Page 3782 - 3796 **DOI:** *https://doij.org/10.10000/IJLMH.119378*

INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES

[ISSN 2581-5369]

Volume 8 | Issue 2

2025

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Pre and Post Digital Currencies Condition with reference to AI

RITUJA GUPTA[1] AND DR. BHAWNA ARORA[2]

ABSTRACT

This paper analyses the role of artificial intelligence (AI) in improving the security of digital currencies. AI techniques, especially deep learning and machine learning, are recruited to alleviate security threats on digital currency trading platforms and create a real-time risk alert system. In Central Bank Digital Currency (CBDC) projects, central banks engage in discussions about the ethical repercussions of AI use. This paper also highlights the formation of decentralised cryptocurrencies initiated by Bitcoin, which has transitioned from payment method to apparent financial asset. In spite a numerous range of cryptocurrencies, trading challenges equivalent to traditional finance, such as fraud detection, price prediction, etc. Furthermore, the findings emphasize the significant challenges of trust and confidentiality within the banking sector while embracing the complexities stated by contemporary payment systems. Considering all this AI's paramount role in enacting digital currencies and inspects the impact on monetary policy, banking stability, and recommendations for successful digital currency deployment.

Keywords: *Artificial Intelligence, Decentralized Cryptocurrencies, Digital Currencies, Monetary Policy, CBDC*

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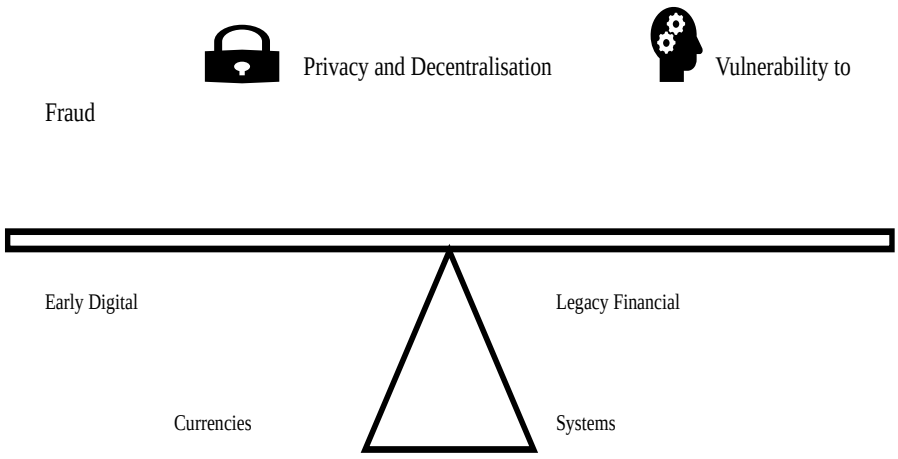
I. INTRODUCTION

Over the years, the evolution of digital currency has been an intriguing journey for both policymakers and tech enthusiasts. Once digital currency was an obscure concept limited to fiscal circle, developed into a disruptive force amending global finance. It focuses on enlarging the efficacy, and functions of traditional currencies among perpetual gaps in currency. Distinct attributes of digital currency are to set apart it from traditional currency. It aims to understand how developments in artificial intelligence have reshaped the landscape of decentralised cryptocurrencies like Bitcoin, and centralised digital currencies, such as Central Bank Digital Currencies (CBCDs). The profound influence may lie in their capacity to overcome obstacles and functions as complements to traditional currencies.[3] The advent of paper money and central banks has led to the transition to flat currency. The digital era ushered digital currencies, cryptocurrencies and online transactions. Central Bank Digital Currencies (CBCDs) attains eminence as worlds shifted towards a digital approach, aiming to enhanced financial efficiency and resource access[4].Numerous initiatives before the modern iterations of cryptocurrencies failed to attain significant traction. Digi Cash, the earliest virtual currency failed in 19th century. Numerous attempts to create cryptocurrencies or innovation consist B-money, Hash cash and Bit Gold. David Chaum is among the paramount names in the early cryptocurrencies[5].



Comparing Digital Currency Innovations and Financial System Vulnerabilities

[3] Ousmene Jacques Mandeng, Digital currencies: New technology and old monetary ideas, 2019 https://www.researchgate.net/publication/333902582_Digital_currencies_New_technology_and_old_monetary_ideas

[4]Central Bank Digital Currency: Driving the shift towards a Global Cashless Society. https://www.ijfmr.com/papers/2024/2/14505.pdf

[5]Evolution of Cryptocurrencies: Effects on Consumer Demand https://www.drnishikantjha.com/papersCollection/Evolution%20Of%20Cryptocurrencies:%20Effects%20On%20Consumer%20Demand.pdf

The journey of digital currencies began form eCash created by Dr. David Chaum in 1990. Its intent was to facilitate the privacy of individuals for micropayments using internet. Its encryption tools, ideas, and formulas helped in developing later digital currencies.[6] However, these attempts failed due to issues like third-party oversight, lack of trust, or technical inefficiencies. Cryptocurrencies enable direct transactions without the need for a mediator, authorizes users to transfer funds instantly and often without paying extra fees[7].

Bitcoin was introduced in 2009 by Satoshi Nakamoto, referred to as "digital gold". It leans on a network of computers to overlook upon a public database of all Bitcoin transactions, known as blockchain. Its transactions occur through wallets, functions like digital bank accounts and ensures transparency and security.

The expeditious growth of digital currency is impelled by benefits like reducing costs associated with physical cash, enabling faster, supporting cross-border transactions, and promoting financial inclusion. It also assists in shattering socio-economic barriers, allowing undeserved communities to retrieve financial services more easily. It endorses a shift regarding cashless transactions, sparking new possibilities for payment innovation and consumer choice[8].

II. SOCIETAL SHIFTS: FROM CASH TO DIGITAL RUPEE

From Cash to Plastic Money:

The government of India is assiduous to developing from cash to cashless economy through initiatives like Digital India, focused on promoting digital transactions. In acknowledging the importance of a cashless India, the government prioritizes addressing issues such as public fraud and cybercrime to improve public awareness. Moreover, banks play a crucial role in this shift, as they steer all transactions, whether cash or cashless, safeguarding the security and virtue of financial operations[9].

Plastic cards happen to be the prominent method of payment at the time of Demonetization. Digital payments are assisting in growth of other industry sectors such as B2B and B2C by eradicating the challenges. This has made easier in realising the transactions in the recipient's financial books. Digital payments have been able to abate the cost of funds required in these industries. The education, healthcare. Manufacturing, banking. E-commerce, and aviation

[6] Julia Kagan eCash: Overview, Rise and Fall https://www.investopedia.com/terms/e/ecash.asp.
[7] 2020 IEEE International Conference on Blockchain and Cryptocurrency (ICBC), IEEE (2020), pp. 1-3
[8] The Rrise of Digital Currencies: Opportunities for Economies, 2024, https://www.investindia.gov.in/team-india-blogs/rise-digital-currencies-opportunities-economies
[9] Moving from Cash to Cashless Economy: Towards Digital India, 2021, https://koreascience.kr/article/JAKO202109554061272.page

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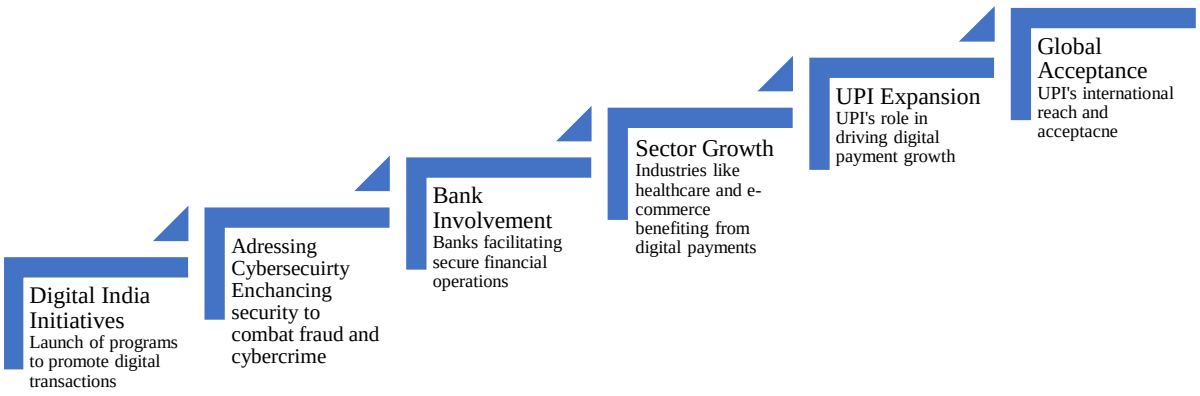
sectors are all experiencing sustainable growth as a result of enhancements in the payments lifecycle. The benefits of digital payments are relished from a small neighbourhood kirana shop to a major multinational managing complex, high-value receivables and repayments[10].

Based on the Reserve Bank of India's (RBI) and National Payments Corporation of India's (NPCI) persistent efforts to implement innovative features, the rise of UPI payments has driven the overall development story of digital payments in India and is anticipated to continue on its high growth trajectory. In the creation of numerous collaborations, UPI's acceptance has increased not only in India but also internationally. Credit cards and National Electronics Toll Collection (NETC) are also enlarging at an expeditious pace. Compared to FY 2022-2023, debit cards transactions reduced in growth in FY 2023-2024. In September 2024 there is a 13% decline in debit card transaction which is better than the 16% decline in August 2024[11].



India's Transition to a Cashless Economy

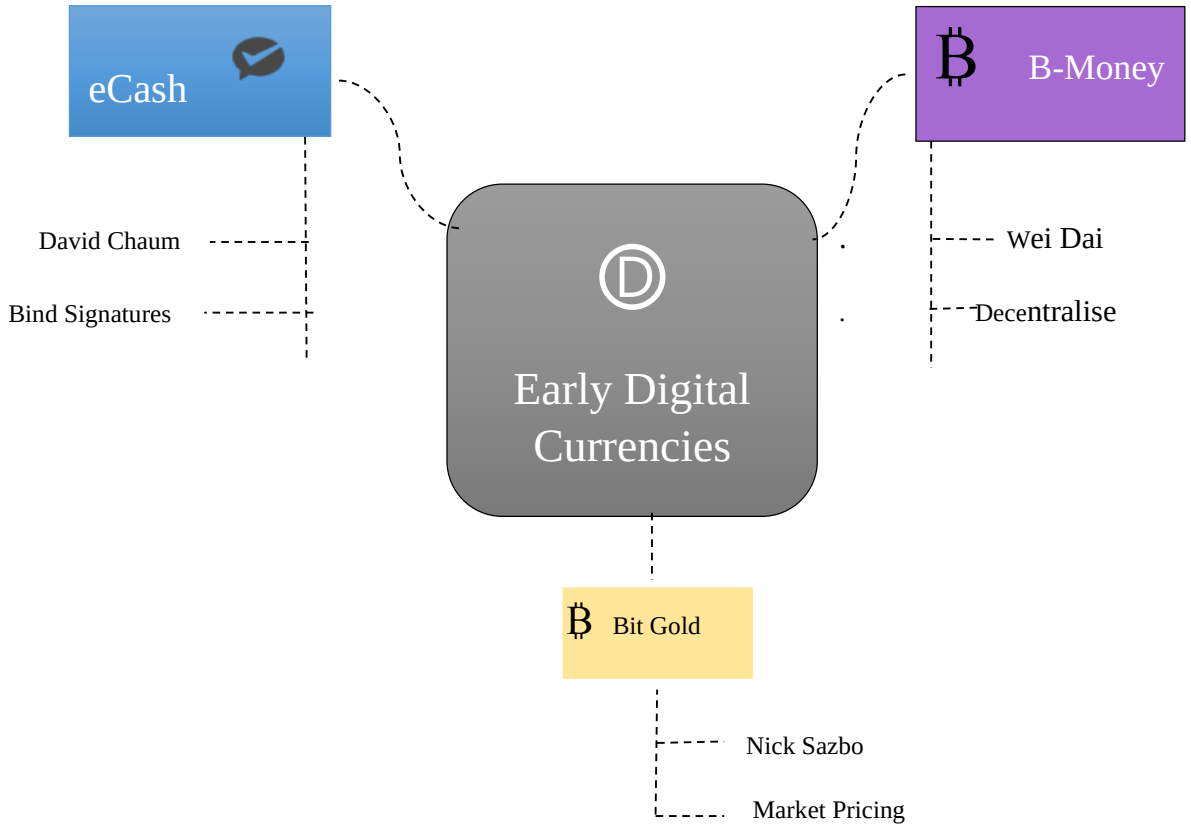
From Plastic Money to E-Cash

An electronic store of monetary value that instantly exchanged in transactions is an electronic currency. People use eCash for multiple reasons, such as Convenience, security, reasonable fees, and accessibility. It is an alternative option for those who don't have access to traditional banking services or who wants to cut on the expenses on their purchases. Furthermore, eCash eradicates the need for currency conversion and enable safe and secure payments. It is crucial for those individuals who lack access to international payment methods or security of their financial information. Digital currency has contributed to the expansion of e-commerce and is

[10] The Indian payments handbook-2023-2028, https://www.pwc.in/assets/pdfs/consulting/financial-services/fintech/publications/the-indian-payments-handbook-%E2%80%93-2023%E2%80%932028.pdf
[11] Samriddhi Singh, https://bfsi.economictimes.indiatimes.com/news/banking/debit-card-transaction-remain-on-a-decline-credit-card-transactions-remains-robust-in-sept24/114836786

a valuable tool for facilitating online transactions. It enables individuals to make online purchases without disclosing private financial information like bank accounts details or credit card numbers.

Evolution of early Digital Currencies



American cryptographer Dr. David Chaum, "the godfather of cryptocurrency" came with the concept of eCash in the early 1980s.c Before internet was available for public use, he was concern about privacy and creates an anonymous based payment for digital age. The core concept behind it was blind signatures, no user was able to create a link between withdrawal and spend transactions. Eventually DigiCash filed for bankruptcy in 1998 and was sold to eCash Technologies.

B-money conceptualized by computer scientists Wei Dai 1998. It was an early concept that focused on a decentralized digital cash system. His advice was an initial endeavour to elaborate how anonymous financial transactions could empower by a decentralized network. This system was initially built on a distributed ledger where all participants would preserve a copy of each transaction. Two protocols were delineated in Dai's proposal. First, all participants kept track each account balance, and transactions was attained through collective agreement. The second

proposal was to effectuate contracts without depending on an external legal system. It provides a certain foundational element but without implementation model. It suggested the use of "untraceable" contract methods and a collective agreement protocol among nodes. His contribution to the crypto world is affectionately acknowledged in Ethereum's smartest unit of either "wei".

Bit Gold was proposed by well-known computer scientists Nick Szabo in 1998, known for his work on digital contracts and digital currency. The significant flaw with Bit Gold was its incapacity to deal with the double-spend issue inherent in digital cash, present in initial forms. It can be difficult to discern differences in how Bit Gold's network functioned because it was never developed beyond ideas and suggestions into code. According to Nick Szabo publications, there are some differences that separate the two. In 2011 Szabo wrote that his design was to have Bit Golds price set by the market.

Unfortunately, transactions via trust-based systems leaves consumers and financial institutions vulnerable to theft and fraud. As a matter of fact, the financial systems legacy of consistent loosed the huge cost of fraudulent activity and siloed architecture motivated[12].

From E-Cash to Bitcoin

Satoshi Nakamoto launched Bitcoin in January 2009. He brings forth the blockchain system, the backbone of the cryptocurrency market. He proposed the idea of a white paper and released the related software as an open-source project It used as a decentralized network of nodes to substantiate transactions through proof-of-work (PoW), achieving consensus without requiring every participant to validate each transaction. It allows transactions to pass off directly from person to person without requirement of a bank to verify or record the transactions[13]. It also means that transactions are anonymous, and no transactions fees are included when using Bitcoin. Banks may provide their clients with a more effective and safe method of transacting by utilizing blockchain technology. It can also assist banks in reducing expenses and streamlining their processes. Blockchain platform is a shared digital leger that enables safe, secure information, and transaction recording[14].

[12] Rakesh Sharma, Bit Gold: Meaning, Overview, and Differences from Bitcoin, 2024, https://www.investopedia.com/terms/b/bit-gold.asp

[13]Digital Currencies, https://www.rba.gov.au/education/resources/explainers/cryptocurrencies.html#:~:text=Bitcoin%20was%20launched%20in%202009,features%20of%20a%20cash%20transaction.

[14] What is Blockchain and How does it work, 2025, https://www.simplilearn.com/tutorials/blockchain-tutorial/blockchain-technology#:~:text=A%20blockchain%20platform%20is%20a,consensus%20among%20the%20network%20participants.

The bitcoin system uses "blockchain" technology to record transaction and the ownership of bitcoins. It provides a record of every bitcoin transaction that has ever occurred, accessible for anyone to access and update on a public network. It is a database of transactions between two partis. The authenticity of the Bitcoin is secured by 'cryptography', a method of securing data and verifying using complex mathematical algorithms. In initial years saw its meagre adoption with hardly 1,000 unique addresses and underneath 10,000 transactions. However, between 2012 and 2016 it gained substantial transaction, attracting not just crypto enthusiasts but also investors and independent miners. Meanwhile, user base evolved and reflected in rising transaction value and prices. The upsurge in popularity led to numerous illicit activities taking exploit advantage of bitcoins anonymity including money laundering, Ponzi schemes. The bitcoin comprises of a global network of stakeholders and miners that secure network and allocation of Bitcoin currency.

Bitcoin had 0 value at the time it was introduced[15]. On October 26, 2010, its price escalated from long-held $0.10 level to $0.20 before the year ended, its price surge to $0.30. later the price began rise above $1 in 2011 and reach a peak of $29.60 on June 8, 2011. An appalling deflation in cryptocurrency markets emanated as the bitcoins value drop roughly $5 at the ending of the year. Bitcoin was worth $13 starting of the year, $100 by April, and $200 by October. Despite it surpassed $1,000 in 2013 and at end $732. In 2018 and 2019, bitcoins price fluctuated sideways. By January 7, 2021, Bitcoin had reached $40,000 breaking the 2020 price record in less than a month. Bitcoin's price reached new all-time highs of over $60,000 as Coinbase.

Although, the Bitcoin's price enhanced due to institutional interest. On April 14, 2021 it reached at $64,895. After the SEC was ordered by courts to reconsider its denial of specific Bitcoin-related investment products, the ling fight for Bitcoin Spot ETFs ended in January 2024. The market stabilized comparatively as the specific funds slowed into March. Afterwards the fund approvals, Bitcoin's price soared, in late February and early March, it was breached again $60,000, reaching at $69,210 on March 6 and $70,184 on March 8. The market performed amiably with increases in all of the main indices. Furthermore, Bitcoin continued its trend of "mimicking" the stock market. On Sep 19, 2024, it was trading about $64,000, a significantly higher than its price of about $60,000.

[15] John Edwards, Bitcoin's price history, 2025, https://www.investopedia.com/articles/forex/121815/bitcoins-price-history.asp

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From Bitcoin to Cryptocurrencies

Several alternative cryptocurrencies, or altcoins emanated each aiming to perceived limitations of Bitcoin. All cryptocurrencies other than Bitcoin (BTC) are often referred as altcoins. Although, the majority of cryptocurrencies are forked from one of the two and re-emerged as an attempt to complete it as a payment method, like fork that created Bitcoin Cash. Some people contemplate altcoins to be all cryptocurrencies other than Bitcoin and Ethereum (ETH). Certain altcoins seek to set themselves apart from Bitcoin and Ethereum by providing new or different consensus mechanisms to validate transactions and open new blocks. The majority of altcoins are developed by developers with their unique or distinct ideas or different visions or uses for their tokens or cryptocurrency. Its goal is to enhanced upon the perceived limitations of blockchain and cryptocurrency.

The first altcoin was Litecoin, launched on October 13, 2011 by Charlie Lee. He created Litecoin as an alternative aiming to enhanced some of the limitations intrinsic in Bitcoin. He wanted to create a cryptocurrency that would expedite transactions confirmation times and one that could be more accessible, especially for smaller transactions. Its one of the biggest goals was to endorse a more decentralized mining ecosystem. Lee developed Litecoin by operating different algorithm known as Scrypt, more memory-intensive and less susceptible to domination by ASICs[16]. Litecoin address the problem by implementing a black time of approx. 2.5 min, enabling faster transactions confirmations and increasing the overall transaction s capacity of the network. Litecoin aimed to address the issue by offering a maximum coin supply of 84 million coins as compared to Bitcoin's 21 million. This larger supply made individual Litecoin more affordable, expediting their use in everyday transactions. The aim was to position Litecoin as a viable digital currency for smaller value transactions.

Namecoin is one of the initial altcoins that sprung up shortly after Bitcoin's introduction 2009. It was launched in April 2011 by an anonymous developer known as "Vinced". Namecoin is a peer-to-peer name system based on Bitcoin. It was developed as a decentralized domain name system (DNS) token and blockchain. It is a token for a blockchain forked from Bitcoin's blockchain. A fork occurs when a new becomes incompatible with the original branch. DNS converts machine-readable IP addresses for example 000.0.0.00 from human-readable domain names. The global system that links domain identities to numerical IP addresses is called DNS. The decentralised of this system was aimed to end internet censorship and improve security and

[16] What is Litecoin and how was it inspired by bitcoin, https://trustmachines.co/learn/what-is-litecoin/

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privacy[17]. It offers a 0decentralised alternative or substitute for internets initial centralized structure. The creators of Namecoin proposed a numerous potential uses and applications for their experimental token. The foremost goal is to enhance the web's resistance to censorship in order to safeguard free speech right online.

Ripple was first founded in 2004 as RipplePay in Vancouver, Canada by Ryan Fugger though a way of moving money safely around the world. In 2012, Fugger sold company to Jed McCaleb, Arthur Britto, and David Schwartz, who converted the company into a digital currency network and reamed it as OpenCoin. McCaleb, who was the former founder of failed cryptocurrency exchange, Mt. Gox, left the company and forked Ripple into Stellar in 2013. Later, the company was renamed as Ripple in 2015[18]. It facilitates global financial institutions to transfer value promptly at a fraction of the costs these institutions bear. Ripple empower RTGS (Real-time gross settlement) for the direct transfer of assets through its blockchain ledger. Ripple settlement time is way faster than SWIFT system and much cheaper to send value through Ripple network compared to SWIFT system. Compared to its earlier reiterations, there has been eloquent changes including a stronger focus on institutional adoption, refined consensus, partnerships with major banks for cross-border payments. Ripple has moved individual users to actively partner with large financial institutions like banks and enable them to leverage the network for faster and cheaper international transfers[19].

Ethereum was initially came in 2015, within 2 years it was ranked the second best blockchain network. Ethereum was first narrate in Vitalik Buterin's white paper in 2013 with the aim of prospering decentralized applications. In 2021, major network ameliorate named London included Ethereum introduced a mechanism for abridging transaction fee volatility. In 2022, it shifted from Proof-of-work (POW) to Proof-of-state (POS) consensus mechanism also known as Ethereum Merge. Ethereum is a decentralized computing network. It enables developers to generate and run applications on its blockchain using smart contracts. Blockchain technology procure public notice with the arrival of Bitcoin in 2009. Smart contracts can be thought of as 'cryptographic bank lockers' which accommodate certain values. It is often called as Blockchain as it proved the potential of blockchain technology beyond the financial sector. Voting systems adapt the Ethereum. The result of polls is available publicly, safeguard a fair system eliminating voting malpractices. Applying Ethereum smart contracts to blockchain-

[17] History of Namecoin: A token forked from Bitcoin's Blockchain, 2022, https://nfting.medium.com/history-of-namecoin-a-token-forked-from-bitcoins-blockchain-1e6304e4e009
[18] Ripple, https://corporatefinanceinstitute.com/resources/cryptocurrency/ripple/
[19] James Howell, Ripple's XRP: a deep dive into the role in Blockchain and financial markets, 2025, https://101blockchains.com/ripple-xrp-in-blockchain-and-finance/

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based crowdfunding platforms assists in enhancing trust and information symmetry. In 2024, the price of Ethereum is anticipated to range between $3,500 and $5,200. Market trends, regulatory developments, and technological advancements are such factors that plays a prominent role in ascertaining Ethereum's price in 2024.

Bitcoin Cash (BCH) is a crypto asset which was came in August 2017, developed from a hard fork appears when an existing blockchain cleave into two. It reduces fees and transaction times and enables vast number of transactions in a single block than Bitcoin. Transaction fees abide to rise between 2009 and 2016[20]. It has extended the size of blocks to limit of 32 MB, allowing numerous transactions to be administered per block. It was developed to maintained a dynamic community of developers. It was come up with the idea of peer-to-peer payment system to remove regulatory authorities and other third parties from financial transactions. The project has focused on assisting a reliable, fast, low-free network and also established a professional mining node that heed on feedback and delivers a substantial growth. BCH popularity has also increased popularity with investors. It ranks #25 by 24-hour trading volume and #16 by market cap. On May 15, 2024 its price was $445, more than a 270% increase from its price of $188 one year before[21].

Cardano was founded by Charles Hoskinson in 2017, a co-founder of Ethereum, and Jeremy Wood, a technologist. It is an open-source platform that intent to equip multiple features through layered design. It uses a version of Proof-of-Stake (PoS) known as Ouroboros, which secure the network and address the block production process. It is supervised by three independent separate organizations, which are Cardano Foundation, Emurgo, and IOHK. Cardano Foundation is accountable for administering the development of the protocol. Emurgo assist enterprises and large organizations to adopt the Cardano blockchain. IOHK designed the proof-of-work algorithm to operate the Cardano network. One of the specialities of Cardano is its consensus protocol, which has been developed in-house and known as 0Ouroboros. Cardano's price initially peaked at $1.18 in January 2018, then return to below $0.05 until 2021. It exceeds $1 in 2021, reaching an all-time high of $2.96 in September. In 2025 it exceeds to $3.10.

III. DIVERSIFIED USE CASES

Decentralised Finance (DeFi)

Decentralised finance (DeFi) is a digital ecosystem that enables people to send, purchase, and

[20] Ariel Courage, What is A bitcoin cash and how does it work, 2024, https://www.investopedia.com/terms/b/bitcoin-cash.asp

[21] What is a bitcoin cash, https://www.bitcoin.com/get-started/what-is-bitcoin-cash/

exchange financial assets without leaning on banks, brokerages, or exchanges. DeFi functions autonomously by smart contracts, eliminating intermediaries from the equation and enabling peer-to-peer transactions. DeFi evades the traditional pathways to make financial transactions. It offers regulation and enhanced control over the money and assets can be transferred or purchase in matter of seconds. De-fi platforms propound a range of feature to contribute in market growth, includes the ability to send money globally, firm fund in cryptocurrency wallets. DeFi platform has observed gaining momentum among cryptocurrency, attracting investors from numerous countries. Due to the growth in Web technologies in the country the U.S. decentralised finance market occupied a dominant position in 2024. One eminent example is the European Union's Markets in Crypto Assets (MiCA), offers uniformity and simplicity among members of state. DeFi platform authorise various range of options like staking, yield farming, and synthetic assets. It assists in decision-making, openness in data, risk management, permissionless digital finance including lending, borrowing, trading, generate business opportunities, and other favourable benefits.

Year	NFT Market Value (USD)	No. of NFT Users (Million)	Avg. Revenue per User (USD)	Key insights	Region/Country Insights
2023	6 Billion	3 Million (US)	114.8	95% NFTs have no real value. "The MEG" NFT valued at 91Million USD US revenue: 9Million USD	US leads in NFT sales 70% of US population unaware of NFTs
2024	193.84 Billion	3 Million (US)		Rapid market value increases due to improved blockchain & gaming popularity Celebrity impact (Snoop Dogg, Grimes) wanes	Asia-Pacific holds 43% of the global market share US continue to dominate sales
2025	170.5 Billion (11.01% CAGR Deadline)	~5 Million (est.)		Experts predict slowdown Market faces valuation correction	US remains a key market due to blockchain companies

2026	Declining	10 Million (est.)		Slower growth phase begins Increased awareness globally	Asia-Pacific influence grows
2027		19.31 Million		0.2% of global population using NFTs Steady growth despite slowdown	Asia-Pacific still leading region
2028		35 Million users		Market stabilities Continued expansion in user base despite lower growth rate	Asia-Pacific maintains leadership

Certain key companies in the decentralised finance market include Compound Labs, Inc., Uniswap, Bancor Network, and others. To accumulate a competitive edge in the industry, organisations are engrossed on enhancing the client base. Consequently, major companies are initiating a number of strategic activities including alliances, merger and acquisitions, and other major companies. The major risk in DeFi is that there is no FDIC backing to forfend funds. The global decentralise finance market was estimated at USD 20.48 billion in 2024 and is expected to grow at a CGAR of 53.7% from 2025 to 2030[22].

Non-Fungible Tokens (NFTs)

The term "non-fungible token" (NFT) was developed to refer the digital ownership of assets that can be examined with these tokens. They operate on the blockchain equivalent to standard transactions but they propose people the prospect to record video, ownership of an image, or any other digital blockchain. The creation and management of NFTs on blockchains in the prominent aspect. In a nutshell, an NFT is a short string that is formatted and maintained on a blockchain in compliance with one of the ubiquitous technical standards. Blockchains incipiently developed as systems for representing cryptocurrencies, which is known as the Bitcoin. In general, traditional currency are fungible, means any two of them have the same market or exchange value.

The first NFT sold was "Quantum" in 2014 by Kevin McCoy and Anil Dash on Namecoin, then minted on Ethereum and sold in 2021. Minting is the manner by which the assets data is encrypted and stored on a blockchain to operate NFTs. The fundamental phasis of minting was to create a new block, validated by a validator, and closing the block. The application of NFTs

[22] Decentralised Finance Market Size and Trenhttps://www.grandviewresearch.com/industry-ands. alysis/decentralized-finance-market-report.

to cryptokitties is undoubtedly well-known. In November 2017, cryptokitties are digital cats with distinct identifiers on Ethereum's blockchain[23]. Almost 30% of all projects declined and become inactive. The market had started to rebound by 2024, and 44.5% of NFT holders were suffering losses on their investments[24].

From Cryptocurrencies to CBDCs

Digital or virtual currencies are embraced by cryptography technologies are recognised as cryptocurrencies. They made it feasible to secure internet payments without any third-party intermediaries. Cryptocurrencies are fungible, their values remain steady when they are purchased, sold, or exchanged. Variable-valued non-fungible tokens (NFTs) are not same as cryptocurrency. Modern cryptocurrencies can be often sold or bought cryptocurrency exchanges and are volatile into flat money. Certain cryptocurrencies made an effort to "peg", or link their values to the value of another like US dollar or Bitcoin. The government has affected traders by enforcing a 1%TDS on transactions and a 30%tax on crypto gains. It works on a decentralised blockchain system, in contrary to traditional flat currency issued by central banks such as the RBI.

The Indian Government proposed Crypto Bill 2021 (Cryptocurrency and Regulation of Official Digital Currency Bill, 2021). The bill intended to manage cryptocurrencies in India by granting a Central Bank Digital Currency (CBDC) but prohibiting cryptocurrencies. It develops a legal framework for digital assets, ensures protection and reduces financial risks. The Forum's Digital Currency Governance Consortium White Paper Series asserts that "almost 70% of central banks are now studying the design and issue of CBDC for their economies". In December 2022, the Digital Rupee pilot program was launched.

The RBI and Indian governments took a broad initiative to rejuvenate the financial system, and encourage the use of digital currency rather than cash.[25] Retail digital payments increased from 162 crore transactions in FY13 to over 14,726 crore transactions in FY24 in February 2024 as per the announcement made by RBI governor in March 2024. Users must solve convoluted mathematical puzzles during the mining process, that develops new bitcoin units and adds them to the blockchain. Almost 90% of central banks worldwide were examining CBDCs, as stated

[23] http://guide.cryptokitties.co/guide/getting-started

[24] Saisuman, Market size, industries, demographics and facts, 2025, https://www.coolest-gadgets.com/nft-statistics/#NFT_Trends_2025

[25] Digital rupee: exploring the future of India's Central Bank Digital Currency (CBDC), https://www.ibef.org/blogs/digital-rupee-exploring-the-future-of-india-s-central-bank-digital-currency-cbdc#:~:text=The%20Digital%20Rupee%20pilot%20programme,digital%20currency%20over%20physical%20cash.

by Bank for International Settlements (BIS) reports from 2023, and by 2025, larger economies like China (Digital Yuan), India (Digital Rupee), and European Union (Digital Euro) are predicted to progress further.

AI role in the Financial System

Nowadays, financial institutions use AI to analyze vast datasets, examine market trends, and make predictions about future volatility. Human cognitive limits impede rapid decision-making in big data era, where traditional methods of investment and trading analysis often fall shortly. Ai driven algorithms can work in real-time, give responses to opportunities and changes faster than any human trader. As AI technologies permeate various aspects, ranging from algorithms trading to risk assessment, financial market have seen a profound changes. Machine learning algorithms are essential in recognizing trading trends and irregularities that may escape from the naked eye.

Blockchain technology and artificial intelligence are at nexus of two revolutionary technologies. the unmatched capacity of AI is to evaluate and learn from data sets, which enhances the decentralized feature of blockchain technology. Traditional techniques for detecting fraud are often reactive using historical data to spot irregularities. AI powered systems are proactive in analyzing transactional data in real time. It enhances the integrity of cryptocurrency ecosystems by enabling the identification of questionable activity[26].

IV. CONCLUSION

The significant development in the realm of central banking is the use of artificial intelligence (AI) into monetary policy, foremost in relation to digital currencies. Central banks can assess and handle complex macroeconomics environment with high levels of irregularities and high-dimensional obstacles with by utilizing AI tools like Recurrent Neutral Networks (RNNs) and reinforcement learning (RL). Government around the world are acquiring numerous ways to reinforce regulation of cryptocurrency depicted by bitcoin, due to its flawed technology, low risks, banks risks, and risk for producers. The countries attempting to issue national digital currencies (CBDCs) issued by central banks focusing on decentralization, seems to be the main development trend in future. The introduction of a CBDC could lead to changes in the financial system, similar to the introduction of new forms of private money like stablecoins. Despite the domains of monetary policy and financial stability, the issue of a new digital currency generates

[26] The role of AI in Digital Currency is cryptocurrency the future of money, 2024, https://www.researchgate .net/publication/384967579_THE_ROLE_OF_AI_IN_DIGITAL_CURRENCY_-IS_CRYPTOCURRENCY_THE_FUTURE_OF_MONEY

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broader policy issues that must be addressed appropriately and with citizen participation.

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