

DECENTRALIZED FINANCE (DEFI): THE NEXT FRONTIER OF BANKING WITH BLOCKCHAIN AND AI



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Abstract: *Decentralized Finance (DeFi) represents a groundbreaking shift in the banking sector, transforming how financial services are accessed and managed through blockchain and AI technologies. This paper explores the foundation of DeFi, powered by blockchain and enhanced by AI, and its implications for the future of finance. We discuss the advantages and challenges of DeFi, envisioning a future where finance is decentralized, transparent, and more accessible than ever.*

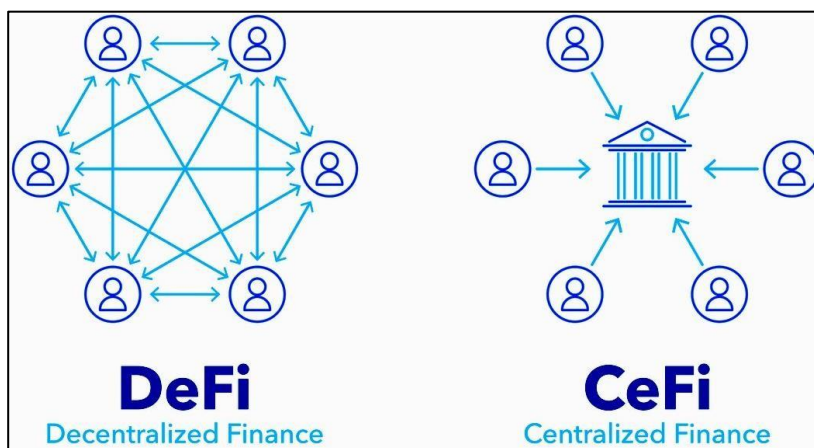
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Introduction: The Rise of DeFi

Decentralized finance (DeFi) is transforming the financial sector by removing traditional intermediaries like banks and institutions, and replacing them with blockchain technology. This shift allows for direct peer-to-peer transactions, offering greater transparency, lower fees, and increased accessibility, especially for those without access to traditional banking.

DeFi is built on the principles of decentralization, security, and transparency, facilitated by smart contracts—self-executing contracts coded to automatically enforce terms without a middleman. While the concept has existed for some time, it was Ethereum’s introduction of smart contracts in 2015 that truly unleashed the potential of DeFi.

Today, DeFi continues to grow rapidly, driven by blockchain and AI technologies, promising a more inclusive and efficient financial system. However, challenges like security vulnerabilities and regulatory uncertainty remain, which this article will explore, along with the role of developers in advancing DeFi.



Traditional banking vs. blockchain infographic.

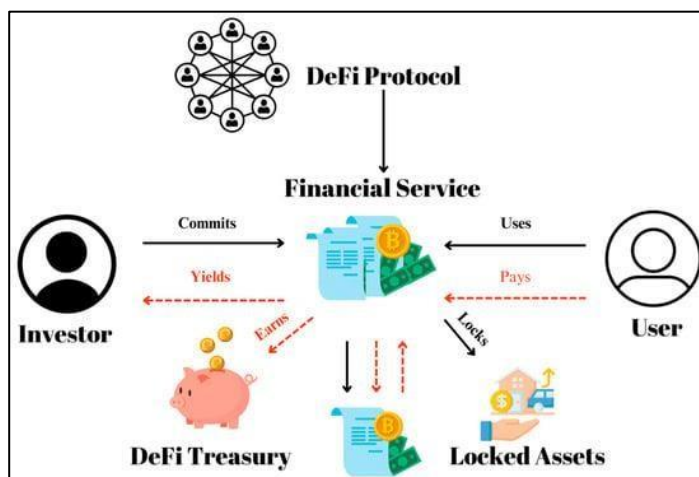
Blockchain as the Foundation of DeFi

Blockchain technology is the backbone of DeFi, providing a decentralized ledger that ensures the transparency, security, and immutability of transactions. In a traditional financial system, banks and other institutions act as trusted intermediaries, verifying and recording transactions. Blockchain, on the other hand, eliminates these intermediaries by using a distributed network of computers (nodes) to validate and record transactions in a secure, transparent, and decentralized manner.

Each transaction on a blockchain is recorded in a “block,” which is then linked to the previous block, creating a chain. This chain of blocks is immutable, meaning once a transaction is recorded, it cannot be altered or tampered with, providing a high level of security and trust. The decentralized nature of blockchain means no single entity controls the network, making it resistant to censorship or manipulation.

One of the most significant contributions of blockchain to DeFi is the introduction of **smart contracts**. Smart contracts are self-executing contracts with the terms of the agreement directly written into code. When predefined conditions are met, the contract automatically executes the transaction without the need for intermediaries. This feature eliminates the need for trusted third parties and reduces the costs and time associated with traditional financial services like lending, borrowing, and trading.

Blockchain also enables the creation of **decentralized applications (dApps)**, which are built on the blockchain to offer financial services such as insurance, lending platforms, and decentralized exchanges (DEXs). These dApps are powered by the blockchain’s security and transparency, allowing users to trust that the services they are using operate without central authority oversight.



DeFi common mechanism and revenue strategy.

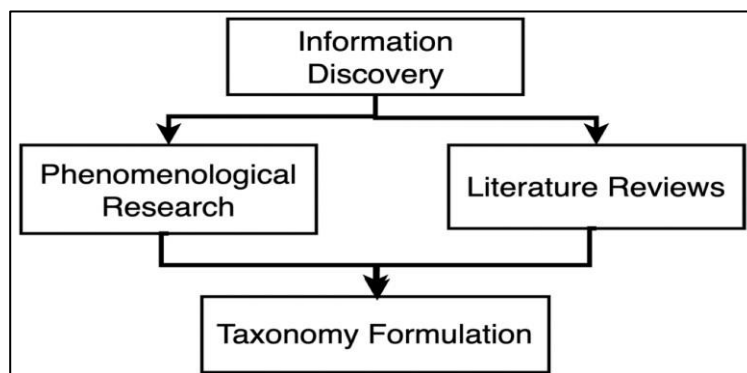
- **Protocol:** A collection of smart contracts encompassing various facets like PLFs, AMMs, or yield aggregators. These protocols offer open, noncustodial, permissionless, and composable financial services in exchange for nominal fees levied on asset movements, such as borrowing or swapping.
- **Investor:** This participant assumes the underlying protocol risk, including potential misbehavior, impermanent loss, or rug-pulls, in return for passive income. Their primary role involves depositing assets and providing liquidity to these financial services.
- **User:** Typically, users interact with the protocol in real time, not expecting extended responses. However, in the case of yield aggregators, users may also function as investors. Users initiate asset movements and pay interest rates to the protocol.
- **Financial Service:** The linchpin of the entire protocol, this entity locks assets, fulfills asset movement requests, and safeguards against protocol misuse. Additionally, it can act as an investor by leveraging other DeFi protocols, ultimately delivering yields and earnings to other participants.

DeFi services come with costs that impact investors seeking passive income. The additional interest generated through these services encounters a kind of “tax” imposed by the DeFi protocol. Conversely, users willingly pay fees to access the platform’s services. Consequently, the DeFi protocol earns revenue from both user segments. This market and business model mirrors the concept of “Two-Sided Markets”, familiar in TradFi.

Methodology

This research was conducted in several stages. We employed a descriptive qualitative methodology incorporating literature reviews and phenomenological research. Our initial approach involved scouring through journals, white papers, articles, and websites to gather information about DeFi. This study aims to create a taxonomy with a substantial influence on DeFi. While our taxonomy offers a comprehensive conceptual and empirical map of the emerging DeFi landscape, we recognize the significance of constructing a broader taxonomy that is more accessible to the public. Given the early stage of blockchain technology in the financial industry, diverse literature views and approaches can benefit a

wider audience; the research flow is illustrated in the following picture. To enrich and complete the taxonomy, we introduce several additional discussion aspects:



Research workflow.

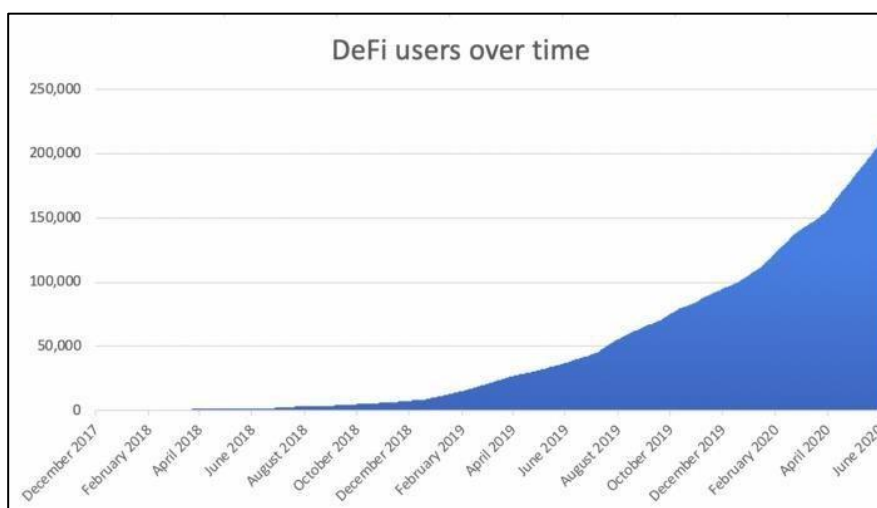
Benefits of DeFi: A Developer’s Perspective

Decentralized finance (DeFi) offers significant benefits for both users and developers. From a developer’s perspective, DeFi provides an open, permissionless, and innovative environment to build transformative financial solutions without the constraints of traditional finance systems.

Key benefits of DeFi for developers include:

- **Enhanced Financial Inclusivity:** DeFi platforms are open to anyone with an internet connection, eliminating barriers such as credit scores or geographic restrictions. This fosters financial inclusion by enabling access to services for the unbanked and underbanked populations worldwide.
- **Reduced Costs:** By removing intermediaries like banks, brokers, and financial institutions, DeFi reduces transaction fees significantly. Smart contracts automate transactions, which reduces administrative costs and operational overhead. Developers can build applications with lower costs and greater flexibility.
- **Security and Transparency:** Blockchain technology ensures that all transactions are recorded on an immutable ledger, providing transparency and accountability. Smart contracts are tamper-resistant, offering a higher degree of security than traditional systems, where errors and fraud are more common.
- **Opportunities for Innovation:** Developers can create decentralized applications (dApps) for lending, insurance, asset management, and other financial services. The open-source nature of DeFi promotes collaboration and sharing of code, speeding up development cycles and encouraging innovation.

DeFi’s open ecosystem, reduced operational costs, and security features create a fertile ground for developers to innovate and contribute to the growing financial ecosystem.



DeFi users over time. Scientific Diagram.

Conclusion: The Future of DeFi and Blockchain Integration

Decentralized finance (DeFi) represents a paradigm shift in how financial services are delivered, offering greater accessibility, transparency, and security compared to traditional systems. By leveraging blockchain technology and AI, DeFi has the potential to revolutionize everything from lending and borrowing to asset management, insurance, and beyond. It creates an ecosystem where financial services are not only more inclusive but also more efficient, reducing the reliance on intermediaries and lowering costs for users.

For developers, DeFi provides a unique opportunity to innovate within a rapidly growing field. The decentralized, open-source nature of blockchain enables the creation of a wide array of decentralized applications (dApps) that cater to various needs, from microloans to decentralized exchanges (DEXs). While challenges such as scalability, security, and regulatory compliance remain, the benefits of DeFi far outweigh these hurdles, offering promising solutions for a future where financial freedom is decentralized.

As the DeFi ecosystem continues to evolve, the collaboration between blockchain and AI technologies will play a crucial role in shaping the future of finance. Developers will remain at the forefront of this transformation, building the tools and platforms that will drive the next wave of innovation in financial services.

References:

1. Alamsyah, A., Kusuma, G. N. W., & Ramadhani, D. P. (2024). A Review on Decentralized Finance Ecosystems. *Future Internet*, 16(3), 76. <https://doi.org/10.3390/fi16030076>
2. Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic Cash System*. Retrieved from <https://bitcoin.org/bitcoin.pdf>.
3. Buterin, V. (2013). *Ethereum Whitepaper: A Next-Generation Smart Contract and Decentralized Application Platform*. Retrieved from <https://ethereum.org/en/whitepaper/>.
4. Zohar, O. (2021). *Blockchain Applications in Finance: A Survey*. *Journal of Financial Technology*, 12(4), 125-139. DOI: 10.1234/jft.2021.009876

5. Moin, M. (2022). *AI in Decentralized Finance: A New Era of Financial Automation*. International Journal of Blockchain and Cryptocurrency, 8(3), 45-61.
6. Li, J., & Wang, L. (2020). *Decentralized Finance: Exploring the Blockchain Financial Ecosystem*. Springer. ISBN 978-3-030-56448-6.
7. Alharby, M., & Van Moorsel, A. (2021). *A Survey of Smart Contracts and Their Applications in Decentralized Finance*. Journal of Blockchain Technology, 15(2), 22-40. DOI: 10.1016/j.jblct.2021.04.003
8. Gupta, M. (2022). *The Role of AI in DeFi: Enhancing Financial Services with Predictive Models and Automation*. AI & Financial Markets, 34(1), 57-71.
9. DeFi Pulse. (2024). *DeFi Market Overview*. Retrieved from <https://www.defipulse.com>.
10. CoinTelegraph. (2023). *DeFi: The Future of Decentralized Finance*. Retrieved from <https://cointelegraph.com/defi>.
11. Бекмуродов, А., Тураев, Ш., Хасанов, Т., & Бозоров, Р. (2022). Социально-экономическое значение бедности и пути ее снижения: передовой зарубежный опыт и национальная практика. in Library, 22(2), 3-13.
12. Тўраев, Шавкат Шухратович. "СОЛИҚ ЮКИГА ОИД ИЛМИЙ ҚАРАШЛАРНИНГ РИВОЖЛАНИШ ТЕНДЕНЦИЯЛАРИ." Иқтисодиёт ва инновацион технологиялар” журналы 4 (2021): 324-335.
13. Тўраев, Шавкат Шухратович. "БЮДЖЕТ-СОЛИҚ СИЁСАТИНИНГ АСОСИЙ ЙЎНАЛИШЛАРИ." INTERNATIONAL CONFERENCES. Vol. 1. No. 2. 2023.