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International Operations Management Conference on Reengineering Business Ecosystems: Synergies and Innovations in Operations and Beyond – August 18, 2025

An empirical analysis of Supply chain management through black chain technology in private companies of Bangalore city in Karnataka.

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Abstract

A blockchain is a distributed database or ledger shared across a computer network's nodes. They are best known for their crucial role in cryptocurrency systems, maintaining a secure and decentralized record of transactions. the blockchain—it starts a sequence of events. Every node in the network proposes its own blocks in this way because they all choose different transactions. Each works on their own blocks, trying to find a solution to the difficulty target, using the "nonce," short for number used once. Blockchain technology can be integrated into multiple areas. The primary use of blockchains is as a distributed ledger for cryptocurrencies such as bitcoin; there were also a few other operational products that had matured from proof of concept by late 2016. of new cryptos such as Monero. Although adopting the latest technologies such as IoT, AI, robotics and drones is necessary for improved supply chain management, integrating them into the existing systems is not easy at all. 73 top Blockchain companies and startups in Bangalore in August 2025.

Keywords: Block chain technology, supply chain management,bit coin, crepto currency,artificial intelligence,robotics and drones.

A blockchain is a distributed database or ledger shared across a computer network's nodes. They are best known for their crucial role in cryptocurrency systems, maintaining a secure and decentralized record of transactions. A blockchain consists of programs called scripts that conduct the tasks you usually would in a database: entering and accessing information, and saving and storing it somewhere. A blockchain is distributed, which means multiple copies are saved on many machines, and they must all match for it to be valid. The Bitcoin blockchain collects transaction information and enters it into a 4MB file called a block (different blockchains have different size blocks). Once the block is full, the block data is run through a cryptographic hash function, which creates a hexadecimal number called the block header hash. The hash is then entered into the following block header and encrypted with the other information in that block's header, creating a chain of blocks, hence the name "blockchain".

Research methodology:

Objectives of the study:

To examine the Block chain technology adoption in supply chain management.

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To examine the top private companies with block chain technology in Bangalore.

Nature and source of data:

The study conducted with the help of secondary data and information obtained through business line, business standard, Economic times, Competition success review, Chronicle, Economic survey.

Analysis of the results:

Transaction Process

Transactions follow a specific process, depending on the blockchain. For example, on Bitcoin's blockchain, if you initiate a transaction using your cryptocurrency wallet—the application that provides an interface for the blockchain—it starts a sequence of events.

Every node in the network proposes its own blocks in this way because they all choose different transactions. Each works on their own blocks, trying to find a solution to the difficulty target, using the "nonce," short for number used once.

The nonce value is a field in the block header that is changeable, and its value incrementally increases with every mining attempt. If the resulting hash isn't equal to or less than the target hash, a value of one is added to the nonce, a new hash is generated, and so on. The nonce rolls over about every 4.5 billion attempts (which takes less than one second) and uses another value called the extra nonce as an additional counter. This continues until a miner generates a valid hash, winning the race and receiving the reward.

Fast Fact

Generating these hashes until a specific value is found is the "proof-of-work" you hear so much about—it "proves" the miner did the work. The sheer amount of work it takes to validate the hash is why the Bitcoin network consumes so much computational power and energy.
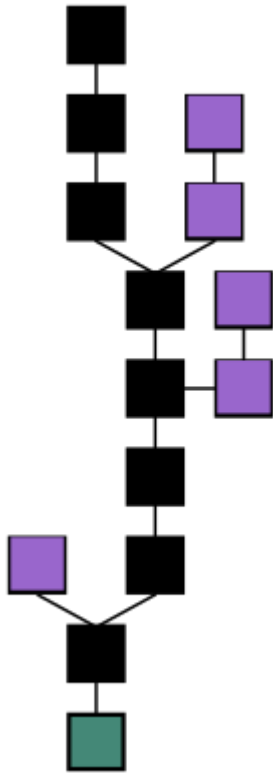
Once a block is closed, a transaction is complete. However, the block is not considered confirmed until five other blocks have been validated. Confirmation takes the network about one hour to complete because it averages just under 10 minutes per block (the first block with your transaction and five following blocks multiplied by 10 equals 60 minutes).

Blockchain Decentralization

A blockchain allows the data in a database to be spread out among several network nodes—computers or devices running software for the blockchain—at various locations. This creates redundancy and maintains the fidelity of the data. For example, if someone tries to alter a record on one node, the other nodes would prevent it from happening by comparing block hashes. This way, no single node can alter information within the chain.

Because of this distribution—and the encrypted proof that work was done—the blockchain data, such as transaction history, becomes irreversible. Such a record could be a list of transactions, but private blockchains can also hold a variety of other information like legal contracts, state identifications, or a company's inventory. Most blockchains wouldn't "store" these items directly; they would likely be sent through a hashing algorithm and represented on the blockchain by a token.

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Blockchain formation. The main chain (black) consists of the longest series of blocks from the genesis block (green) to the current block. Orphan blocks (purple) exist outside of the main chain.

Supply Chain Management:

Blockchain analysis

The analysis of public blockchains has become increasingly important with the popularity of bitcoin, Ethereum, litecoin and other cryptocurrencies.[55] A blockchain, if it is public, provides access to anyone to observe and analyse the chain data, given the know-how. The process of understanding and accessing the flow of crypto has been an issue for many cryptocurrencies, crypto exchanges and banks.[56][57] The reason for this is accusations of blockchain-enabled cryptocurrencies enabling illicit dark market trading of drugs, weapons, money laundering, etc.[58] A common belief has been that cryptocurrency is private and untraceable, thus leading many actors to use it for illegal purposes. This is changing now that specialised tech companies provide blockchain tracking services, making crypto exchanges, law-enforcement and banks more aware of what is happening with crypto funds and fiat-crypto exchanges. The development, some argue, has led criminals to prioritise the use

Uses

Blockchain technology can be integrated into multiple areas. The primary use of blockchains is as a distributed ledger for cryptocurrencies such as bitcoin; there were also a few other operational products that had matured from proof of concept by late 2016. of new cryptos such as Monero.

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According to the ASCM Supply Chain Dictionary, supply chain management is the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally.

Benefits of Supply Chain Management

Supply chain management helps businesses to boost their profits and competitiveness. Apart from this, here are the key benefits:

- **Improved operational efficiency:** Streamlined supply chain processes optimise machine performance and workflow. It reduces bottlenecks and enhances productivity.

- **Anticipating Customer Demand:** Supply chain management helps businesses to better understand the customer requirements, such as what they want and when they want it. This allows them to plan accordingly.

- **Improved Visibility:** It provides a clear view of the entire supply chain, which helps businesses to spot any potential risk or any opportunity. This helps in proactive decision-making.

- **Accurate Forecasting:** Data analysis and forecasting are an important part of supply chain management. This enables businesses to predict the future demand more precisely, avoid bottlenecks and therefore allocate the resources in an effective manner.

- **Enhanced Product Quality**: Customer satisfaction and loyalty comes with improving product quality. This is what supply chain management helps to achieve by monitoring and optimising the processes at every stage.

- **Sustainability:** With supply chain management comes responsible sourcing, initiatives for waste reduction and transportation which is efficient. This helps to reduce the overall environmental impact and the associated cost.

- **Cash Flow Management:** Supply chain management also helps to manage the cash flow and avoid costly disruptions by allocating the resources efficiently.

- **Efficient Logistics:** It also assists in optimising the transportation and the distribution process. This helps the businesses to deliver the products to the customers quickly.

- **Better customer service:** Good supply chain management means happier customers. It helps companies quickly meet customer needs, improve delivery times, and offer personalized products. This makes it easier for companies to stay competitive.

Challenges of Supply Chain Management

Managing supply chains involves several significant challenges:

- **Rising Risks:** There are several issues such as changing consumer demand, shortage of raw materials, and economic uncertainties, which contribute to the increasing risks in the supply chain management.

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- **Unexpected Delays:** When there are long distances and a number of steps involved, it makes the supply chain prone to delays, particularly with long lead times.

- **Cost Control:** Another challenge is the increasing cost of the raw materials, labour, energy and freight, which makes businesses to tighten the cost control to keep the operations running in a smooth manner.

- **Data Synchronisation:** To manage the supply chain efficiently, it requires accurate and timely data, which becomes challenging for businesses.

Digital Transformation: Although adopting the latest technologies such as IoT, AI, robotics and drones is necessary for improved supply chain management, integrating them into the existing systems is not easy at all.

73 top Blockchain companies and startups in Bangalore in August 2025

1) Brine Finance, Polygon (polygon.technology)

2) Brine Finance

3) Polygon (polygon.technology)

4) GoSats

5) Arcana Network (previously Newfang)

6) SecureDApp

7) Chainflux

8) New Street Tech

9) Oddz Finance

10) Fitmint

11) Krypto.com

12) Deliq Technologies

13) Repute Network

14) Unmarshal

15) StreamNFT

16) Hypersign

17) GARI Network

18) DcodeBlock

19) Chainrisk

20) zkUNO ~ Onchain Card Game with Tamper-Proof Hands & Zero-Knowledge Sync

21) CropBytes

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22) TRUSTGRID.AI

23) Wipro Blockchain Practice

24) DefiPe

25) Nord Finance

26) Age of Gods

27) Metabank DeFi

28) Murmur Dapp

29) Goldbck: eGold Rewards & Access GoldPass

30) IoTracX2018.

Conclusion:

Supply chains play a critical role in economies all around the world. Every product and service has a supply chain. Effective supply chain management means the difference between having enough medicine, food or critical supplies to meet demand or facing shortages and bare shelves.

Blockchain is seen as a pivotal technological advancement of the 21st century, with the ability to impact organizations at strategic, operational, and market levels. In 2019, it was estimated that around $2.9 billion were invested in blockchain technology, which represents an 89% increase from the year prior. Additionally, the International Data Corp estimated that corporate investment into blockchain technology would reach $12.4 billion by 2022. Furthermore, According to PricewaterhouseCoopers (PwC), the second-largest professional services network in the world, blockchain technology has the potential to generate an annual business value of more than $3 trillion by 2030.

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