A PROJECT REPORT ON ADVANCED SECURITY WITH SPECIAL REFERENCE OF BLOCKCHAIN TECHNOLOGY

(I-3004)

(Session: 2022-2023)

Submitted in partial fulfilment of the requirement for the award of Master of Commerce

(Affiliated to CCS University, Meerut)

SUBMITTED BY

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CERTIFICATE

*This is to certify that the project entitled "**ADVANCED SECURITY WITH SPECIAL REFERENCE OF BLOCKCHAIN TECHNOLOGY**" by Miss **Aayushi Tiwari** is a bona-fide record of work done under my guidance and supervision in partial fulfilment of the requirement for the award of the degree of Master of Commerce. The project embodies the result of original work and studies carried out by the student herself and the contents of the project do not form the basis of the award of any other degree to the candidate or to anyone else.*

Project Guide

Dr.Hemlata Agarwal

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Signature of the Student

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DECLARATION

I, ***Aayushi Tiwari*** *student of* ***M.com 3rd sem,*** *hereby declare that the bona-fide record of "****ADVANCED SECURITY WITH SPECIAL REFERENCE OF BLOCKCHAIN TECHNOLOGY****" done in partial fulfilment of the M.COM degree program of* ***Chaudhary Charan Singh University*** *under the guidance of* ***Dr. Hemlata Agarwal , Assistant Professor, Ram Chameli Chadha Vishvas Girls College, Meerut***

The information presented through this project is true and original to the best of my knowledge.

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ACKNOWLEDGEMENT

First, I praise and thank God Almighty who showers his plentiful blessings upon me, who guide, shield and strengthen me all the time.

I am thankful to my teacher ***Dr. Hemlata Agarwal*** *my project guide without whose guidance and encouragement, I could not have completed my project work. Her moral support besides the scholarly guidance in research is the foundation of this Project. Thankyou, for all the help and guidance.*

I wish to express my performed gratitude and heart-felt thanks to ***Dr. Neetu Chawla*** *Principal of* ***Ram Chameli Chadha Vishvas Girls College*** *for her encouragement and for giving me permission for the study*

I am also thankful to the other faculties of the department for the valuable advices and co-operation, rendered for the successful completion of my project.

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Neetu Chawla

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LIST OF FIGURES & CHARTS

CHAPTER 1

INTRODUCTION

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INTRODUCTION

One of the most hyped IT buzzwords to have emerged in the last couple of years . Blockchain has found its way into major media headline on a near-basis , but a year and half ago , it was a word used by a relatively small number of people to describe the peer-to-peer distributed ledger technology.

The blockchain is an absolutely innovative invention-the brainchild of a person or a group of people known by the pseudonym , Satoshi Nakamoto. But since then, it has evolved into something greater and the main question every single person is asked is : what is blockchain?

Before we explore the technology of blockchain and how it works, it is first worth exploring the concept of behind blockchain and its uses in different sectors.

It is to no surprise that blockchain technology being a buzzword of the day has attracted the attention of entrepreneurs, governments, banks and many more people across the globe see the advent of the blockchain technology to "The Internet". Also, they see the shift of power balance from centralized bodies in the communication and business sectors.

Blockchain is the backbone Technology of Digital CryptoCurrency BitCoin. The blockchain is a distributed database of records of all transactions or digital event that have been executed and shared among participating parties. Each transaction verified by the majority of participants of the system. It contains every single record of each transaction.
BitCoin is the most popular cryptocurrency an example of the blockchain. Blockchain Technology Records Transaction in Digital Ledger which is distributed over the Network thus making it incorruptible. Anything of value like Land Assets, Cars, etc. can be recorded on Blockchain as a Transaction.

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BENEFITS OF BLOCKCHAIN TECHNOLOGY:

- ***Time-saving:*** *No central Authority verification needed for settlements making the process faster and cheaper*

- ***Cost-saving:*** *A Blockchain network reduces expenses in several ways. No need for third-party verification. Participants can share assets directly. Intermediaries are reduced. Transaction efforts are minimized as every participant has a copy of shared ledger.*

- ***Tighter security:*** *No one can temper with Blockchain Data as it shared among millions of Participant. The system is safe against cybercrimes and Fraud.*

- ***Consensus-based:*** *All relevant network participants must agree that a transaction is valid. This is achieved through the use of consensus algorithms.*

- ***Flexible:*** *Smart Contracts which are executed based on certain conditions can be written into the platform. Blockchain Network can evolve in pace with business processes.*

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OBJECTIVES OF THE STUDY:

- *To study how concept of Blockchain can help a country.*
- *To study the different aspects of Blockchain .*
- *To study the impact of Blockchain on the different sectors.*
- *To study the effects of Blockchain on the different sectors.*
- *To study about the outcomes of Blockchain on the different sectors.*

RESARCH METHODOLOGY:

RESEARCH DESIGN

My research design will be descriptive followed by partially exploratory because the entire project will be based on the data collected from internet, reports, journals and analysis so that the detailed and clear description will be there in the project, so there is a mix of explanation and description design. It will cover all the major information about Blockchain and will give a clearer view to the reader how it works.

SOURCE OF DATA

The main source of information in my project will be based on secondary data like facts, figures, graphs collected from internet, which will be analyzed and summarized in the form of this project report.

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SCOPE OF RESEARCH

My project topic basically falls in the category of business, banking & finance. The objective of the research having the main aim to make people aware of Blockchain and it use in different sectors.

LIMITATIONS OF THE STUDY :

- ✓ The secondary data collected might consist of manipulations, which might have given bias in the result.
- ✓ The lack of experience in preparing the project report.
- ✓ The method lacks flexibility. In case of inadequate or incomplete information the result may deviate.
- ✓ It is very difficult to check the accuracy of the information provided.
- ✓ Documents may lack authenticity parts of the document might be missing, and we might not even be to verify the document, meaning we cannot check whether its biased or not.
- ✓ The way things are measured may change over time, making historical comparisons difficult.
- ✓ As a project report the area of study is vast and may be not enough for to give any limitation.

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CHAPTER 2

REVIEW OF LITERATURE

INTRODUCTION

Review of literature forms an integral as well as an essential part of modern research studies. No research study is considered complete unless an extensive literature review is made by the researcher. The basic purpose of undertaking this exercise is to find the research gap between, studies conducted so far or literature available, and also to finalize precisely the topic of research and to get insight into the research topic selected for study, In this sense this exercise becomes a sort of exploratory research.

REVIEW OF LITERATURE :

- ***Bhaskar, P.,Tiwari, C.K. & Joshi, A. 2021,*** *This research paper provides a groundwork for education institutions, the policymakers and researchers to explore other areas where blockchain technology can be implemented, this research has also suggested some prospective uses of blockchain technology in different functions of an education system, more application can be brought into the education system to exploit the potential of blockchain technology. The study identifies the benefits, barriers and present application of blockchain technology in education. The analysis shows that blockchain technology in education is still a young discipline, but has a lot of potential to benefits the educational sector at large.*

- ***Vincenzo Morabito 2018,*** *In this researchTechnological advancements and innovation is constantly evolving and growing at such a fast rate that everyone is required to stay knowledgeable of these advancements and innovations. The standard change of blockchain is not left out from this evolution. The technological concept behind the blockchain is interestingly closely identical to that of a database. However, it is clearly one of the key concepts that needs to be understood for the future. There are five key concepts that not only need to be understood but also explored in a manner that examines how they interrelate one to another: smart contracts, decentralized consensus, the blockchain, trusted computing and proof of work/state. This exciting computing standard is critically important because it will be instrumental to the creation of decentralized applications.*

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- ***Primavera De Filippi 2017,*** *In their research paper they said that the blockchain is more than just ICT innovation, but facilitates new types of economic organization & governance. Suggests two approaches to economics of blockchain: innovation-centered and governance-centered. Argues that the governance approach-based in new institutional economics and public choice economics-is most promising, because it models as a new technology for creating spontaneous organizations, i.e. new types of economies."*

- ***Goldman Sachs 2016*** *, In his research paper he said that blockchain has the potential to redefine transactions and the back office of a multitude of different industries. From banking and payments to legal representatives to voting system to vehicle registrations to wire fees to gun checks to academic records to trade settlements to cataloguing ownership of works of art, a distributed shared ledger has the potential to make interactions quicker, less-expensive and safer.*

- ***Guang Chen, Bing Xu, Manli Lu & Nian-Shing Chen 2018,*** *The current paper focused on its potential educational applications on distributed ledger technology. It allows participants to secure the settlement of transactions, achieve the transaction, and transfer of assets at a low-cost. Blockchain uses specialized hardware to construct sizeable cryptographic data chain, and SHA-256 hash function is used to prevent the tampering of data of third-party users. Any attempt to change even just a bit of information will break the existing chains. In short, blockchain is a decentralized and trustworthy digital public ledger. It uses distributed techniques and consensus algorithms that were maintained by all participants.*

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- ***Laura Jutila 2017,*** *In his research paper he acknowledges that industries and old ways of doing business have been reshaped or become entirely obsolete due to the new digitalization trends. The current technology to truly revolutionize and disrupt especially industries that rely on trust, such as financial sector, is the blockchain technology. The core idea of this technology is that it is a public, shared and tamperproof ledger that*

allows people who do not know or even trust in each other to share information in a trustworthy ledger, where any sorts of immaterial information of value can be stored. This thesis is a literature review that provides a theoretical framework to examine how the blockchain technology affects particularly the financial sector.

- **Shuchih Ernest Chang & Hueimin Louis Luo & Yichian Chen 2019,** *This paper, we review the design of enterprise blockchains to explore how changing the architecture of trade finance could impact the drivers of trade finance gaps. By grounding our analysis in the technical architecture of a live, enterprise blockchain platform, we aim to provide a tangible discussion around the technology. Applying blockchain technology to trade finance – regardless of the top of stack application – will directly impact the flow of information, compliance challenges, and profitability in ways that can contribute to a more inclusive trade finance structure.*

- **Yli-Huumo J, Ko D, Choi S, Park S, Smolander K (2016)** *The majority of research is focusing on revealing and improving limitations of Blockchain from privacy and security perspectives, but many of the proposed solutions lack concrete evaluation on their effectiveness. Many other Blockchain scalability related challenges including throughput and latency have been left unstudied. On the basis of this study, recommendations on future research directions are provided for researchers. The goal of Blockchain technology is to create a decentralized environment where no third party is in control of the transactions and data.*

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- **A Kwilinski 2019,** *In his study researched that network accounting can be translated into a secure, transparent for all parties and easy to use format. The introduction of technology in accounting has the following advantages: online transactions are high-speed and user-friendly; accounts can be updated using smartphone apps; optical data recognition systems allow you to automate the entire process, starting with the introduction of primary documents. Therefore, consideration of issues related to the use of the blockade accounting infrastructure in the block is important and relevant. The scientific hypothesis of the research is based on the assumption that the introduction of the blockade technology in the field of accounting will ensure the quality, transparency, efficiency and safety of accounting and control and management processes at the enterprise.*

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CHAPTER 3

THEORETICAL FRAMEWORK

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HISTORY OF BLOCKCHAIN :

- *In 1991, researcher scientists named Stuart Haber and W. Scott Stornetta introduce Blockchain Technology. These scientists wanted some Computational practical Solution for time-stamping the digital documents so that they couldn't be tempered or misdated. So both scientists together developed a system with the help of Cryptography. In this System, the time-stamped documents are stored in a Chain of Blocks.*

- *After that in 1992, Merkle Trees formed a legal corporation by using a system developed by Stuart Haber and W. Scott Stornetta with some more features. Hence, Blockchain Technology became efficient to store several documents to be collected into one block. Merkle used a Secured Chain of Block which stores multiple data records in a sequence. However, this Technology became unused when Patent came into existence in 2004.*

- *However, in the same year 2004, Cryptographic activist Hal Finney introduced a system for digital cash known as "Reusable Proof of Work". This step was the game-changer in the history of Blockchain and Cryptography*

After that in 2008, Satoshi Nakamoto conceptualized the concept of "Distributed Blockchain" under his white paper: "A Peer to Peer Electronic Cash System". He modified the model of Merkle Tree and created a system that is more secure and contains the secure history of data exchange. His System follows a peer-to-peer network of time stamping. His system became so useful that Blockchain become the backbone of Cryptography.

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Blockchain mix many old technologies that society has been using for thousands of years in new ways. For example, cryptography and payment are merged to create cryptocurrency. Cryptography is the art of secure communication under the eye of third parties. Payment through a token that represents values is also something humans have been doing for a very long time, but when merged, it creates cryptocurrencies and becomes something entirely new. Cryptocurrency take the concept of money and move it online with the ability to trade value securely through a token.

Blockchains also incorporate hashing (transforming date of any size into short, fixed-length values.) Hashing also incorporates another old technology called Merkle trees, which take many hashes and squeeze them down to one hash, while still being able to prove each piece of data that was individually hashed.

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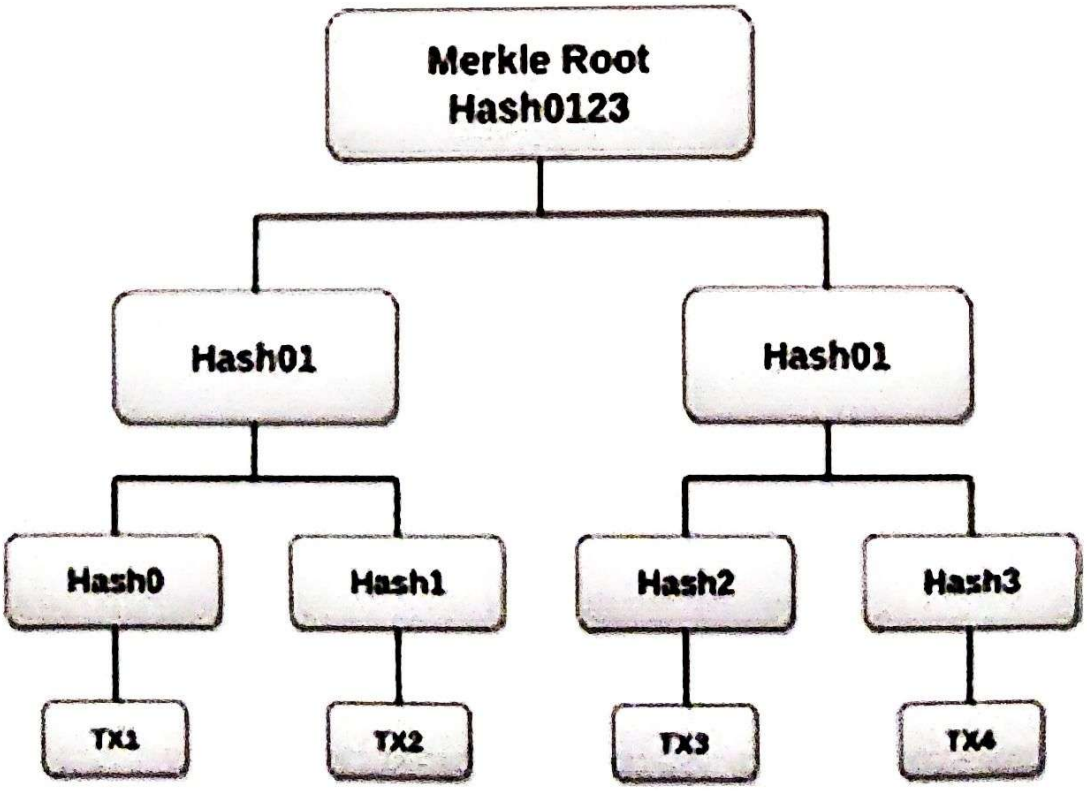

MERKLE TREE

Neetu Chawla

Ultimately, blockchain are ledgers, which society has been using for thousands of years to keep financial accounts. When all these old models are merged and facilitated online in a distributed database, they become revolutionary.

Bitcoin was designed primarily to send the Bitcoin cryptocurrency . But very quickly, the creators realized that it had a much larger potential. With that in mind, they architected the blockchain of Bitcoin to be able to record more than the data concerning the movement of the token. The Bitcoin blockchain is the oldest, and one of the largest, blockchains in the world. It is composed of thousands of nodes that are running the Bitcoin protocol. The protocol is creating and securing the blockchain.

In order to create a message in the Bitcoin blockchain, you have to send some Bitcoin from one account to another. When you send a transaction in Bitcoin, the message is broadcast across the whole network. After the message is sent, it`s impossible to alter it because the message is recorded inside the Bitcoin blockchain. This feature makes it imperative that you always choose your message wisely and never broadcast sensitive information.

Broadcasting the same message to thousands of nodes and then saving it forever in the token`s ledger can add up in a hurry. So, Bitcoin requires that you keep your communications very short. The current limit is just 40 characters.

Bitcoin is a living and ever-changing system. The Bitcoin core development community is actively seeking ways to improve the system by making it stronger and faster. Anyone can contribute to the Bitcoin protocol by engaging on its GitHub page. However, there is a small community of dominant core developers of Bitcoin.

WHAT IS BLOCKCHAIN?

Blockchain refers to a distributed, encrypted database, which is a public depository of information that cannot be reversed and is incorruptible. In other words, a Blockchain can be defined as a distributed public ledger or database of records of every transaction that has been carried out and shared among those patrticipating in the network.

Every transaction or digital event in the public ledger to the authenticated via the agreement of more than half of those participating in the network. This implies that no participant or user as an individual can modify any data within a blockchain without the consent of other users(participants). It could be observed clearly, that the technological concept behind the Blockchain is interestingly closely identical to that of a database.

The Blockchain makes it possible for first time participants to reach an agreement on how a specific transaction or digital event can occur without requiring any controlling authority. This technology (Blockchain Technology) is unique in the sense that it reduces the function of the middleman.

WHAT IS BLOCKCHAIN?

A database or a ledger that maintains a continuously growing list of data records or transactions.

So, it`s a spreadsheet like Excel?

In a way yes, but it has special qualities that make it better than traditional databases.

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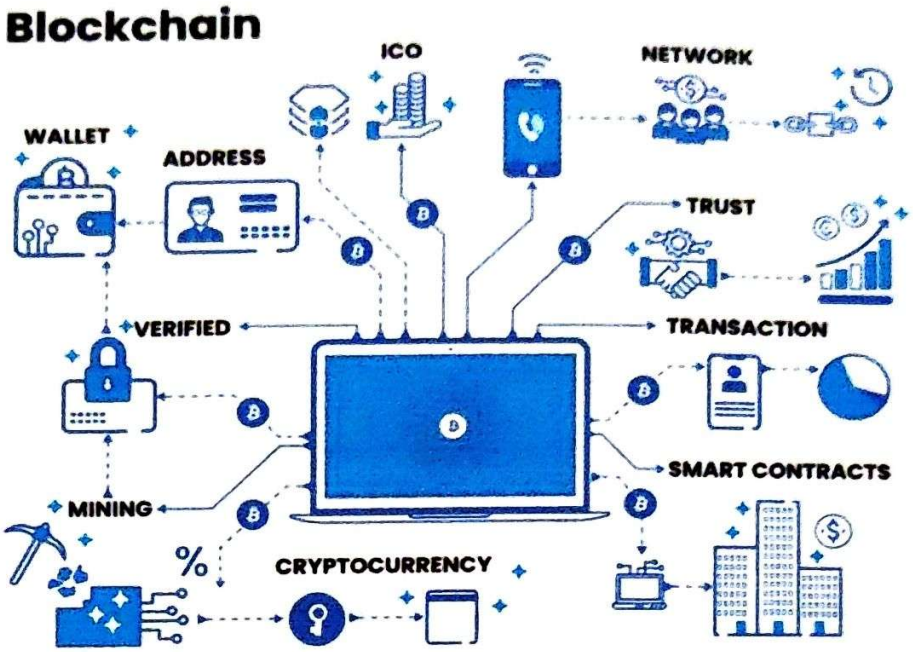
Figure 1.1



Key Features of Blockchain

I. Decentralised Database

A decentralized database/ledger stores information across a network of distributed computers as opposed to on a single centralized server. Decentralized databases require consensus amongst the majority of computers in the network in order to determine if the information stored on the database is accurately represented.

Advantages:

- *Modular development*
- *Reliability*
- *Lower communication costs*
- *Better response*

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Disadvantages:

- *Costly software*
- *Large overhead*
- *Data integrity*
- *Improper data distribution*

II. Eliminating Third Party

Third-party data is any information collected by an entity that does not have a direct relationship with the user the data is being collected on. Often times, third-party data is collected from a variety of websites and platforms and is then aggregated together by a third-party data provider such as a DMP.

III. Smart Contracts

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss.

IV. Self-Executing Systems

Self-executing broadly refers to something that goes into effect or can be enforced after being created without anything else required. Often self-executing refers to a clause of a contract or law that makes the document effective after the document is signed or other requirement.

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Different types of Blockchain

All blockchain are classified into three categories:

1) ***Public Blockchain***
2) ***Private Blockchain***
3) ***Permissioned Blockchain***

Public Blockchain

In a Public Blockchain, anyone can read and write the data stored on the Blockchain as it is accessible to everyone in the world. A person can become a member of the Blockchain network and can store, send and receive data after downloading the required software on his device.

A Public Blockchain is completely decentralized to read and write data onto the Blockchain are shared equally by all the connected users, who come to a consensus before any data is stored on the database, A Public Blockchain is based on a completely trust-less system where no user is given special privileges on any decision.

Private Blockchain

A private blockchain is managed by a network administrator and participants need consent to join the network i.e., a private blockchain is a permissioned blockchain. There are one or more entities which control the network and this leads to reliance on third-parties to transact. In this type of blockchain only entity participating in the transaction have knowledge about the transaction performed whereas others will not able to access it i.e. transactions are private.

The organization in control has the power to change the rules of a Private Blockchain and may also decline transactions based on their established rules and regulations.

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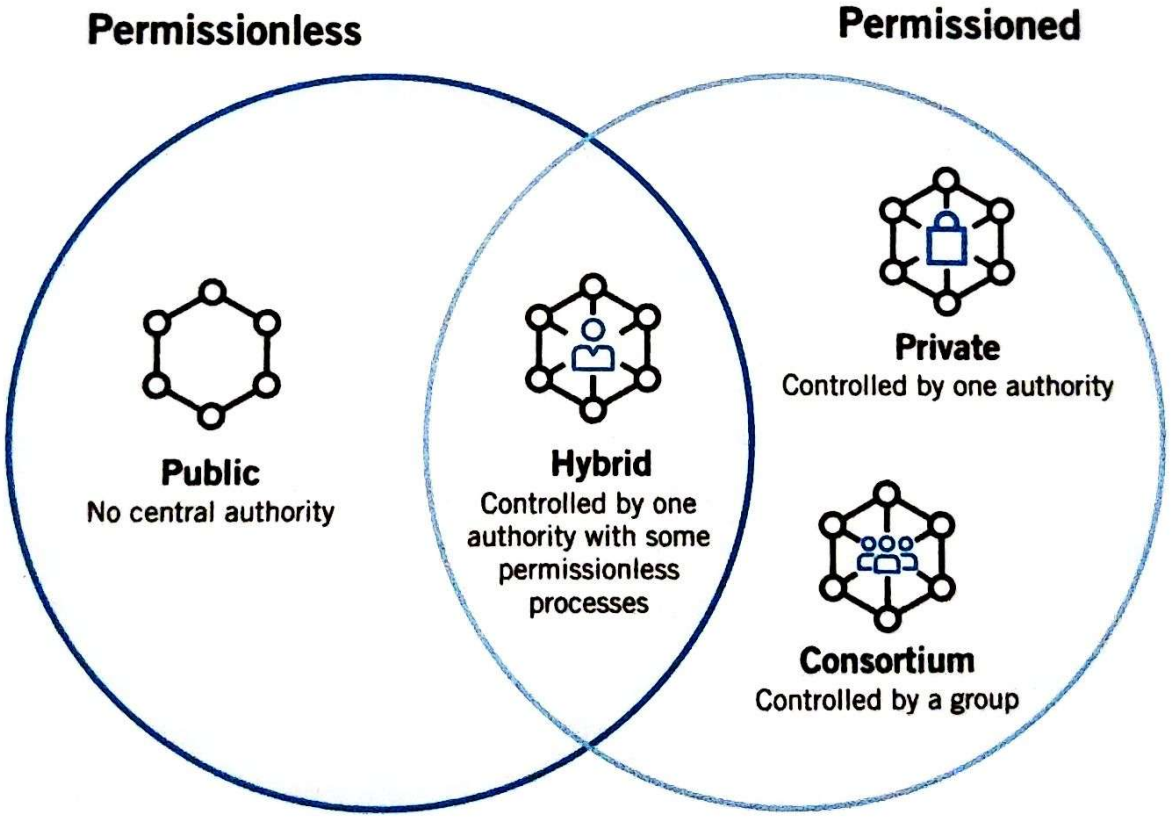
Permissioned Blockchain

A Permissioned Blockchain is a type of Private Blockchain and shares many features of the latter. A Permissioned Blockchain provides a hybrid between the `Low-trust` provided by Public Blockchains and the `single highly-trusted entity` model of Private Blockchains. Popularly called a Consortium Blockchain, it is one where instead of allowing any person with an internet connection to participate in the verification of the transaction process or with an internet connection to participate in the verification of the transaction process or allowing a single company to have full control, a few selected nodes are predetermined.

Figure 1.2



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Benefits of Blockchain Technology

There are immense benefits the Blockchain technology provides. Some of these benefits include;

Trust, Openness, Independence, Speed Robustness, Global Nature and Effectiveness.

Before any data is added to an explicitly defined Blockchain, it is expected that a greater number of users of the system reach an agreement. This pattern is quite distinict from the centralized pattern in which there is a central authority. A more trustworthy system is created when majority of the users have a say over the writing, creation and alteration of such data. This high level of trust has been the case of the innovation brought about by Blockchain technology.

Also, through the case of smart contracts that reconciles in real-time, the level of openness has drastically improved with the advent of blockchain technology. Also, since trade data is published to a common platform, trades can be viewed by participants in real-time. This helps to forestall any form of manipulations or alterations.

The design of Blockchain technology was done in such a manner that this technology is not dependent on any financial institution such as banks or governments. This makes it more attractive and less prone to regulations. Furthermore, the technology of Blockchain has enhanced the level of speed of transactions. Since Blockchains can automate messages by the addition of code snippets called `smart contracts` that does not involve the involvement of any human in any way, the speed of payment is enhanced.

- *Enhanced security. Your data is sensitive and crucial, and blockchain can significantly change how your critical information is viewed.*
- *Greater transparency.*
- *Instant traceability.*
- *Increased efficiency and speed.*
- *Automation.*

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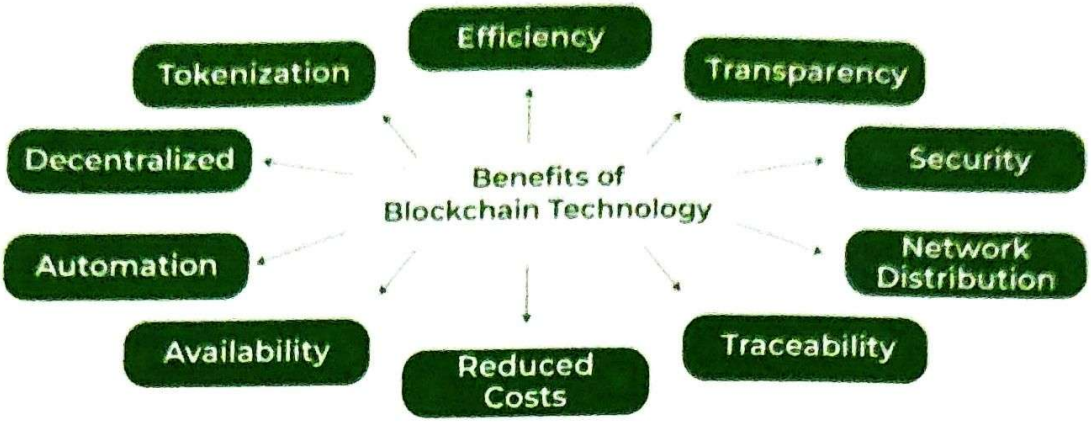
Figure 1.3



Blockchain technology may provide several important features that could be leveraged for use in the creative economy:

- ✓ *Transactions are verified and approved by consensus among participants in the network, making fraud more difficult.*
- ✓ *The full chronology of events (for example, transactions) that take place are tracked, allowing anyone to trace or audit prior transactions.*
- ✓ *The technology operates on a distributed, rather than centralized platform, with each participant having access to exactly the same ledger records, allowing participants to enter or leave at will and providing resilience against attacks.*
- ✓ *Empowered users: Blockchain provides the users with the ability to control their information as well as the transaction that they are part.*
- ✓ *Process with integrity, transparency and immutability: Transactions conducted using blockchain are viewable by public and cannot be altered, thus, their integrity, transparency and immutability are guaranteed.*
- ✓ *Faster and lower costs transactions: Blockchain technology has the potential to radically reduce the time and costs for the transactions by eliminating the intermediaries or third-party agents.*

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Limitations of Blockchain Technology

Lack of Awareness

There is a lot of discussion about blockchain, but people do not know the true value of blockchain and how they could implement it in different situations.

Limited availability of technical talent

Today, there are a lot of developers available who can do a lot of different things in every field. But in the blockchain technology, there are not so many developers available who have specialized expertise in blockchain technology. Hence, the lack of developers is a hindrance to developing anything on the blockchain.

Immutable

*In immutable, we cannot make any **modifications** to any of the records. It is very helpful if you want to keep the **integrity** of a record and make sure that nobody ever tampers with it. But immutability also has a drawback.We can understand this, in the case, when you want to make any revisions, or want to go back and make any reversals. **For example**, you have processed payment and need to go back and make an amendment to change that payment.*

Key Management

As we know, blockchain is built on cryptography, which implies that there are different keys, such as public keys and private keys. When you are dealing with a private key, then you are also running the risk that somebody may lose access to your private key. It happens a lot in the early days when bitcoin wasn't worth that much. People would just collect a lot of bitcoin, and then suddenly forgot what the key was, and those may be worth millions of dollars today.

Scalability

*Blockchain like bitcoin has consensus mechanisms which require every participating node to verify the transaction. It limits the number of transactions a blockchain network can process. So bitcoin was not developed to do the large scale volumes of transactions that many of the other institutions are doing. Currently, bitcoin can process a maximum of **seven transactions per second**.*

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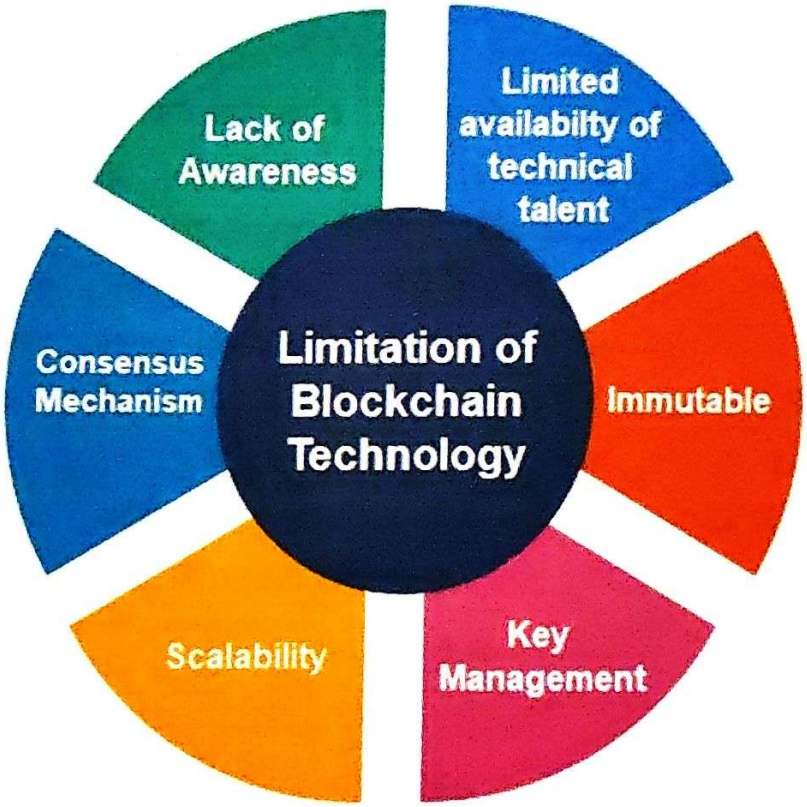
Consensus Mechanism

In the blockchain, we know that a block can be created in every 10 minutes. It is because every transaction made must ensure that every block in the blockchain network must reach a common consensus. Depending on the network size and the number of blocks or nodes involved in a blockchain, the back-and-forth communications involved to attain a consensus can consume a considerable amount of time and resources.

Figure 1.4



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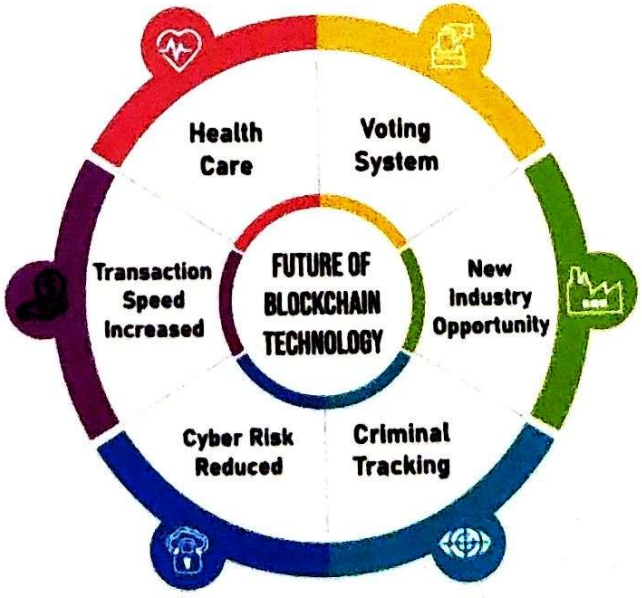
Future of Blockchain

Blockchain technology has a great future it will harnessed and implemented on various platforms. Blockchain technology could govern the future of finance as it will result into huge reduction of cost for all participants in the market thereby changing global banking.

Blockchain has provided a solution to carry transparency to the supply chain as a result of it fetches trust throughout a trustless atmosphere. Blockchain permits right corporations to succeed, by decreasing the amount of unhealthy players at intervals the supply chain.

The general population tends to think of blockchain as a technology that is exclusive to Bitcoin. This perception is far from the truth as this technology has far-reaching capabilities than just revolutionizing currency. Despite being a new and evolving technology, blockchain is already making waves in several business and industrial applications. As a decentralized ledger of data divided into blocks and distributed across multiple nodes, blockchain enables ledgers to be independent of any intermediary verifying authority. Decentralization and cryptography make the data open to all yet secure and immutable. Such features make blockchain a promising implementation for the near future

Figure 1.5



Applications Of Blockchain By Field In Finance:

Blockchain technology provides hands-down efficiency when it comes to tracking financial properties. It provides a transparent ledger system, making it even easier to track and tackle the inflow and outflow of cash.

In Cloud Storage:

With the successful implementation of blockchain technology, cloud storage can become extra secure against the attacks of hackers. It reduces unauthorized data tampering while encrypting the data using cryptography.

In Cyber Security:

As discussed earlier, blockchain uses principles of ledger technology and decentralization, making it a perfect fit to fortify cyber security. It helps secure private messaging by forming an integrating API framework that eventually enables cross-messenger communication proficiency.

In Digital Advertising:

Digital advertising faces many challenges now and then, including bot traffic, opacity, domain fraud, and insufficiency of payment models. Still, with blockchain technology, one can resolve such issues, and all the transactions can now be dealt with seamlessly.

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Ways Businesses are already using Blockchains

Shipping

Maersk ,the world`s largest shipping company, completed an inaugural test this spring of using a blockchain to track it`s cargo. The test involved not just Maersk but a series of third parties-the shipper, Dutch customs, and the U.S. Department of Homeland Security-with all of them tracking containers remotely. The tech`s reliance on cryptographic signatures makes it harder for anyone to mislay goods or tamper with labels while cargo is on the move, and can reduce the time goods spend in transit.

Banking

Despite its sophistication, the banking industry is still confused by inactive systems that can take hours or days to confirm basic transactions such as stock sales or money transfers. But the ongoing adoption of blockchains by the likes of Barclays, which conducted a ground-breaking transaction (it involved butter exports) using the technology in 2016, means this is changing. In the near futute, look for rapid increases in the speed of banking services as well as the disruption of intermediaries like brokers and clearing houses. Big banks are even planning to use blockchains to remake the SWIFT system, which is used for global interbank transfers.

Law

All sorts of agreements-from home sales to business purchase to employee contracts-require lawyers and courts to enforce. Now, more firms are experimenting with "smart contracts" that execute themselves: A Blockchain system can, for instance, release money from escrow once one party to a contract transfers a deed. Lawyers nervous about their jobs can rest easy for now, as smart contracts are still a novelty. But this could change soon, especially as states like Arizona pass laws that confirm smart contracts are valid.

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Indian Government Views on Blockchain

The favorable view of the Indian governments and the industry signal the opening of one of the world's largest markets to the Blockchain Industry. It's going to be an exciting space to watch.

Reserve Bank of India (RBI), India's central bank also has been conducting various evaluations on the Blockchain technology and in a research report released in January 2017 , mentioned that Blockchain technology can bring cost savings, efficiency, and transparency to the banking industry.

Large private banks and other corporate have already made significant progress in adopting the technology in India.

The Reserve Bank of India has successfully tested blockchain technology for trade application. The evaluation was carried out in partnership with MonetaGo, domestic banks and other financial institutions.

The Indian central bank recently tested Bitcoin's underlying blockchain technology. The Reserve Bank of India's research arm is said to be involved in its first ever end – to – end test of the technology along with other stakeholders of the country's financial system.

Institute for Development and Research in Banking Technology (IDRBT), the Reserve Bank's research arm has worked closely with the regulators, banks, financial institutions and clearing houses during the evaluation process. MonetaGo, a New York- based cryptocurrency firm served as a technology partner during the study.

The adoption of blockchain technology among stock exchanges and trade platforms is increasing. The potential of blockchain technology to automate trade settlements and transactions can prove to be a huge cost saver for financial institutions. Even Reserve Bank of India's experiment involved the use of blockchain in a trade application and the results are now available in a white paper titled " Applications of blockchain technology in banking and financial sector in India".

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Uses of Blockchain Technology in India

Banking Sector

Blockchain is basically a distributed ledger. It can store facts like, who owns a particular piece of land or say a bond. The technology can be used to keep an immutable record of ownership and enable transaction of the asset amongst distrusting parties.

Financial Services Sector

The utilization of blockchain technology in the financial service sector has long been lauded for its impeccable capability to introduce, transparency, time efficiency, and productivity to the ecosystem Simply put, blockchain helps reduce the chances of data breaches as well as operational risks.

Non-Financial Services Sector

Despite financial players being the first movers to explore this Distributed Ledger Technology, non-financial players have been paying attention and looking for ways to leverage the opportunities that Blockchain offers. The front-runners among them are retail, travel, healthcare, telecommunications and public-sector industries. The major use cases applicable to these industries are focused on the decentralized data storage, data immutability, and distributed ownership features of Blockchain.

Cross Industry use cases

Provides emerging research highlighting the possibilities inherent in blockchain for different sectors of the economy and the added value blockchain can provide for the future of these different sectors. Featuring coverage on a broad range of topics such as data privacy, information sharing, and digital identity, this book is ideally designed for IT specialists, consultants, design engineers, cryptographers, service designers, researchers, academics, government officials, and industry professionals.

The "Ethereum blockchain" enables more open, inclusive, and secure business networks, shared operating models, more efficient processes, reduced costs, and new products and services in banking and finance.

CHAPTER 4

DATA ANALYSIS & INTERPRETATION

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Investors into the sector tend to be specialists in blockchain technology

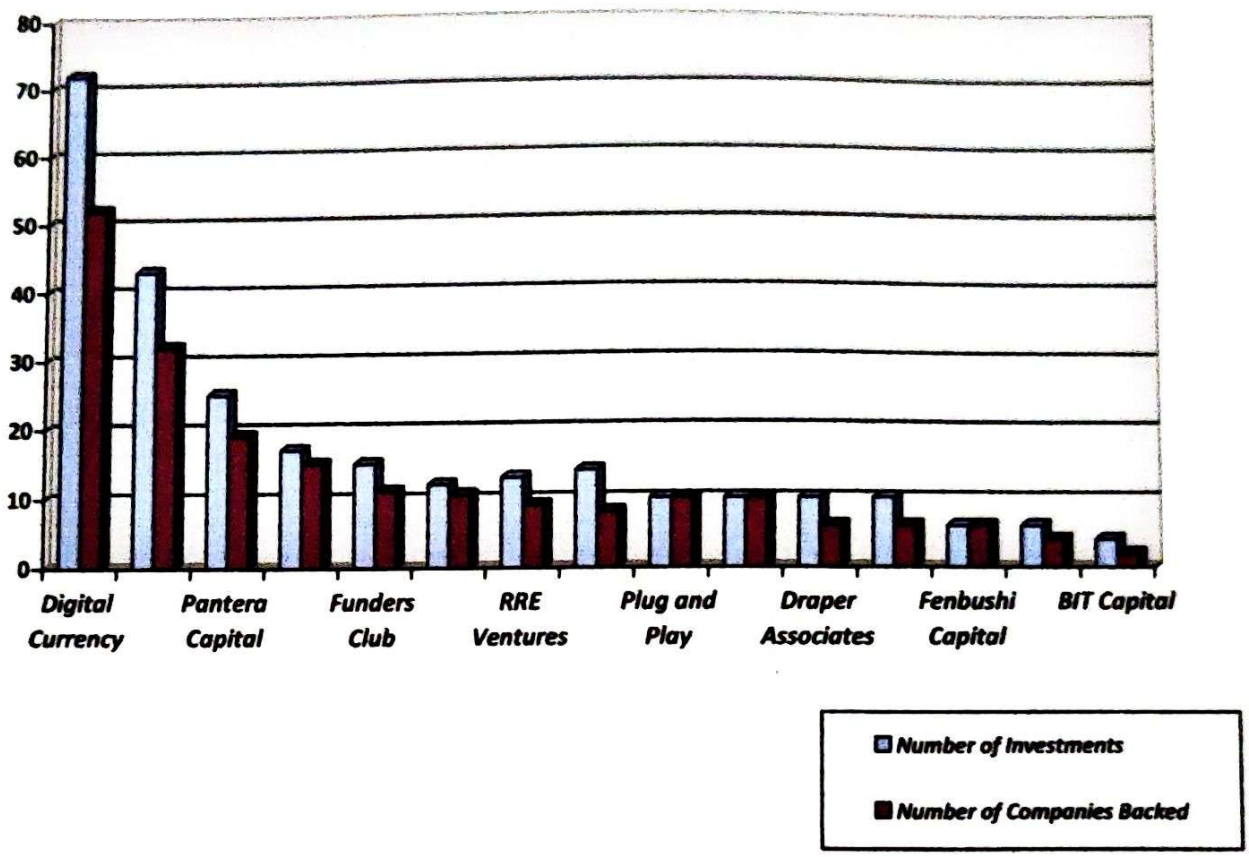

Figure 1.6

In the above figure 1 it is showing that in which sector the more investment is done regarding blockchain technology like in Digital Currency the most investment is done and the lowest investment is in BiT Capital.

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Blockchain will grow at a rate of 85.9% from 2017 to 2024

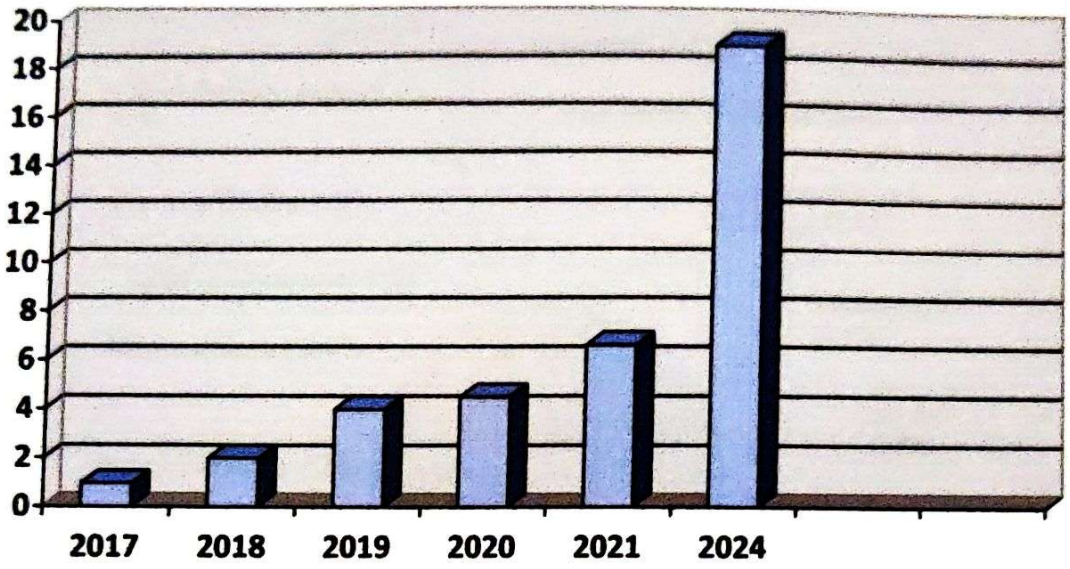

Figure 1.7

In the above figure 2 it is clearly showing that Markets believes the major driving factors contributing to the rapid growth rate of blockchain include increasing venture capital funding into the technology, and extensive use of the solution in banking and security. Companies and individuals are increasingly using blockchain solutions for digital identities, and smart contract management.

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Percentage of Startups in Different Industries Focusing on Blockchain

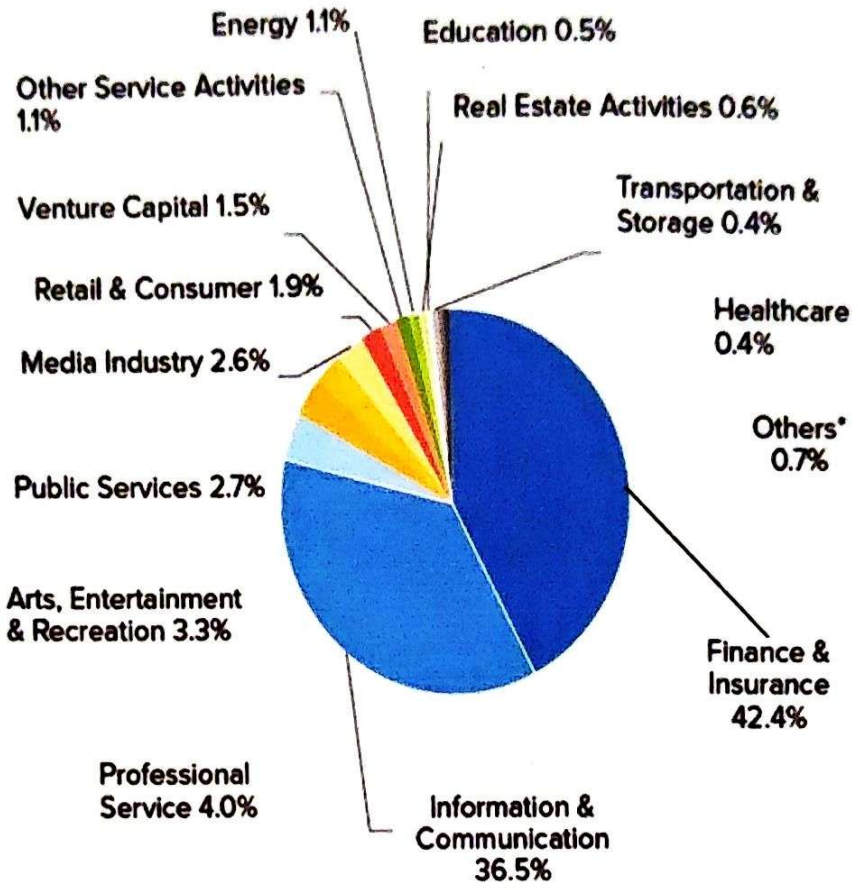

Figure 1.8

In the above figure 3 it is clearly showing that the Blockchain technology has emerged as a true game changer. The technology, while introducing new possibilities and applications every now and then, has gained its own share of hype and scams.

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Fortune Business Insight

Global Blockchain Technology Market Size, 2015-2025 (US$ Million)

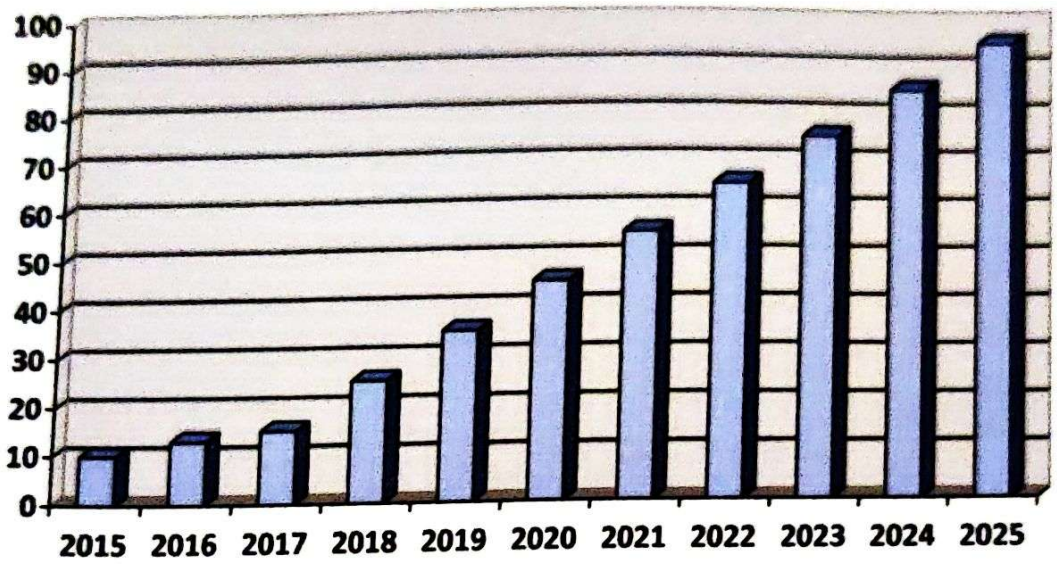

Figure 1.9

In the above figure 4 it is clearly showing that the main reason for the growth of the global blockchain technology market, according to the Fortune Business Insights report, is that more enterprises worldwide are increasing their investment in blockchain research and development from within.

The research also expects that rising interest from public or government authorities for growing research and regulatory approvals of products in the market will also accelerate the expansion of the blockchain industry.

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CHAPTER 5

CONCLUSION & RECOMMENDATION

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CHALLENGES & ISSUES

Blockchain are not without their hurdles. While blockchain has immense potential to the society, it is also recognized that this is hard to achieve without substantial regulatory will and collaborative effort from all parties involved.

Total transparency a double-edged sword – The demand for change in business processes (transaction processing) will come either from the grassroots demanding the certain data go on a blockchain and form a record which cannot be subsequently edited, or form regulators and policymakers mandating such change.

- ***Requires a lot of coordination – Blockchains can also be used in industry platforms for the sharing of data that is helpful to the industry as a whole. In this case, a majority of players in an industry need to come together and agree on what such a platform would look like, who would pay for it, and what value participant would get from it.***
- ***Regulatory clarity over data sovereignty – Regulatory clarity of on and off-chain assets is something that is often discussed, in the context of bitcoins and the issues of data governance of a share certificate on a blockchain. What is often neglected is regulatory clarity over data sovereignty. In an industry blockchain, the same data is copied over many data centres, often in different countries. A lot of the data are encrypted so that only the intended recipient can see it.***

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CONCLUSION

In many ways, Blockchain today is comparable to where the Internet was in early 1990s. While we have witnessed how the 'Internet of Information' has changed our societies over the past two decades, we are now entering a phase where Blockchain is likely to do the same by ushering in new paradigm comprising 'Internet of Trust' and 'Internet of Value'. It is expected to disrupt the way stakeholders would interact in a decentralized framework of trust, thereby increasingly democratizing value. Banks and financial services institutions play a very important role in those wider societal interactions today and Blockchain is therefore forcing them to rethink their roles to stay relevant in this emerging paradigm.

It`s early days, but industry leaders are sponsoring a wide range of blockchain use cases supported by industry consortiums. Having seen the potential of this technology and the challenges, we think the opportunity is clear but the blue sky is too far off and companies need to validate use cases and business/ technical viability before implementing blockchain.

RECOMMENDATION

There are many possible ways that blockchains can make government more accountable, transparent, efficient and fraud-proof, which include contract management, electronic voting and health care. There are already several pilot projects in different countries regarding the use of blockchain technology in e-health, e-resident systems, elections and especially land and property registration. A prominent country which has already several applications of blockchain technology in use is Estonia. Other countries include for example Sweden, Hong Kong, Ghana, Kenya, Nigeria, or Georgia. However, despite these pilot projects blockchain technology is still in its infancy, so that there are still unknown factors and vulnerabilities.

Neetu Chawla

Recommend actions

- ✓ ***To provide a balance between privacy and confidentiality on the one side and transparency on the other side.***
- ✓ ***Resolve challenges such as transaction speed, the verification process and data limits.***
- ✓ ***Provide high-performance, low-latency operations.***
- ✓ ***Ensure that distributed ledgers are scalable, secure and provide proof of correctness of their contents.***
- ✓ ***Energy efficiency.***
- ✓ ***Ensure high level of cryptography.***

The societal demand for a trustworthy public sector resonates until today. This need also includes issues such as better quality public services – fairness and customer service standards in public service provision. Informants mentioned establishing trust in governance, accessing timely and accurate information, unlinking public sector and politics as some of the key needs under this header. One information expressed his opinion as: " A clear point of authority to be established (often have to roam offices because it is not clear the authority for a particular task)."

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Franks, P.C. (2020), "**Implications of blockchain distributed ledger technology for records management and information governance programs**", *Records Management Journal*, Vol. 30 No. 3, pp. 287-299.

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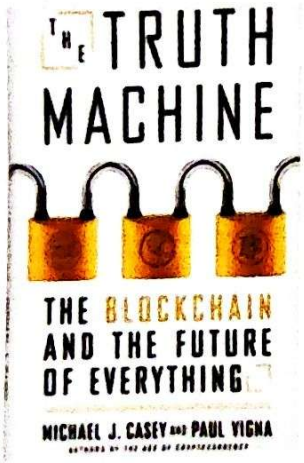
BOOKS

- ***The Truth Machine: The Blockchain and the Future of Everything***

  (By Paul Vigna and Michael J. Casey)



The book describes blockchain's potential to restore personal control over people's data, assets and identities, provides excluded individuals with access to the global blockchain economy and shifts the balance of power to restore society's faith in itself. It reveals the possibilities and implications as the transparency and security of the blockchain process replace the need for a middleman and highlights how this shift will affect job losses, special interests and social cohesion.

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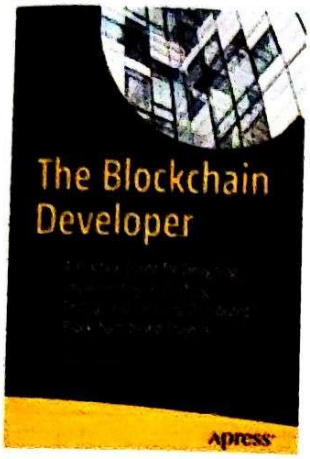
- ***The Blockchain Developer: A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Blockchain-based Projects***

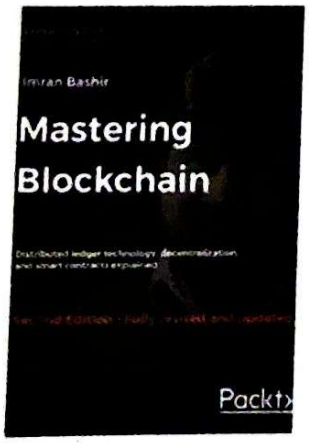
(By Elad Elrom)



This book helps you understand Blockchain beyond development and crypto to better harness its power and capability. You will learn tips to start your own project, and best practices for testing, security, and even compliance. Immerse yourself in this technology and review key topics such as cryptoeconomics, coding your own Blockchain P2P network, different consensus mechanisms, decentralized ledger, mining, wallets, blocks, and transactions.

- ***Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained***

(By Imran Bashir)



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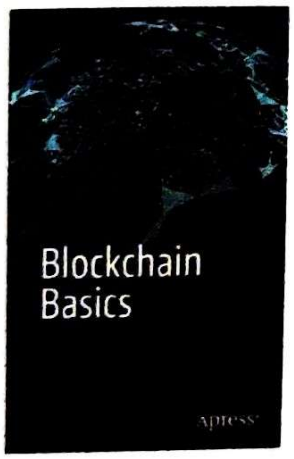
This book explains that a blockchain is a distributed ledger that is replicated across multiple nodes and enables immutable, transparent and cryptographically secure record-keeping of transactions. The blockchain technology is the backbone of cryptocurrencies, and it has applications in finance, government, media and almost all other industries. Mastering Blockchain, Second Edition has been thoroughly updated and revised to provide a detailed description of this leading technology and its implementation in the real world.

- ***Blockchain Basics: A Non-Technical Introduction in 25 Steps 1st ed. Edition, Kindle Edition***

  (By Daniel Drescher)



This book bridges the gap that exists between purely technical books about the blockchain and purely business-focused books. It does so by explaining both the technical concepts that make up the blockchain and their role in business-relevant applications.

What You'll Learn

- What the blockchain is
- Why it is needed and what problem it solve
- Major components and their purpose
- Limitations, why they exist, and what has been done to overcome them

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