

THE RISE OF DECENTRALISED FINANCE: DISRUPTING TRADITIONAL BANKING SYSTEMS

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ABSTRACT

One of the most radical changes in modern financial environment is Decentralised Finance (DeFi). Through the use of the blockchain technology, DeFi enables individuals to access financial services such as loan acquisition, lending, purchasing and selling assets without relying on third parties such as a bank. In the current research article, a thorough analytical review of the advancement of DeFi and its risk to the standard banking system is undertaken through its of literature review and the description of global data and the quantification of the market performance indicators. This paper comes up with the conclusion about the exponential growth of DeFi platforms, their risks, the emerging regulatory trends, and insights into future progress of long-term integrations based on

the numbers of 2020 to 2025. The study also concludes that the DeFi is revolutionizing the financial sector by contributing to the development of transparency, efficiency, and financial inclusiveness but regulatory uncertainty, contract smartness and unintended liquidity are enormous setbacks.

Keywords: *Decentralised finance, blockchain, smart contracts, banking disruption, DeFi risks, financial inclusion, regulation, fintech innovation, stable coins.*

1. Introduction

technological advances blockchain, cryptocurrencies, and smart contracts have radically changed the paradigm of the entire financial ecosystem around the world. Decentralised Finance (DeFi) is one of them that had turned out to be a strong alternative to any banking system. DeFi removes the use of intermediaries and users are now able to conduct the financial transactions directly via the decentralized protocols.

As per the BIS (2025), over 5 million users worldwide, and the market capitalization of tokens and applications that are DeFi was over \$120 billion. The IMF (2024) noted that the IMF has been instrumental in powering up financial innovation by DeFi and highlighted the complex, systemic risks that it brings due to a lax regulatory approach.

The growth of DeFi can be observed due to the growing discontent with the centralized banking system, the rising demand of financial independence and the use of digital currency on the global scale. Nevertheless, the increasing impact of DeFi is a potential opportunity and threat to the stability of the entire world financial system, and it is necessary to carefully study it academically.

2. Objectives of the Study

The key objectives of this research are as follows:

1. To examine the development and maturity trend in DeFi ecosystems (202021).
2. To explore what are the major characteristics, and how DeFi works, to disrupt the traditional banking systems.
3. To assess the advantages and risks due to DeFi use.
4. To analyze the data on DeFi market growth, transaction volume, and user adoption trends.
5. To gauge regulatory and governance issues of the DeFi.

6. To come up with researches on how DeFi can be integrated into international financial systems in a sustainable way.

3. Literature Review

Research on DeFi has grown considerably in recent years, encompassing various aspects such as technological, economic, legal and ethical in dimensions. Some overarching academic works have also been made, and they are summarized below..

Technological Foundations

Scherrer (2021) introduces an initial background to the concept of DeFi as a smart contract-based blockchain interoperability ecosystem. He also points out that programmability of DeFi opens the possibility of a relentless financial application. On the same note, according to Chen et al. (2022), blockchain is an engine of disintermediation since it does not have central repositories of power, but mathematical algorithms.

Werner et al. (2021) discussed the decentralized architecture of DeFi and the notion of “composability) which enables developers to compose many protocols in a way that is analogous to someone building something out of building blocks. This flexibility and scalability brought by this modularity is not present in traditional banking infrastructures.

Economic and Financial Implications

In their study, Aquilina et al. (2025) discovered that DeFi can help eradicate financial democracy and at the same time amplify systemic risk due to liquidity concentration and exposure to leverage. The OECD (2023) pointed out that through the deployment of the DeFi, it was possible to reduce the transaction costs using the system by nearly 70 percent when compared to non-intermediary systems.

Tapscott and Tapscott (2023) argue that because DeFi may potentially fracture the monopoly through the control of the financial infrastructure by the user and the developer. Nevertheless, as Qin et al. (2022) caution, a poor code of smart contracts may be used against users to reduce their trust in them.

Governance and Regulation

Chiu (2023) investigated the regulatory grey areas in DeFi governance, including the absence of a centralized responsibility as an obstacle to enforcement of the law. According to the FATF

(2025), transactions involving pseudonymous DeFi are significant problems to the Anti-Money-Laundering (AML) systems.

According to the Financial Stability Board (FSB, 2024) it should apply the use of a functional based regulatory model instead of targeting the technology itself. This approach could align DeFi operations with existing risk frameworks applicable to banks and fintechs.

Research Gap

Existing studies provide fragmented insights into the technical and regulatory challenges of DeFi. However, there remains a gap in integrating quantitative DeFi data analysis with policy-oriented research. This study bridges that gap by combining literature synthesis with updated market data to analyze the disruptive influence of DeFi on banking systems

4. Conceptual Framework

The conceptual framework of Decentralised Finance (DeFi) explains how technological, financial, and governance components integrate to create a self-operating, trustless financial ecosystem. DeFi restructures traditional banking functions—like lending, borrowing, trading, and saving—through smart contracts that execute transactions automatically on public blockchains.

Unlike centralized banking systems that rely on intermediaries and regulations, DeFi systems are transparent, autonomous, and globally accessible, relying on code, cryptography, and decentralized consensus.

➤ Layers of the DeFi Architecture

DeFi operates through three interconnected layers, each serving a unique role in the ecosystem (Schär, 2021; OECD, 2023):

a. Infrastructure Layer

This foundational layer includes public blockchains (Ethereum, Solana, Binance Smart Chain, Avalanche) that provide security, consensus, and settlement mechanisms.

- Consensus mechanisms like Proof of Stake ensure validation without centralized authorities.
- Layer 2 solutions (e.g., Arbitrum, Polygon) enhance scalability and reduce transaction costs.

This layer forms the technical backbone that enables decentralized applications to function securely and efficiently.

b. Protocol Layer

Smart contracts, which take the place of traditional middlemen, describe the financial logic at the protocol layer

Key protocol types include:

- **Decentralized Exchanges (DEXs):** Through Automated Market Makers (AMMs), Uniswap and Curve can be used for peer-to-peer trade.
- **Lending Platforms:** Thanks to cash pools, Compound and Aave can back up a collateralized loan.
- **Stablecoins:** There is a MakerDAO asset called the CDAI that is tied to fiat currencies. This is also known as price security.
- **Insurance Protocols:** Nexus Mutual is offering covering for failed decentralized smart contracts.

Because these protocols are flexible and composable, they can be used in other protocols, making them look like money Legos. This lets new ideas come up without locking systems down.

c. Application Layer

The user-facing layer is the closest to the user and is made up of decentralized apps (dApps) and wallets (like MetaMask and Trust Wallet). This is where users who aren't very tech-savvy can interact with the system. Aggregators, such as Yearn Finance, look into how to get the best return ratio from different protocols and platforms, such as DeFi Pulse, to check on liquidity and performance. The layer makes consumption and acceptance possible, which makes blockchain easier to use and adopt than it could be now because of its complexity.

➤ Layer Interactions

The three layers interact seamlessly:

1. **Applications** initiate transactions based on user activity.
2. **Protocols** execute the financial logic via smart contracts.

3. **Blockchains** validate and store the transactions immutably.

This is a closed-loop feedback mechanism that automatically and openly bridges the financial intermediation model with a code-based trust model that results in assurance of all the activities being visible, audible, and irreducible on the blockchain.

➤ **Economic and Governance Logic**

The DeFi framework is built on several economic and governance principles:

- **Incentive Alignment:** Users earn rewards through staking, lending, or liquidity provision.
- **Network Effects:** Increased participation deepens liquidity, enhancing efficiency.
- **Decentralized Governance:** Many protocols are managed by DAOs, where token holders vote on policy and upgrades (Chiu, 2023).

These mechanisms ensure that users and developers share both economic incentives and governance responsibilities, promoting long-term sustainability.

➤ **Comparison with Traditional Banking**

Aspect	Traditional Banking	Decentralised Finance (DeFi)
Control	Centralized under institutions	Distributed via blockchain
Trust Model	Based on regulators and contracts	Based on code and consensus
Accessibility	Restricted; requires intermediaries	Open; global participation
Transparency	Limited reporting	Full on-chain visibility
Speed & Cost	Slow, high transaction costs	Fast, low-cost settlements

This contrast highlights how DeFi challenges traditional banking by replacing institutional trust with technological trust, improving efficiency, and expanding access to underserved populations.

Theoretical Implications

DeFi’s conceptual foundation challenges conventional economic assumptions:

- **Disintermediation Theory:** Intermediaries are replaced by autonomous smart contracts.
- **Transaction Cost Theory:** Code automation lowers verification and operational costs.
- **Network Resilience:** The decentralized architecture reduces single-point failure risks.

Hence, DeFi is not just a technological innovation—it represents a new financial paradigm centered on transparency, inclusivity, and user empowerment.

5. Data Analysis: Trends in DeFi Growth (2020–2025)

Growth of DeFi Market Capitalization

Year	Total Value Locked (USD Billion)	Growth Rate (%)	Active Wallets (Million)
2020	10	-	0.5
2021	95	+850%	1.8
2022	68	-28%	2.2
2023	78	+15%	3.1
2024	105	+34%	4.3
2025	120	+14%	5.0

Source: CoinDesk Research (2025), BIS (2025), IMF Global Financial Stability Report (2024).

Analysis:

- DeFi witnessed a compound annual growth rate (CAGR) of 82% between 2020–2025.
- While there was a temporary downturn in 2022 (apparently, following the meltdown of Terra-Luna), DeFi rebounded and has risen steadily due to the use of stablecoins and the Layer-2 scaling solutions.
- The active wallets increase denotes the increase of the use and the involvement of the institutions.

Lending and Exchange Volumes

Total volume of DFi lending, in Aave and Compound, coaxed themselves at six percent, and the call to Uniswap and Curve, each with an average of over 2 billion dollars in a single day, by 2025, passed down to an average of 45 percent.

The statistics is an indication of the increasing trend in the substitution of centralized exchanges and lending institutions with decentralized institutions.

Regional Adoption Trends

- **North America and Europe:** Institutional DeFi adoption via custodial partnerships.
- **Asia-Pacific:** Retail participation and blockchain-based remittances.
- **Africa:** Rising interest in DeFi for financial inclusion and micro-lending (OECD, 2023).

6. Findings and Discussion

As the paper shows, the growing trend of Decentralized Finance (DeFi) is already a big change from the way banks work as we know it. According to blockchain and smart contract technology, DeFi will help a new form of financial intermediation that is open, easy to use, and effective.

➤ Key Findings

1. Exponential Market Growth:

The DeFi business has grown a lot, and its Total Value Locked (TVL) is expected to go over \$100 billion by 2025 (CoinDesk, 2021). This rise shows that both individual

and institutional investors are becoming more confident. It also marks a long-term change away from centralized banking forms and toward decentralized ones.

2. **Decentralized Financial Services:**

protocols like Aave, Compound, and Uniswap have changed the way banks do things like loan, borrowing, and trading so that there are no longer any middlemen. Here's how code-based tools might be able to do simple financial tasks more quickly and clearly.

3. **Financial Inclusion:**

Findings show that DeFi increases access to financial services, especially for people who don't have bank accounts or don't have enough money in their accounts. Due to the fact that it doesn't require permission, anyone with an internet link can take part in DeFi. This will de-mock finance around the world.

4. **Risk and Volatility:**

Even though DeFi has a lot of benefits, it also has some risks, such as smart contract performance, liquidity issues, and legal uncertainty. These kinds of problems can cause huge losses and a loss of investor trust, which is why we need a stronger governance and compliance infrastructure.

5. **Regulatory Gaps:**

This is a very big problem because there is no one in charge of it. The current lack of rules, which has been warned about by international financial authorities like BIS and FATF, can finally leave users open to fraud and system failure.

Discussion

With these changes, it's clear that DeFi will soon tell the rest of the world about new technologies and changes in the economy. It doesn't need a bank because its network is decentralized, and transfers can happen in real time for a low cost. On the other hand, these features are what make DeFi so strong, which means they could be used in bad ways or malfunction.

DeFi works well and is used by many, but standard banks are still the most popular when it comes to safety, rules, and protecting customers. In the future, the growth of finance may rely on how well the systems are put together.

In conclusion, DeFi hasn't hit the stability and size of traditional banking yet, but it is still growing steadily thanks to open regulations and the use of technology. This new wave will change the way money is handled around the world.

7. Policy Implications

Increasing bodies of academic work about Decentralised Finance (DeFi) suggest it may offer new opportunities to global policymakers and financial regulators, as well as encourage challenges. Although DeFi is mostly driven by innovation, transparency, and inclusiveness, it also poses the risks of market volatility, breaches of security and tax evasion. Therefore, the direction of sustainable incorporation of DeFi into the worldwide financial system by governments and international institutions needs to be supported by the notion of balance and vision.

➤ Need for Regulatory Clarity

The main policy issue is that there is no clear legal framework, which regulates the functioning of DeFi. Most DeFi platforms are difficult to regulate as they are usually decentralized, borderless and unlike traditional financial institutions they are highly regulated and monitored. The issue that regulators must target is that of more specific kind of regulation which is that of risks associated with individual means of financial functions (ex: lending, trading, etc.) than the technology itself.

➤ Strengthening Security and Consumer Protection

As the number of smart contract exploits and frauds are on the rise, regulatory bodies must push the DeFi protocols toward security audits, transparency standards, and risk disclosure requirements. When the customer is confident in the security and the stability of the business through some consumer protection measures used in a usual bank, like insurance or compensation policy, user trust will be increased and future stability is enhanced.

➤ Promoting Responsible Innovation

Regulatory sandboxes: Government and financial authorities should promote the use of regulatory sandboxes, which allow for supervised experimentation. These frameworks will make it possible for DeFi startups to come up with responsible new ideas in the areas of anti-money laundering (AML) and counter-counterterrorism funding (CFT).

➤ **Global Coordination and Standardization**

International organizations like the IMF, BIS, FATF, and FSB need to work together more because DeFi is not inside a state line. There will be less regulatory arbitrage when there are international standards in place. This means that the DeFi innovations can be in line with the goals for global financial security.

Integration with Traditional Finance

As an alternative, lawmakers should think about hybrid models. In these models, regulated financial institutions work with DeFi systems by adding digital currencies, blockchain settlements, or tokenized assets. There would be more doubts about how well autonomy works and how stable and accountable the current banking system is.

To sum up, DeFi policy needs to be effective, new, and protective in order to keep users and the whole financial system safe, open the environment, and let new projects stay competitive. Clear rules, international technical standards, and the ability for systems to talk to each other will either make DeFi a reliable part of international banking, or they will break it up into many separate, risky options.

Conclusion

The growth of Decentralized Finance, or DeFi, makes it possible for the way financial systems work to change over time. DeFi has broken the big banks' hold on financial technology by creating blockchain technology, smart contracts, and digital tokens. This has shown that the financial sector is ready to provide services without the need for middlemen.

The summary of the data shows that DeFi is fairly open, useful, and engaging, and that it can enable its users to lend, borrow, and trade directly with each other without involving banks or payment processors. Its open source and permissionless nature has also helped improve financial inclusion. People who live in areas with few banks can now reach financial markets all over the world.

However, the paper also mentions the alarming rate of the growth of DeFi. The vulnerabilities of smart contracts, market manipulation, and regulatory uncertainty are the threats to the topology. And because there aren't any standard ways to police and limit people to a state of formal adoption, there is also the chance of abuse.

Even though these problems are required, the innovation at the heart of DeFi can't be ignored. Since governments and lawmakers are starting to set up clear compliance systems, DeFi can stop being a disruptive alternative and start functioning as an important part of existing financial systems. The best option would be to set up hybrid systems in which normal banks start using blockchain frameworks while still being protected by regulations.

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