blockchain, (ii) the exchange handling rate, and (iii) the inactivity of information transmission [8]. Generally, PoW offers great adaptability with lackluster showing, though different conventions offer great execution for little quantities of imitations, with restricted versatility. Given apparently inborn trade-offs between the number of hubs and execution, today isn't clear what the ideal blockchain arrangement is, for most of utilization cases in which the quantity of hubs ranges from two or three tens to two or three thousand.

SILK ROAD'S MONEY FLOW

Silk Road was one of the main on the web illegal businesses that utilized Bitcoin and TOR innovations for secrecy [21]. Blockchain is yet a rising innovation, in this manner not a great deal of designers is worried about the standards of Software Designing applied to blockchain-based frameworks. Also, the absence of rules and benchmarks on the most proficient method to plan programming models that incorporate shrewd agreements as a component of the framework calls for further consideration. At last, just a bunch of encounters in genuine world, and still a ton of discussion on whether an application requires the utilization of blockchain. The rise of structures like the one exhibited in this paper may help to beat such troubles.

As dangers to legitimacy for our methodology, we can feature the following. As in the first place, only the short number of specialists have partaken in the investigation, this may result on a potential inclination, however keeps away from the responses to be aimless considering the absence of experience of over-viewed specialists [27] [28]. One ought to likewise take note of that the quantity of specialists in the blockchain world isn't that large. Another worry is the quantity of broke down digital currencies, since among the main ones there is Bitcoin itself and two Bitcoin forks (Litecoin, Bitcoin Cash). Some progressive approaches may have not picked up energy yet, reason why we are intending to expand our investigation, covering more usage [8].

DISCUSSION

Crypto currencies issued will have an impact on the global supply of money, and their price volatility will certainly have an impact on the economies. The most mainstream one is Bitcoin, yet there are likewise different cryptographic forms of money like Ethereum, Ripple, and numerous others. They are decentralized which implies that nobody can control it, no financial framework, budgetary organization or the administration itself. It will therefore become more difficult for central banks to pursue monetary policies while ignoring these currencies. Central banks will need to change cryptocurrency markets to create a controlled number of cryptocurrencies with more stable prices. It is inevitable that some regulations on the use of cryptocurrencies on e-commerce sites will come into force and that some governments will have to impose requirements on the security of e-wallet applications.

Deriving from the above discussions these cryptocurrencies (e.g. crypto $or crypto TL) will also be accepted by banks and government agencies. It will therefore be possible to open a bank account

or pay your tax through these currencies. Eventually, all users and trade may migrate and consolidate to these currencies. The blockchain is at the core of Bitcoin and the maximum number of other virtual currencies. The blockchain is where all transaction records are kept, which wallets test to verify the ownership of bitcoin, and this is how new bitcoins are made. By doing so, digital currencies will not only become more flexible and powerful but will also become more robust. Although blockchain based cryptocurrencies have wide implementations, many problems still need to be addressed. The features they provide are not original on an individual basis, and most of the frameworks on which they are built have been well known for years. Block chain technology offers a high level of data storage and transmission security, a honest and transparent network infrastructure, decentralization and low maintenance costs. Numerous nations have built up their own cryptographic forms of money which are utilized as an installment resource, as advanced cash. It could be only a trick which will bring nothing worth mentioning, however it could likewise be a simple method to get rich.

APPLICATION OF BLOCKCHAIN TECHNOLOGY IN BANKING SECTOR

After doing some notable research regarding blockchain technology in banking and finance, we can clearly say that blockchain can solve most of the problems that banks and financial organizations are currently facing on an ongoing basis [29]. Blockchain technology offers a high level of security in data storage and transmission, open and transparent network infrastructure, decentralization, and low operating costs. Such amazing features make blockchain, even in the extremely conservative and restricted banking industry, a very exciting and in-demand solution. Without a number of mediators, most credit and financial institutions cannot carry out their work, while their involvement makes these institutions services much more expensive.

Blockchain innovation offers one approach to improve brilliant funds security by utilizing the record of information transmitted starting with one bank then onto the next bank and forestalls the irregular interchanges. Blockchain is a decentralized system which empowers all gatherings to make exchanges in a trust-less system [30]. The blockchain approach has been generally applied to numerous fields, for example, fund, protection, assembling, and social insurance. The blockchain has a dispersed record that contains associated squares of exchanges for every one of the individuals in a system. The security and protection issues of brilliant homes might be feasible with blockchain innovation [3]. We talk about the extra security dangers of the proposed model and set forward reaction methodologies [13].

The first blockchain innovation is strong to single-point assaults. On the off chance that a hub is manufactured, the entire hash esteems in its squares will be not the same as the others and it will be dropped from the system. If over 51 percent of the hubs are manufactured, the bogus information caution will produce results, yet that is hard to execute in a system scale condition [31]. In our model, the imperatives are debilitated, yet we can decrease the hazard to a satisfactory level through the setting of system parameters, particularly for IoT conditions where security prerequisites are not high [12].

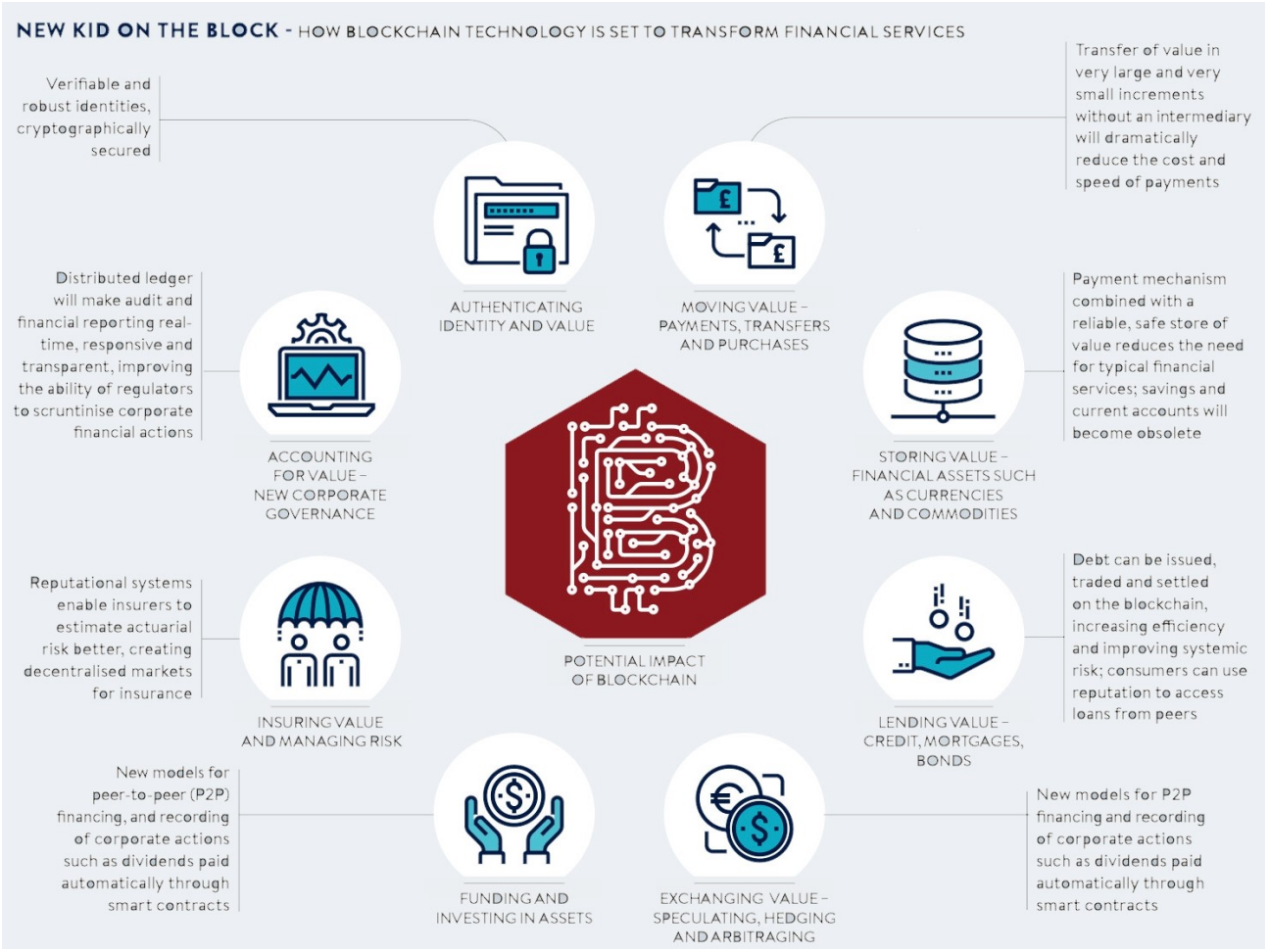


Figure 4: Different Applications of Blockchain technology in Banking sector

Blockchain innovation is ready to bring critical changes in the banking and money industry. From fig.4. we can clearly see the various prominent applications of blockchain in banking sector which directly makes it powerful to use. By considering the properties of blockchain being disseminated and permanent, the innovation can upset the present financial procedures [33]. Be it a trade of qualities, cross border installments, client ID, or verifying the budgetary information of the clients; blockchain can bring a few positive updates for the users. There are a few difficulties that the banking and money industry is presently confronting [13]. Blockchain holds the possibility to fathom those difficulties by decreasing the general expense and making things progressively secure. Blockchain has risen as a suitable innovation for supplanting the present procedures with new and propelled ones. In this specific situation, blockchain empowers the advancement of new business openings and wipe out existing wasteful aspects.

While the innovation is grabbing its pace, it is yet to be perceived how associations change their plans of action and procure its benefits. Blockchain accompanies focal points just as hindrances. If you are searching for approaches to receive blockchain to your momentum business model, it is imperative to consider both the focal points it offers; just as know about the burdens it has [13]. Blockchain's diverse characteristics of decentralization, immutability, and openness make it globally appealing to business sectors and domains. Although there are still many roadblocks in

the way, it can be honestly claimed that Blockchain has the ability to convert the finance and banking sectors by reducing the cost of expertise and financial labor savings.

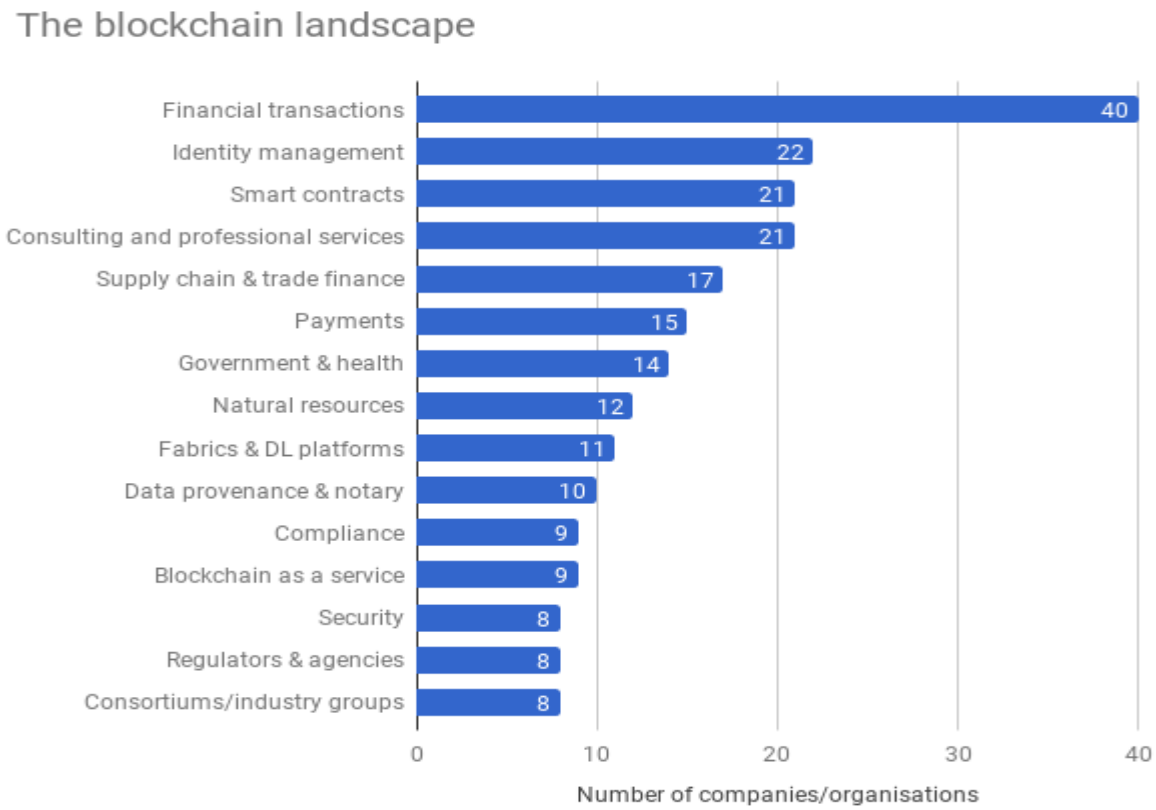


Figure 5: Usage of Blockchain technology in Banking Industry [34]

24 percent of monetary executives from all over the world are very familiar with the blockchain era, according to a PwC report. It also allows customers with the valuable asset of decentralization to take advantage of the group network and infrastructure along with low operating charges [10]. Financial institutes serve the necessary function of keeping money of human beings in a stable and constant way, and therefore the procedures in place involve a few mediators. The presence of these mediators is what makes the company particularly high-priced.

However, with the involvement of too many people and manual procedures, the chances for mistakes and fraud are constantly growing [35] [12]. Blockchain technology pastimes to do heavy weightlifting by using payment securing and making the overall consumer experience extra wide and much less cash consuming. With rising use cases every day, the blockchain revolution has the potential to disrupt the cutting-edge banking and finance quarter and fig.5 shows the use cases of blockchain technology in banking and finance and after a clear review, we can say that usage of blockchain for financial transactions are prominent and later the smart contracts, fraud management and all take the next places [9]. Moreover, after exploring papers related to Blockchain in finance, we found some few ways wherein blockchain can alternate the modern-day face of the banking enterprise are; Fraud reduction, Know Your Customer (KYC), Smart Assets and Smart Contracts, which are explained in detail below.

Fraud Reduction

As blockchain is a stable and non-corruptible environment which is working on a dispensed database system, there is no risk of an unmarried latching mechanism. Every transaction is stored in the form of a block with an incredibly difficult to intoxicate authentication mechanism [13]. In fact, all the blocks are connected to each other and as a result of this connection process, if one block is broken all the different blocks on the blockchain display the exchange immediately. It, in effect, allows music the break and gives the hacker little space to make adjustments within the usual computer. [10]. Using steady Blockchain gadgets well into the field, we could still put off today's cybercrimes and assaults from the banking and monetary domains.

Know Your Customer (KYC)

Banks and monetary establishments are solely worried about the increased fees they have to pay in accordance with AML and KYC i.e. Anti-money laundering and consumer awareness. All of these approaches take a lot of time and should be finished for my part through all the mainly dependent banks and money institutions [10]. The cumulative projected cost of these approaches ranges from 60 million to 500 million dollars annually, according to a Thomson Reuters Survey. In contrast to terrorist activities, the risk assessment protocols for these clients are conducted to reduce money laundering. Generally, banks must upload a patron's KYC data to the main repository that can be used to verify an existing or potential consumer's statistics [36]. In contrast to terrorist activities, the risk assessment protocols for these clients are conducted to reduce money laundering. Generally, banks must upload a patron's KYC data to the main repository that can be used to verify an existing or potential consumer's statistics [12]. This means that by using blockchain technology, duplication of resources could be eliminated. In fact, all system notifications can be in near real-time for all economic institutions. This would lead to a reduction in organizational efforts as well as charges for offices of compliance.

Smart Assets

Trade finances can get rough, as payments within the real estate must be recorded with a clean time and date stamp. Worldwide supply chains contain lots of companies and goods that are bought and distributed continuously. All desk work stressed in archiving the data of interest and supply is even extra entangled. Blockchain would hold these records of sophisticated assets digitized and update them in real-time. A sophisticated asset network would not be limited to just moving devices from right here to there, but it will also have the detail of where a particular product is shipped and where it originated [12]. A sophisticated asset monitoring tool, in contrast, holds lots of scope for banks and financial institutes around the world trading in modern times. A bank with a rich set of data can use blockchain to turn this information into treasured data for its customers.

Smart Contracts

In the banking and finance sector, the implementation of smart contracts can be extremely vital. A smart settlement is a piece of auto-executable code that executes while some conditions which are recorded in it are resolved. Smart contracts can help to boost the level and reduce complex approaches while they are used during the financial transactions [13]. This will make sure that relevant information is passed as when the transaction is properly accepted if all of the system's specified circumstances are met. Therefore, as these terms are clear to all things that are involved within the transactions, the likelihood of errors at the time of execution are significantly reduced [6]. Despite the stringent authorities around the financial globe, commercial banks have begun to

understand the potential of blockchain technology in multicultural businesses to see the growth of cryptocurrencies [19]. The huge financial sector have begun to indulge in assessments to identify the feasible use instances of this highly centralized technological advancement for their business enterprise methodologies.

DISCUSSION

The basic reasons of the association to slant towards the ”dim web” and usage of digital forms of money are to muddle of the characters of its individuals and sympathizers, to carry on the promulgation exercises and to have the option to keep acquiring fund [37]. It is imagined that the present use is going to spread out in reverse relationship to loss of domains and that different associations following the philosophy of El Kaide are going to expand their exercises in the internet after some time. With respect to the exercises of DEASH fear-based oppressor organization, it is seen that psychological militant associations focus on the most extreme impact and harm in their exercises step by step [13]. The inconceivability is evident that people acknowledge themselves and have a sense of security in a situation wherein the day by day life is threatened to such a degree. In this manner, it is a need to avoid potential risk mulling over the thought of expanding globalization of psychological warfare.

It will therefore become more difficult for central banks to pursue monetary policies while ignoring these digital currencies [20] [36]. Central banks will need to change cryptocurrency markets to create a controlled number of cryptocurrencies with more stable prices. Deriving from the above discussions these digital currencies will also be accepted by banks and government agencies [30] [38]. It will therefore be possible to open a bank account or pay your tax through these currencies. Eventually, all users and trade may migrate and consolidate to these currencies and unauthorized users are reduced with high-end authentication. Block chain based banking technology offers a high level of data storage and transmission security, an honest and transparent network infrastructure, decentralization and low maintenance costs [37].

APPLICATION OF BLOCKCHAIN TECHNOLOGY IN HEALTHCARE

Health care has become one of the most significant new uses of blockchain-distributed ledger technology. Blockchain is generally treated as a distributed ledger for distributing, storing, evaluating, documenting, and validating purposes among stakeholders related to health care [39] [38]. Among the technologies of health care, the most debated is the use of blockchains as an underlying Health Information Exchange (HIE) network, or health exchanges between clients, suppliers, payers and other relevant parties [40]. Such implementations can be further classified depending on their main goals of leveraging blockchains. Most researches or ongoing projects concentrate on sharing information on patient care using blockchains to strengthen the monitoring of medical records, improved insurance benefits, streamlined clinical research, system and software gateways to health care.

Blockchain is a mutual, changeless record of shared exchanges worked from connected exchange squares and put away in an advanced ledger. Blockchain, as seems to be, as of now does not have various components expected to make it effective as a national record keeping system to supplant our current system. [40] Many of these obstructions are fiscally driven, for example, the motivating forces to make this huge system of associated Blocks of information [37]. The current EHR

showcase is esteemed at several billions of dollars, and as of late, numerous scholastic colleges and other enormous well-being frameworks have emptied many dollars into new merchant drove business well-being record frameworks in huge part boosted by the government.

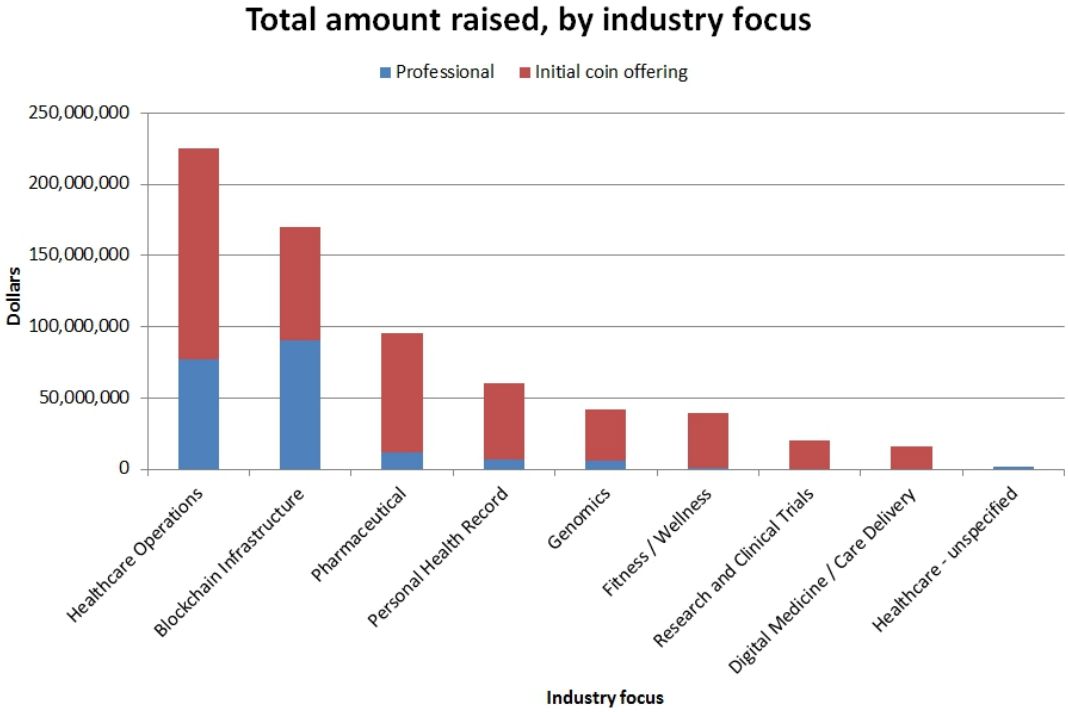


Figure 6: Blockchain market capitalisation in Healthcare industry [41]

From the fig.6, we can clearly review how various sectors of healthcare industry are pouring huge amount of money in blockchain technology We describe the key benefits and comparative advantages of blockchain in order to better understand why distributed ledger technology can be feasible for health applications [36]. As Blockchain can be used in various healthcare domains like healthcare genomics, pharmaceuticals, clinical research and biomedical, which are explained below.

BLOCKCHAIN AND GENOMICS

Blockchain is permitting to record genomics information that can battle fake pharmaceuticals and ensure licensed innovation rights [39].Medicinal Genomics Corporation (https://www.restorative genomics.com) is an atomic data organization that applies best in class life science innovation to Cannabis plant hereditary qualities and committed to sequencing of genomes of the patients with seizure issue, for example, epilepsy, formative and scholarly inabilities (counting those on the chemical imbalance range), and mitochondrial diseases [39]. It has developed novel DNA refinement advancements and Next-Generation DNA Sequencing advances which have been broadly received by fundamental restorative examinations establishments and business associations. It is the utilization of blockchain to counter claims on licenses as there might be no genuine prior evidence of it in the zone and utilizing it to get lines carefully legally approved by utilizing confirmation of blockchain innovation. Worldwide Alliance for Genomics Health (GA4GH) (https://www.Ga4gh.Org) is wanting to apply blockchain for the world over sharing genomics

statistics [39]. Decentralization and sharing of information by mean of blockchain will bring down the expense and enable nations to the information [38] [33]. Because of protection limitations of data, it might be conceivable to place into impact individual blockchain, be that as it may, the entire parcel in close to home blockchain might be exposed to the supervision of an unbiased applicable position. Private blockchain can be a need in certain conditions in genomics like while adapting to the total genome. Of past due, patients are upsetting more affirmations that their genomic records are being verified precisely, got to as in step with their needs which comes into reality with blockchain [26] [36].

In the meantime, patients are encouraged to gain the right of access with respect to their results and allow individuals to access other blocks for research purposes in their data. In this way, it is basic for partners to perceive blockchain utilization in life science R&D and exceptionally in pharma R and D and its potential interruption in near future [39] [42]. The blockchain entries of data are permanent. Subsequently, the data stored on a ledger cannot be changed or removed. Therefore, caution is required if the personal information preserved in the blockchain is to meet with consumer protection laws, which might be difficult in terms of personal rights in removing or modifying data because of certain restrictions. A Russian startup called Zenome [42]. It is hoping to place buyers in charge of their genomic information. The blockchain-based, distributed innovation will computerize assortment and sharing of genomic information to some degree by enabling people to transfer their own DNA profiles control which scientists may access and add to each protected store of data [12]. This could be a stage where genomic data can be obtained and sold.

BLOCKCHAIN AND PHARMACEUTICALS

The revolutionary potential of blockchain technology has caught scientists and engineers' attention as it makes businesses increasingly competitive and innovators keep feeding the excitement about opportunities [43]. Blockchain ledger helps Food and Drug Administration (FDA) licenses to become quicker in new drug innovation methods due to different data collection, audit trail supply chain screening and reduced theft due to the acknowledgment of different network events. Security in the supply chain is one aspect that has recently gained attention, while the Drug Supply Chain Safety Act (DSCSA) has been introduced in the United States [12]. Among various issues, the action was brought off to tackle the inconvenience of illegal drugs. Fraudulent tablets are medications that do not include the active ingredients they may be supposed to have and can, therefore, affect customers from all sectors. Blockchain can be a response to dealing with the illegal drug issue as the blockchain network guarantees drug detection, tracking, inspection and alerts, trust and accountability among groups throughout improvements in the production lines' property rights.

BLOCKCHAIN AND CLINICAL RESEARCH

In contemporary clinical research, reproducibility, data sharing, questions over personal data confidentiality and patient enrollment in clinical trials are enormous scientific obstacles [43]. Blockchain, a new technology, may be a key to solving these issues and should attract the attention of the entire field of clinical research [39]. Blockchain helps a clinical research to attain a significant level of historicity and inviolability of evidence for the whole information stream. It therefore guarantees traceability, avoids post-reconstruction and allows the clinical research to be fully managed through what is known as smart contracts. At the same time, for a single patient or team of patients or clinical trial partners, the software provides fine-grained information access, security

and mutual criteria [12]. Information inviolability and historicity are two key functional features of the data level.

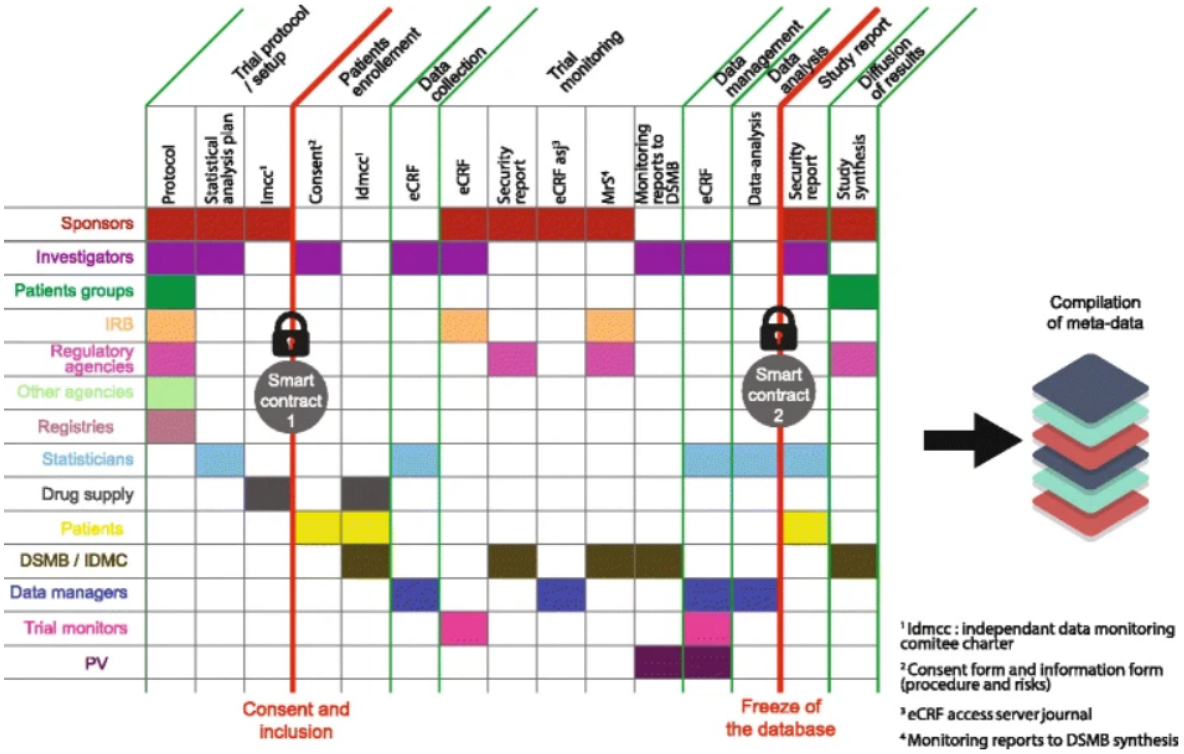


Figure 7: clinical research complex data workflow in Blockchain [44]

In terms of data inviolability and historicity, it follows that Blockchain guarantees that incidents are recorded in their proper chronological order, effectively preventing a post-reconstruction study. Firstly, the cryptographic verification of each transaction guarantees information integrity. This is crucial to maintaining data integrity — preventing information falsification, data "beautification" and software innovation in some way [43] [45]. Secondly, traceability and data historicity are among the core features of the technology: every transaction with Blockchain is timed. Such material is freely transparent; a copy of the time-stamped data evidence is held by any client. Fig.7 illustrates the diverse streams of heterogeneous information and metadata circulated in a clinical trial, including multiple actors in the healthcare sector, and all records that can be processed in Blockchain.

DISCUSSION

In the medical information sharing system, we combine the knowledge of blockchain, database and cryptography to build a system for the sharing of medical information. By using the system, we can improve the use of medical data and encourage the sharing of medical data. It will be of great benefit to the development of medicine [43]. By utilizing the framework, we can improve the use of medicinal information and advance the sharing of restorative information. It will be enormously useful for the improvement of medication. The model likewise has a few hindrances. With the use of POW, we're going to waste some processing capability, and as the machine gets bigger, it's going to waste a lot of resources. In addition, the clinical date digest encode requires the support of health professionals. It is technology that always drives science forward. Blockchain technology is a type

of system needed to achieve the next order of magnitude of change in vital areas such as human health , genome science, agriculture, pharmacy and beyond. There is a huge importance of blockchain technology on medical sector by recording the patient's data and storing it with high security domain to archive every information. It is time to adopt these revolutionary and inevitable innovations that will advance science and change the lives of the common man in the society.

SUMMARY

After a notable research on underlying blockchain technology which offers distributed governance, immutable audit trail, provenance of data, robustness and privacy, we contrasted blockchain innovations and identified prominent applications of blockchain related to historically decentralized cryptocurrencies, banking systems and healthcare. Moreover, we presented a summary of cryptocurrency implementations of blockchain technology, such as Bitcoin and gave a detailed explanation about all other cryptocurrencies. And it has seen that administrations will perceive digital forms of money later and national banks will issue their own cryptographic forms of money at a superior cost strength, better security and better protection (backed by the legislature). However, blockchain has huge history in banking and cryptocurrency and it is currently entering into the healthcare industry by widening its borders (i.e., enhancing medical record processing, genomics, enhancing insurance claim system, streamlined clinical research, biomedicals and pharmaceuticals).

And the table.1 provides the overview of different studies, where the authors explained the prominent applications of blockchain in all distinguishable fields like banking/ finance, cryptocurrency and healthcare/medical. Every author has their own route in explaining about blockchain technology in each sector by holding their unique frameworks and different fundamentals [3] [48]. Giving a walkthrough over the table, we can find the works of different authors in blockchain technology who en-routed the importance of blockchain in the fields of smart contracts, IOT, IT governance, automobiles, medical, banking and finance and economy changes which has created the significant improvements in all industry domains. And one of the important uses of blockchain from the above is, electronic voting system framework built based on blockchain technology which has improved the voting system with reduced the vote rigging / electronic voting frauds with proper authorized authentication. Which even has high-end security of voting data for getting the relevant and accurate results.

Table 1: Overview of studies on Blockchain

Papers	Methodology	Findings
Ali FarukhAcik et al. (2019) [36]	Used the conceptual framework of block chain distributed ledger software	Trade credits to create relative and immutable ledgers on a decentralized base transactions.
Huan Zhou et al. (2019) [46]	Used the resource allocation methodology of SLA and found its issues	Blockchain based witness model for cloud service level agreement (SLA) enforcement
Fran Casino et al. (2019) [4]	Worked on quality evaluation, synthesizing data in blockchain and reported its characteristics	Blockchain provides potential mechanisms for its application domain
Konstantinos Christidis et al. (2016) [6]	Worked on blockchain smart contracts for distributed and automated works	Block chain smart contracts and IOT to create significant changes across industries.
Roman Beck et al. (2018) [1]	Worked on foundations of blockchain in IT gover- nance and economics and found its issues	A framework and research agenda for governance in blockchain economy

Kibin Lee et al. (2016) [33]	Worked on electronic voting criterion design for system integrity, voter anonymity and authentication.	A blockchain based electronic voting system for better society
Yuxin Liao et al. (2019) [20]	Used a chronological order for trading data by utilizing SHA-3 algorithm	A Blockchain traceability system based on smart agriculture using wireless sensor networks.
Steve Huckle et al. (2016) [30]	Worked on socialism techniques and identified blockchain applications in it	The development of blockchain is directly applicable to various forms of socialism.
Hao Jiang et al. (2018) [40]	Worked on blockchain conventional databases and information sharing models in medical domain	A design of blockchain medical info sharing model with enhanced sharing and utilization of data.
Yidong Wang et al. (2019) [38]	Worked on blockchain based aviation missile business model using encryption algorithm	Blockchain based aviation missile data security system has a potential outcome in security domain.
Ferri Andrianto Susilo et al. (2018) [16]	Worked on blockchain based encryption algorithm for facial recognition, AI, machine learning.	Significant blockchain based digital supply chain development using Rijindael algorithm 256
Zhu Chaoyong et al. (2018) [12]	Analyzed the Stackelberg-problem in supply chain finance by blockchain based funding plat- forms and programs	A significant mechanism of blockchain based supply chain finance
Yu Wei et al. (2019) [9]	Worked on improving state-of-the-art private SSE scheme based on asymmetric primitive cryptography	An efficient FSSE(Forward secure searchable encryption) design with keyed-block chains
Cosmin Rus et al. (2018) [19]	Analysis of bitcoin phenomenon for safe and distributed transactions	Potential bitcoin outcomes in both economic and technological notions in entire digital coin creation
Zhuo Yu et al. (2019) [47]	Worked on Blockchain based electronic audit system by using software architectural model	A blockchain based online audit technological framework for realistic and feasible works.
Patrice Lyons et al. (2018) [37]	Analyzed the design of trade based on architecture of the Digital Object(DO) and identified the purpose of blocks using encryption	Designing blocks as digital entities has created a great impact on technology and development

Moreover, every sector of the society is using blockchain in their respective ways for getting relevant outcomes and most prominently the importance of blockchain technology in medical sector is clearly increasing day by day and many technologists and scientists and digging deep into it , to find the future possibilities. It is clear that blockchain has already created its own impact in banking/finance, digital currencies, IOT, Trustworthy cloud and many other sectors, It needs to be indulged more in healthcare industry by recording the patient's data and storing it in high security domain to make it easy to archive every information at any time and this information is secured and stored on chain of blocks and providing high security approach on online data share.

At the end, we found several possible challenges facing through the implementation of blockchain technology in banking, healthcare and cryptocurrency (e.g., transparency, scalability, and 51 percent of hacking threats). These risks prominently encountered in the banking sector and can be overcome by designing high security protocols to enter the banking server and even cryptocurrency transfers and user logins in healthcare organization should need a high-end authorized authentication. Through mitigating these limitations, blockchain technology can reach its heights in all directions. To conclude in detail each Blockchain decentralized ledger technology has its own niche in global market and have the potential to advance the areas of Banking/finance,

Cryptocurrency and Health care in prominent ways and we expect several new applications to appear shortly in future.

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